

Faculty Council Meeting Meeting Minutes Monday, November 19, 2018 4:00-5:30PM – BRB 105

4:00PM	Welcome and Chair's Comments	Sudha Chakrapani	
4:02PM	Approval of Minutes from October 15, 2018 meeting (see attached)	Sudha Chakrapani	
4:05PM	Steering Committee Activities Report	Sudha Chakrapani	
4:06PM	Presentation on the Amendment to the UH Affiliation Agreement	Pam Davis	
4:25PM	Presentation on BME	Gene Barnett	
4:35PM	Proposal on Experimental Biotechnology Track	Martin Snider	
4:45PM	Review of Robert's Rules of Order	Nicole Deming	
4:55PM	Bylaws Presentation	Darin Croft	
5:20PM	Discussion of Faculty–Proposed Amendments in Bylaws Article 3	Danny Manor	
5:30PM	Report on Faculty Senate Activities	Danny Manor	
5:35PM	New Business		
	Adjourn		

Members Present

Corinne Bazella	Judith French	Vincent Monnier
Tracey Bonfield	Monica Gerrek	Nimitt Patel
Robert Bonomo	Sherine Ghafoori	P. Ramakrishnan
David Buchner	Beata Jastrzebska	Ben Roitberg
Cathleen Carlin	Hung-Ying Kao	Satya Sahoo
Sudha Chakrapani	Stathis Karathanasis	Scott Simpson
Shu Chen	David Katz	Phoebe Stewart
Gary Clark	Varun Kshettry	Charles Sturgis

Members Present

<u>(continued)</u>		
Travis Cleland	Cynthia Kubu	James Howard Swain
Brian D'Anza	Charles Malemud	Carlos Trombetta
Pamela Davis	Danny Manor	Anna Valujskikh
Piet de Boer	Jennifer McBride	Richard Zigmond
William Dupps Maureen McEnery		
Members Absent		
Philipp Dines	Maria Cecilia Lansang	Jochen Son-Hing
Jennifer Dorth	Vicki Noble	Daniel Sweeney
Zachary Grimmett	Clifford Packer	Patricia Thomas
Mahmoud Ghannoum	Hilary Petersen	Melissa Times
Laura Kreiner	Aparna Roy	Michael Wolfe
Suet Kam Lam	Barbara Snyder	
Others Present		
Nicole Deming	Joyce Helton	Supriya Goyal

Chair Announcements (Sudha Chakrapani)

Sudha Chakrapani, Chair of Faculty Council, called the meeting to order at 4:00PM and briefly outlined the agenda items that would be addressed at the meeting. She noted that at the last Faculty Council meeting discussion took place to determine a plan to move forward with the letter to UH leadership. As a follow-up, Sudha Chakrapani requested Dean Davis present to the Faculty Council on the amendment to the UH affiliation, which is on the agenda today.

Approval of Minutes from October 15 Meeting

A motion was made and seconded to approve the meeting minutes from the October 15 Faculty Council meeting as presented. When the members were solicited, no edits or corrections were suggested. There being no further discussion a vote was taken. 28 were in favor, 1 was opposed, and 4 abstained. The motion passes.

Steering Committee Activities Report (Sudha Chakrapani)

The Faculty Council Steering Committee met on November 5, 2018. It was noted that Dean Davis would be speaking at the next Faculty Council meeting on the amendment to the UH affiliation agreement. The committee reviewed the Bylaws presentation from Darin Croft, the draft presentation from Martin Snider on the Experimental Biotechnology Track, and advised the Dean on a Department Chair and several Emeritus appointments.

Presentation on the Amendment to the UH Affiliation Agreement (Dean Pamela Davis)

Dean Davis welcomed the opportunity to speak about the MOU and address concerns on the part of faculty about institutional commitments to UH and the SOM in the UH clinical departments

revised affiliation agreements. All faculty should have received an email on October 16 announcing the MOU and outlining the steps that are being taken to further support biomedical research in the two institutions and lay out a better path of affiliation and teamwork. It releases the SOM from a number of financial obligations e.g. the obligation to pay all cost of research in UH clinical departments.

From the time the MOU was initially signed until July 2018, CWRU paid for all of the unfunded faculty currently in UH clinical departments who are 100% CWRU employed. Now the two institutions have agreed to jointly support PhD research investigators with appointments in clinical departments of UH. This support will total \$2 million for PhDs and the amount will be escalated for inflation each year, be retroactive to July 1, 2018, and budgeted by the SOM for this fiscal year. This represents 2/3 of unfunded PhD salaries.

Additionally, CWRU and UH have agreed to share support of physician scientists. Specifically UH is to provide research merit pay up to \$3 million for each year for faculty currently on the roster and duly employed, and who have not received CWRU compensation beyond that coming from their grants. Terms of research merit pay will be released as soon as available.

There have been other modifications in the MOU. The SOM and UH have agreed to work together and establish a framework to jointly coordinate recruitment efforts for research faculty (scientist and physician-scientist) in the SOM's academic clinical departments based at UH CMC. Current advisory council faculty based at UH and the SOM will act as a forum to explore mutual opportunities including research activities and then make recommendations to CWRU and UH leadership. This is a very positive step forward, and as a result of the recent agreement, we fully expect additional collaborations and partnerships to result, which will advance future research efforts.

The question was asked if the Dean could be more specific as to what that means for a PhD who is basically fully employed by UH but received tenure -- what will that tenure document say as to what the commitment of the university is? PhDs fully employed by UH, while not many, have been hired since the new affiliation agreement. There is a side letter dealing with the tenure commitment made by UH in terms of salary support.

The notice for termination is 18 months. The agreement is a two year agreement with automatic one year renewals.

Presentation on New BME Department-CCLCM (Gene Barnett)

Gene Barnett explained that a proposal has been submitted to create the Basic Sciences Academic Department of Biomedical Engineering (BME) at CCLCM of Case Western Reserve University. When CCLCM was created, Biomedical Engineering was originally placed within the Department of Molecular Medicine. The Academic Chair of this new CCLCM Biomedical Engineering Department would be D. Geoffrey Vince, PhD., the same person who is the Clinical Chair of Biomedical Engineering in the Lerner Research Institute at Cleveland Clinic.

There are 45 Researchers and 26 with joint appointments in the Biomedical Engineering Department who teach under-grads, medical students, residents, and fellows from CCLCM,

CWRU, other institutions and foreign institutions. This proposal comes at the request of Dean Pamela Davis with the full support of Dean James Young, is significantly robust and warrants being recognized, and offers SOM department alignment with other institutions.

An analysis of the effect of establishment of the second department on existing departments of the School of Medicine indicates that it would parallel the existence of such academic departments at other CWRU School of Medicine teaching hospitals but would have no adverse impact on them, is the preferred alignment, and allows for better showcasing of unique accomplishments.

Research publications authored by faculty with appointment in the new department will make note of the CWRU faculty appointment. All CCLCM research will continue to note CWRU appointment and the new department will better reflect the academic diversity of CCLCM of CWRU. A 5-year business plan should affirm that the new department will not require funding from the SOM and will have no financial impact on CWRU and/or SOM. It is already spurring excitement and great interest. The increased visibility of new CCLCM department may spur further pursuits and encourage engagement at HEC.

The movement to enhance the opportunities for our students in biomedical engineering has been a long time coming. With this new department, we will be able to offer our students a much broader range of opportunities, combine research funding, and put our Department of Biomedical Engineering in the top ranks of biomedical engineering.

The vote results will be shown in percentages from this point on. Votes were confirmed and a quorum was present.

A motion was made and seconded to approve the proposal to create a new academic department of Biomedical Engineering, CCLCM. There being no further discussion, a vote was taken. 31 were in favor, 2 were opposed, and 1 abstained. The motion passes.

Today's quorum is 26.

<u>Proposal on Experimental Biotechnology Track in MS Biochemistry Program (Martin Snider)</u>

The Department of Biochemistry is in the process of expanding their master's program with the goal for that program to better prepare their master's students most destined to stay in research tracks for employment and PhD education. To prepare their students for employment opportunities in biotech, they plan to add a biotechnology track to the MS program to educate students in these areas. The track requires four new courses: BIOC 500, 501, 502, and 511. BIOC 500-502 form a course sequence that will introduce students to common techniques used in biochemistry labs and give them hands on experience and training.

Two other courses, BIOC 501 is a didactic class that presents experimental design, covers the principles behind common experimental techniques, and covers the principals of designing experiments, record keeping, and data analysis. BIOC 511 presents information about the

organization and practices in biotechnology research, product development and the biotech and pharmaceutical industry.

All four of these courses have been approved. 500, 501 and 511 are being offered for the first time in the fall 2018 semester with enrollments of 9, 16 and 9 respectively.

Biochemistry Department faculty members undertook a "listening tour" among biotech organizations in Cleveland. The course was used in spring as a tool to recruit new students and was an aid in getting students signed up. We feel that we will be able to meet targets and cover startup costs without too much difficulty. The investment required to get the lab courses started has been endorsed by Dean Matthew Lester and Dean Pamela Davis.

This is not a master's program. Several others that include biotechnology are focused more on entrepreneurship and relatively light on courses that prepare people for work in the biotech sector. There are some other courses that sound similar but have not been offered for several years. On paper, there is overlap, but it is relatively small.

If there are not enough biotech companies in Cleveland for internships, we will certainly offer the opportunity to work outside of Cleveland. Some of those internships will be involved in working in university laboratories. There is a lot of interest from local industry in taking up our graduates. One of the local companies plans to hire 150 new employees and is very interested in our people because they get to test drive an internship.

A motion was made and seconded to approve the proposal to create an Experimental Biotechnology Track in the Biochemistry MS (Plan B) Program. Since there was no further discussion on this topic, a vote was taken. 31 were in favor, 1 was opposed, and 1 abstained. The motion passes.

Review of Robert's Rules of Order (Nicole Deming)

Sudha Chakrapani explained that the Faculty Council Steering Committee received an argument from the Bylaws Committee that the motion to table or postpone is an action that must be taken relative to a motion that is on the floor. Darin Croft stated he had not been recognized as having the floor and had made no motion.

The FCSC considered this argument and recognized it was a procedure of error; no point of order was raised on the floor. To move forward by striking a middle ground, FCSC decided to move forward with the bylaws amendment and they voted to bring Article 3 back for discussion.

To facilitate this process, Nicole Deming was asked to provide a brief overview of Robert's Rules of Order.

The Faculty Council Chair has the responsibility to ensure that each side is allowed to give their opinion. Faculty Council representatives must make their statements to the Chair rather than to each other. The rights of all members are to be respected. While every member is provided an opportunity to voice their opinion, it is the majority that gets to act. The Chair decides all

questions of order. After the Chair makes a motion, a member of Faculty Council can appeal. Faculty Council gets to decide these actions.

After the Chair makes a ruling, if a member is not in agreement, the chair's decision can be appealed and seconded. It then goes to Faculty Council for a vote. For an order from the floor to happen, it must be made at the time of the ruling. If any other business has intervened, the opportunity is lost.

To make a motion, the representative raises a hand and waits to be recognized by the Chair. The motion then has to be seconded. The Chair has to state the motion. If another motion is on the table or if the motion is unclear they can clarify the motion. Once the motion is repeated, the Chair opens the floor for discussion. Everyone must have the opportunity to be recognized once before someone is recognized twice. If there is a subsidiary motion on the table to amend the motion, the motion to amend must be considered before the main motion may be voted on. Nicole Deming has a chart that she will send to Faculty Council to ensure the rules are known to all members.

If we have a dissenting opinion to one of the proposed changes/paragraphs in the bylaws, if there is a motion to consider, or after a motion is presented, a motion may be made to reject the amendment. There can be discussion on the main motion, but if the majority reject it, then it's done.

If there is a motion, and it is seconded, and this happens before the Chair calls the question, and states the question before opening up for debate, the original person who made the motion, or someone in the membership, can ask for it to be rephrased. This has to occur before the question is stated. If stated, then there must be a motion to amend.

Members can vote to postpone to a certain time or to amend. Debate can be ended, and a motion made to vote immediately. You cannot interrupt the speaker but have to recognized by the Chair. It does need to be seconded, is not debatable, but need 2/3 vote to end debate.

Members have the opportunity to end the debate if they have the overwhelming support of their colleagues. The decision made last meeting did not follow Robert's Rules of Order, but a majority approved the motion and the matter was not objected to promptly. In terms of parliamentary procedure, and strict adherence, the time to object on the motion is past and the motion stands.

FCSC tried to create a compromise by highlighting those proposed amendments to Article 3 that did not overlap with the ad hoc committee's charge.

What happens here today will determine the agenda that FCSC will approve at its December meeting. When the Faculty Council voted to create the Ad Hoc Committee to review Faculty Council Membership, one of the obligations was to report in December, per their charge, on what it has been doing. Dr. Kubu said they would meet this deadline.

Bylaws Presentation (Darin Croft)

The Bylaws Committee have been doing the 5-year review for the last year. An amendment of the bylaws may be proposed by majority vote of the Faculty Council, by the dean, or by written petition of 20 or more faculty members. Ultimately, it goes before the entire faculty to become part of the bylaws.

Proposed changes under discussion include some substantive issues that engender SOM debate and discussion, cross references, and trivial changes e.g. grammatical areas. There was no more than one major change in any section.

Discussion of Faculty-Proposed Amendments in Bylaws Article 3 (Darin Croft)

3.1 – major substantive change that Faculty Council shall serve as the SOM Executive Committee of the faculty of medicine...corrected the name for the Committee on Students.

What is the Faculty Council Steering Committee responsible for? As stated in the handbook, the Executive Committee is composed of those people directly elected by their department. The Steering Committee is elected from this body and not from the entire faculty.

The Faculty Council itself voted to make itself the Executive Committee of the faculty of medicine.

A motion was made and seconded to approve the amendments to 3.1 through 3a. There being no further discussion a vote was taken. 24 were in favor, 4 were opposed, and 4 abstained. The motion passes.

3.2a and 3.2b – Spelling out DGMS departmental status ...to facilitate communication between standing committees and the Faculty Council....keep standing committees to be in communication with Faculty Council. A motion was made and seconded to accept all of these changes 3.2a and 3.2b. There being no further discussion, a vote was taken. 30 were in favor, 3 were opposed, and 2 abstained. The motion passes.

Clarification was asked for DGMS - it already had departmental status later in the bylaws, signposting for language that was already there. DGMS was given departmental status in 1986. It is a very special type of entity.

3.3 – Election of members of Faculty Council – enumerate types of representatives - hope this will be the template for any changes of representation to come out of the ad hoc committee.

3. The point of order is stating that the October vote stands, it was not the same motion.

A motion was made and seconded to approve the motion to postpone discussion of 3.3 a-d until after the Ad Hoc Committee on Faculty Representation presents its report in December 2018. There being no further discussion, a vote was taken. 16 were in favor, 16 were opposed, and 0 abstained. The subsidiary motion does not pass.

Any bylaws proposed by this body go to the Bylaws Committee for their recommendation, then back to Faculty Council. It would probably take 2-3 months for this to happen. The Bylaws require that if an amendment is sent to Faculty Council prior to April 1 it must be voted on before June of the academic year.

A motion was made and seconded to approve the amendments to 3.3 preamble – subsidiary to divide the vote to first vote on the preamble section – seconded. Do you approve the motion to divide the question? There being no further discussion, a vote was taken. 16 were in favor, 11 were opposed, and 2 abstained. The motion passes.

A motion was made and seconded to approve the amendment to 3.3 preamble. There being no further discussion a vote was taken. 24 were in favor, 3 were opposed, and 0 abstained. The motion passes.

A motion was made and seconded to approve the amendment to 3.3 a-d. There being no further discussion a vote was taken. 17 were in favor, 13were opposed, and 0 abstained. The motion passes.

The Chair announced that the hour for adjournment has arrived. The meeting was adjourned at 5.38 PM

Respectfully submitted,

Joyce Helton

Meeting of the School of Medicine Faculty Council

November 19, 2018 BRB 105 4:00 p.m.

Sudha Chakrapani, PhD, (Physiology and Biophysics), Chair Phoebe Stewart, PhD (Pharmacology), Past-Chair Nicole Deming, JD, MA, Assistant Dean For Faculty Affairs and Human Resources Secretary of Faculty of Medicine



Faculty Council Meeting Agenda

- 4.00 PM Chair Announcements
- 4.02 PM Approval of Minutes from October 15th, 2018 meeting.
- 4.05 PM Steering Committee Activities Report (Sudha Chakrapani)
- 4.05 PM Presentation on the amendment to the UH affiliation agreement (Dean Pam Davis)
- 4.25 PM Presentation on new BME department-CCLCM (Gene Barnett)
- 4.35 PM Proposal on Experimental Biotechnology Track (Martin Snider)
- 4.45 PM Review of Robert's Rule of Order (Nicole Deming)
- 4.50 PM Amendments Discussion from the Bylaws Committee (Darin Croft).
- 5.20 PM Discussion regarding Faculty-proposed amendments in Bylaws Article 3 (Danny Manor).
- 5.30 PM Report on Faculty Senate activities (Danny Manor)
- New Business
- Adjourn



Steering Committee Activities Report Meeting Date: November 5th, 2018

Members Present: Sudha Chakrapani (Chair), Phoebe Stewart (Past-Chair), Shu Chen, Cynthia Kubu, Danny Manor, and Vincent Monnier

- Reviewed the Bylaws amendment presentation from Darin Croft.
- Reviewed draft presentation from Martin Snider on Experimental Biotechnology Track.
- Advised the Dean on Department Chair appointment.
- Provided advice to the Dean on Emeritus appointments.



Presentation on the amendment to the UH affiliation agreement (Dean Pam Davis)



Affiliation Advisory Council

Pamela Davis – Division of General Medical Sciences (SOM) Dan Simon – Medicine (UH)

Mark Chance – Nutrition (SOM) Fabio Cominelli – Medicine (UH) Mitch Drumm – Pediatrics (UH) Ben Gaston – Pediatrics (UH) Stan Gerson – Medicine (UH) Mahmoud Ghannoum - Dermatology (UH) Vikas Gulani – Radiology (UH) Jonathan Haines – Population and Quantitative Health Sciences (SOM) Cliff Harding – Pathology (SOM) Alex Huang – Pediatrics (UH) Mukesh Jain – Medicine (UH) Mike Konstan – Pediatrics (UH) Grace McComsey – Pediatrics (UH) Theodoros Teknos – Otolaryngology (UH)

New Department application BME-CCLCM (Gene Barnett)



Biomedical Engineering

CCLCM Proposal for Secondary Department November 19, 2018



Biomedical Engineering

- Originally placed within the Department of Molecular Medicine when CCLCM began
- D. Geoffrey Vince, PhD –Academic Chair



1. The breadth and depth of the identified faculty's teaching and research productivity

Biomedical Engineering

- 45 Researchers & 26 with joint appointments
- Teach under-grads, medicals students, residents, and fellows from CCLCM, CWRU, other institutions, and foreign institutions

2. Any additional factors that are relevant to the proposed new department

- New alliance supported by BME in both Engineering and SOM at CWRU
- Significantly robust and warrants being recognized

3. An analysis of the effect of establishment of the second department on existing departments of the School of Medicine

- No adverse effect
- Preferred alignment that is supported by BME in both Engineering and SOM
- Allows for better showcasing of unique accomplishments

4. A statement that research publications authored by faculty with appointment in the new department will make note of the CWRU faculty appointment

- All CCLCM research will *continue* to note CWRU appointment
- New department will better reflect the academic diversity of CCLCM of CWRU

5. A five-year business plan should affirm that the new department will not require funding from the School of Medicine

- Will have no financial impact on SOM or CWRU
- This new collaboration is already spurring excitement and great interest
- Encourage engagement at HEC and between CCF and CWRU

Key Takeaways

- Collaboration between CCF and CWRU
- Increased visibility and attribution of accomplishments
- No financial impact
- Improved engagement at HEC and between CCF and CWRU



Cleveland Clinic

Every life deserves world class care.

Proposal on Experimental Biotechnology Track in MS Biochemistry program (Martin Snider)



Motion to lay on the table Article 3 amendment discussion until after Ad Hoc Committee on Faculty Representation presents its recommendation

<u>Communication from Darin Croft</u>: In reflecting more on what happened yesterday in Faculty Council, I am of the opinion that the motion to table Article 3 was our of order.

First, a motion to table (or postpone; see below) is an action that must be taken relative to a motion that is on the floor. I had not been recognized as having the floor and had made no motion. Simply having the proposed changes to Article 3 on the agenda does not constitute having a motion on the floor. Therefore, there was no motion that could be tabled, and there is no such thing as a preemptory motion to table. A motion to table could only have been proposed after I had been recognized as having the floor and had proposed a motion - i.e., by reading the text of the proposed changes to the FC.

Second, even if the above procedures had been followed correctly, the changes to Article 3 were not being proposed as a single motion but rather a series of motions (seven to be exact), each of which was to be voted upon by the FC. Therefore, tabling all of Article 3 would require a series of motions to table rather than just one.

Finally, although the motion was stated as a motion to table (lay on the table), it was not, in point of fact, a motion to table. Rather, it was a motion to postpone consideration. As noted <u>in this table</u>, such a motion IS debatable (unlike a motion to lay on the table). Since it was not debated before being voted on, the motion was out of order.



<u>Communication from the Steering Committee:</u> The Steering Committee discussed the argument that the motion to table Article 3 was out of order. It recognizes the procedural error, it however notes that no "point-of-order" was raised on the floor and the argument was presented the following day. The Committee also considered that an overwhelming majority of FC members voted to table the discussion (24-3-1). To strike a middle ground and move forward with the Bylaws amendments, the SC voted to bring Article 3 back for discussion.



Review of Robert's Rule of Order (Nicole Deming)



Robert's Rules of Order

Brief review

Faculty Council Chair

- To protect the assembly from obviously dilatory motions by refusing to recognize them (§ 39).
- To enforce the rules relating to debate and those relating to order and decorum within the assembly (§ 43).
- To expedite business in every way compatible with the rights of members.
- To decide all questions of order (§ 23), subject to appeal (§ 24)--unless, when in

Incorrect process...make a Point of Order

- <u>Listing of Individual Incidental Motions</u> (page 70).
- Although the presiding officer has the responsibility of enforcing the rules, any member who believes he has noticed a case where the chair is failing to do so can, at the time the breach occurs, call attention to it by making a *Point of Order* (§ 23); the effect is to require the chair to make a ruling on the question involved;

<u>Timeliness Requirement for a</u> <u>Point of Order</u>

If a question of order is to be raised, it must be raised promptly at the time the breach occurs...Points of order regarding the conduct of a vote must be raised immediately following the announcement of the voting results (see pp.408-9). The only exceptions to the rule that a point of order must be made at the time of the breach arise in connection with breaches that are of a continuing nature, in which case a point of order can be made at any time during the continuance of the breach

§ 24. Appeal.

- By electing a presiding officer, the assembly delegates to [her] the authority and duty to make necessary rulings on questions of parliamentary law. But any two members have the right to *Appeal* from [her] decision on such a question. By one member making (or "taking") the appeal and another seconding it, the question is taken from the chair and vested in the assembly for final decision. <u>Members have no right to criticize a ruling of the chair unless they appeal from [her] decision.
 </u>
- An appeal...Is in order when another has the floor, but the appeal must be made at the time of the ruling. <u>If any debate or business has intervened, it is too late to appeal.</u>

Making a Motion

- 1. A member makes a motion (I move to...)
- 2. Another member *seconds* the motion (I second it.)
- 3. The Chair *states the question*. Chair states the question unless it is out of order or the wording is unclear.
- 4. Members then *debate* the motion.
- 5. The Chair *puts the question* to a vote. (Is there any further debate?)
- 6 The Chair announces the results of the vote

Fundamental Principle of Parliamentary Law

Only one question can be considered at a time; once a motion is before the assembly, it must be adopted or rejected by a vote, or the assembly must take action disposing of the question in some other way, before any other business (except certain matters called "privileges questions") can be introduced.

This is where the need for secondary motions arise

- Subsidiary (motion to "amend" the main motion, "postpone to a certain time")
- Privileged ("call for the order of the day" to enforce the schedule)
- Incidental ("point of order", "lay on the table")

ROBERTS RULES CHEAT SHEET

То:	You say:	Interrupt Speaker	Second Needed	Debatable	Amendable	Vote Needed
Adjourn	"I move that we adjourn"	No	Yes	No	No	Majority
Recess	"I move that we recess until"	No	Yes	No	Yes	Majority
Complain about noise, room	"Point of privilege"	Yes	No	No	No	Chair
temp., etc.						Decides
Suspend further consideration of	"I move that we table it"	No	Yes	No	No	Majority
something						
End debate	"I move the previous question"	No	Yes	No	No	2/3
Postpone consideration of	"I move we postpone this matter	No	Yes	Yes	Yes	Majority
something	until"					
Amend a motion	"I move that this motion be amended	No	Yes	Yes	Yes	Majority
	by"					
Introduce business (a primary	"I move that"	No	Yes	Yes	Yes	Majority
motion)						

The above listed motions and points are listed in established order of precedence. When any one of them is pending, you may not introduce another that is listed above it.

То:	You say:	Interrupt Speaker	Second Needed	Debatable	Amendable	Vote Needed
Object to procedure or personal affront	"Point of order"	Yes	No	No	No	Chair decides
Request information	"Point of information"	Yes	No	No	No	None
Ask for vote by actual count to verify voice vote	"I call for a division of the house"	Must be done before new motion	No	No	No	None unless someone objects
Object to considering some undiplomatic or improper matter	"I object to consideration of this question"	Yes	No	No	No	2/3
Take up matter previously tabled	"I move we take from the table"	Yes	Yes	No	No	Majority
Reconsider something already disposed of	"I move we now (or later) reconsider our action relative to"	Yes	Yes	Only if original motion was debatable	No	Majority
Consider something out of its scheduled order	"I move we suspend the rules and consider"	No	Yes	No	No	2/3
Vote on a ruling by the Chair	"I appeal the Chair's decision"	Yes	Yes	Yes	No	Majority

The motions, points and proposals listed above have no established order of preference; any of them may be introduced at any time except when meeting is considering one of the top three matters listed from the first chart (Motion to Adjourn, Recess or Point of Privilege).

PROCEDURE FOR HANDLING A MAIN MOTION

NOTE: Nothing goes to discussion without a motion being on the floor.

Obtaining and assigning the floor

A member raises hand when no one else has the floor

• The chair recognizes the member by name

How the Motion is Brought Before the Assembly

- The member makes the motion: I move that (or "to") ... and resumes his seat.
- Another member seconds the motion: I second the motion or I second it or second.
- The chair states the motion: *It is moved and seconded that ... Are you ready for the question?*

Consideration of the Motion

- 1. Members can debate the motion.
- 2. Before speaking in debate, members obtain the floor.
- 3. The maker of the motion has first right to the floor if he claims it properly
- 4. Debate must be confined to the merits of the motion.
- 5. Debate can be closed only by order of the assembly (2/3 vote) or by the chair if no one seeks the floor for further debate.

The chair puts the motion to a vote

- 1. The chair asks: *Are you ready for the question?* If no one rises to claim the floor, the chair proceeds to take the vote.
- 2. The chair says: The question is on the adoption of the motion that ... As many as are in favor, say 'Aye'. (Pause for response.) Those opposed, say 'Nay'. (Pause for response.) Those abstained please say 'Aye'.

The chair announces the result of the vote.

- 1. The ayes have it, the motion carries, and ... (indicating the effect of the vote) or
- 2. The nays have it and the motion fails

WHEN DEBATING YOUR MOTIONS

- 1. Listen to the other side
- 2. Focus on issues, not personalities
- 3. Avoid questioning motives
- 4. Be polite
HOW TO ACCOMPLISH WHAT YOU WANT TO DO IN MEETINGS

MAIN MOTION

You want to propose a new idea or action for the group.

- After recognition, make a main motion.
- Member: "Madame Chairman, I move that _____."

AMENDING A MOTION

You want to change some of the wording that is being discussed.

- After recognition, "Madame Chairman, I move that the motion be amended by adding the following words _____."
- After recognition, "Madame Chairman, I move that the motion be amended by striking out the following words _____."
- After recognition, "Madame Chairman, I move that the motion be amended by striking out the following words, _____, and adding in their place the following words _____."

REFER TO A COMMITTEE

You feel that an idea or proposal being discussed needs more study and investigation.

• After recognition, "Madame Chairman, I move that the question be referred to a committee made up of members Smith, Jones and Brown."

POSTPONE DEFINITELY

You want the membership to have more time to consider the question under discussion and you want to postpone it to a definite time or day, and have it come up for further consideration.

After recognition, "Madame Chairman, I move to postpone the question until ______."

PREVIOUS QUESTION

You think discussion has gone on for too long and you want to stop discussion and vote.

• After recognition, "Madam President, I move the previous question."

LIMIT DEBATE

You think discussion is getting long, but you want to give a reasonable length of time for consideration of the question.

 After recognition, "Madam President, I move to limit discussion to two minutes per speaker."

POSTPONE INDEFINITELY

You want to kill a motion that is being discussed.

• After recognition, "Madam Moderator, I move to postpone the question indefinitely."

POSTPONE INDEFINITELY

You are against a motion just proposed and want to learn who is for and who is against the motion.

• After recognition, "Madame President, I move to postpone the motion indefinitely."

RECESS

You want to take a break for a while.

• After recognition, "Madame Moderator, I move to recess for ten minutes."

ADJOURNMENT

You want the meeting to end.

• After recognition, "Madame Chairman, I move to adjourn."

PERMISSION TO WITHDRAW A MOTION

You have made a motion and after discussion, are sorry you made it.

• After recognition, "Madam President, I ask permission to withdraw my motion."

CALL FOR ORDERS OF THE DAY

At the beginning of the meeting, the agenda was adopted. The chairman is not following the order of the approved agenda.

• Without recognition, "Call for orders of the day."

SUSPENDING THE RULES

The agenda has been approved and as the meeting progressed, it became obvious that an item you are interested in will not come up before adjournment.

• After recognition, "Madam Chairman, I move to suspend the rules and move item 5 to position 2."

POINT OF PERSONAL PRIVILEGE

The noise outside the meeting has become so great that you are having trouble hearing.

- Without recognition, "Point of personal privilege."
- Chairman: "State your point."
- Member: "There is too much noise, I can't hear."

COMMITTEE OF THE WHOLE

You are going to propose a question that is likely to be controversial and you feel that some of the members will try to kill it by various maneuvers. Also you want to keep out visitors and the press.

• After recognition, "Madame Chairman, I move that we go into a committee of the whole."

POINT OF ORDER

It is obvious that the meeting is not following proper rules.

• Without recognition, "I rise to a point of order," or "Point of order."

POINT OF INFORMATION

You are wondering about some of the facts under discussion, such as the balance in the treasury when expenditures are being discussed.

• Without recognition, "Point of information."

POINT OF PARLIAMENTARY INQUIRY

You are confused about some of the parliamentary rules.

• Without recognition, "Point of parliamentary inquiry."

APPEAL FROM THE DECISION OF THE CHAIR

Without recognition, "I appeal from the decision of the chair."

Class of Rule	Requirements to Adopt	Requirements to Suspend
Charter	Adopted by majority vote or	Cannot be suspended
	as proved by law or	
	governing authority	
Bylaws	Adopted by membership	Cannot be suspended
Special Rules of Order	Previous notice & 2/3 vote,	2/3 Vote
	or a majority of entire	
	membership	
Standing Rules	Majority vote	Can be suspended for
		session by majority vote
		during a meeting
Modified Roberts Rules of	Adopted in bylaws	2/3 vote
Order		

Rule Classification and Requirements

Amendments Discussion from the Bylaws Committee (Darin Croft)



Goals of Bylaws Committee 5-year review

Major Changes:

- I. Increase overall faculty participation and leadership opportunities in faculty governance
- II. Ensure equitable representation in co-governance
- III. Ensure that the SOM Bylaws and standing committee charges are aligned
- IV. Ensure that the SOM Bylaws are consistent with the Faculty Handbook and Faculty Senate Bylaws

Minor Changes:

- 1. Ensure internal consistency and cross-reference related sections
- 2. Eliminate redundancy and reiterate selected content for emphasis
- 3. Move text to group with related content
- 4. Eliminate undefined terms and outdated provisions

Trivial Changes:

- a. Correct errors and oversights
- b. Clarify and simplify language
- c. Make curatorial changes (correct grammar, punctuation, etc.)

Summary of Proposed Amendments to the SOM Bylaws > proposed by Bylaws Committee as part of 5-year review (2017-19)

Page (codes)	Article/ Section	Title	Торіс	Salient difference	Rationale	Vote (Y : N) (date)
8 (III, 1)	3.1	Purpose and functions of the Faculty Council	SOM Executive Committee (previously not defined in Bylaws)	Makes explicit that Faculty Council serves as the SOM Executive Committee	Codifies FC's response to a query from the Faculty Senate, which was approved on 12/12/2016 and supported by the Senate	5 : 0 (01/23/18)
9-10 (l)	3.2b	'n	Non-voting members of Faculty Council	Allows each standing committee to be represented at FC meetings	To allow identification of issues related to each committee's charge	5 : 0 (11/13/17 & 04/10/18)
10 (l)	3.3a	Election of Faculty Council Representatives	Process for election of departmental representatives	Previous version did not specify which party was to be informed of an upcoming opening	Ensures that faculty members are made aware of opportunities via direct communication	5 : 0 (03/12/18)
10-11 (3)	3.3 (all)	Election of Faculty Council Representatives	Process for electing different classes of FC representatives	Text rearranged to create a preamble and clearly delineate each constituency	Clarifies how each type of FC representative is elected	5 : 0 (03/12/18)
12 (l)	3.5 1-2	Officers of the Faculty Council	Chair-elect candidate eligibility	Removes the restriction that Chair-elect candidates must have 2 years left in their term	Makes candidates with significant FC experience eligible to serve and prevents candidates from running unopposed	6 : 0 (01/23/18 & 5 : 0 02/12/18)

* Column 1 codes: Roman numerals refer to to major changes, Arabic numerals refer to minor changes



Faculty Council Meeting Draft Meeting Minutes Monday, October 15, 2018 4:00-5:30PM – BRB 105

4:00PM	Welcome and Chair's Comments	Sudha Chakrapani
4:10PM	Approval of Minutes from September 17, 2018 meeting (see attached)	Sudha Chakrapani
4:20PM	Steering Committee Activities Report	Sudha Chakrapani
4:25PM	Discussion on the HEC and CWRU's Financial Commitment to the Campus	Matthew Lester
4:30PM	Update from the Ad Hoc Committee on Faculty Representation	Cynthia Kubu
4:40PM	Bylaws Amendment to SOM Standing Committee on Minorities and Women	Darin Croft
4:50PM	Amendment Discussion from the Bylaws Committee (see attached)	Darin Croft
5:20PM	New Business	
5:30PM	Adjourn	

Members Present

Tracey Bonfield	Sherine Ghafoori	Vincent Monnier
David Buchner	Beata Jastrzebska	Vicki Noble
Cathleen Carlin	Hung-Ying Kao	Hilary Petersen
Sudha Chakrapani	Stathis Karathanasis	P. Ramakrishnan
Shu Chen	Laura Kreiner	Ben Roitberg
Gary Clark	Varun Kshettry	Satya Sahoo
Brian D'Anza	Cynthia Kubu	Scott Simpson
Piet de Boer	Suet Kam Lam	Jochen Son-Hing
Philipp Dines	Maria Cecilia Lansang	Phoebe Stewart
Jennifer Dorth	Charles Malemud	Charles Sturgis
William Dupps	Danny Manor	Daniel Sweeney
Monica Gerrek	Jenifer McBride	Carlos Trombetta

Members Absent

Corinne Bazella Robert Bonomo Travis Cleland Pamela Davis Judith French Mahmoud Ghannoum

Others Present

Nicole Deming

Zachary Grimmett Clifford Packer Nimitt Patel Aparna Roy Barbara Snyder James Howard Swain Patricia Thomas Melissa Times Anna Valujskikh Michael Wolfe Richard Zigmond

Chair Announcements

Sudha Chakrapani, Chair of Faculty Council, called the meeting to order at 4:00PM briefly outlining the agenda items for the meeting.

Joyce Helton

She reminded Faculty Council that Dean Davis will deliver the 2018 State of the School presentation on Tuesday, October 23, at 10:00AM in the Wolstein Research Building Auditorium, Room 1413. Everyone is encouraged to attend.

Faculty Council members reached out to faculty at UH in spring of this year, and based upon the responses, drafted a letter to UH leadership detailing the pressing concerns of the faculty. This letter was edited multiple times and presented at the June 2018 meeting. The letter was tabled at the June meeting. During June meeting, Dean Davis indicated that new information would be forthcoming which could determine a different focus for the letter. The FCSC will be reviewing the letter again, and re-initiating discussion at the Faculty Council meeting in November. When asked whether UH had signed an agreement, Dean Davis informed Dr. Chakrapani that an announcement would be forthcoming.

Approval of Minutes from September 17, 2018 Meeting (see attached)

Dr. Chakrapani stated that her changes to the meeting minutes had already been included in the draft document that was sent to Faculty Council for review. The members were solicited for changes or comments. There being no further discussion, a motion was made and seconded to approve the meeting minutes as submitted. A vote was taken. 27 were in favor, 0 opposed, and 0 abstained. The motion passes.

Steering Committee Activities Report (Sudha Chakrapani)

During their October meeting, the Faculty Council Steering Committee reviewed Darin Croft's Bylaws amendment presentation, and Matthew Lester's draft presentation on the HEC, which were then approved to be presented at the October 15 Faculty Council meeting. They also advised Dean Davis on several emeritus appointments and a department chair appointment.

<u>Discussion on the Health Education Campus</u> and CWRU's Financial Commitment to the <u>Campus (Matthew Lester)</u>

Matthew Lester, Senior Associate Dean of Finance provided an update on the Health Education Campus (HEC) and an overview of CWRU's financial commitment to the campus. The SOM's

long-term financial plan included HEC costs, and the current estimate is in line with the budget. Increased student enrollment in the MD program, which is already fully implemented, was built into the budget to cover additional anticipated cost.

The Health Education Campus consists of two buildings, the Samson Pavilion (the main education building) and the Dental Building. Today's presentation is a preliminary budget for the full first year of the HEC operating costs.

Dean Lester provided the total project cost to Faculty Council with the cost breakdown for SOM, Dental, Nursing and CCLCM. Indirect allocations for Utech and a library, although not listed, are still a cost. The amount of AV equipment at the HEC will increase the overall capability for high tech by 50%. The first year, ongoing service costs for technicians who manage the equipment/wireless, will be free. The next year, however, we will have to pay.

While estimates for the cost of required services appear to be conservative, we are currently working to determine the most correct number. All of the existing IT staff for the Dental Clinic will continue to support them at the new facility. Due to the uniqueness of the patient electronic medical records, etc., technicians already familiar with the system are necessary to maintain it.

Transportation costs and schedules are under consideration. Multiple shuttles will travel between the main campus and the HEC. Car services such as Uber and Lyft are being considered as an option using a corporate account for payment. Transportation is expected to be high in the first year.

Proportional usage is based upon the floor plans generated to date. While there will be some shared spaces between one or more schools, this may change in the future. In one or two years, classroom allocation, and shared or dedicated spaces, can be re-evaluated. The allocation methodology used to allocate cost takes the initial assigned square footage per school, adds in the shared spaces, which equals the allocation percentage per school -- SOM – 31%, Dental – 20%, Nursing – 28%, and CCLCM (the Cleveland Clinic number) – 21%. While using a headcount to determine cost was considered, the deans agreed that square footage was a better starting point.

While FY19 is estimated to be higher than expected, this increased cost was anticipated and is already included in the SOM's budget, keeping within budget parameters. Additional funding was provided through the expanded MD class, which was enlarged to provide additional revenue with the objective of covering the increased cost.

Money has been budgeted for the building phase move in the spring, which will take place a little earlier than anticipated. Once we take ownership of the facility, cost is shifted from construction to utilities, building maintenance, custodial services, security, etc. Some individual line items appeared a little high (transportation was assumed to be high for the first year) with the expectation that it should be rationalized in subsequent years.

UH has an option to purchase half of the Wolstein Building, which may ultimately result in labs having to be relocated. The Wolstein Building was originally constructed by and paid for by

UH. At one point, CWRU stepped in to purchase and reduce the bonds that UH held. In that transaction, UH received an option of purchase for the Wolstein Building at remaining book value (purchase price minus depreciation). Being an owner does not grant operational control; we both will bring our expectations to the table when we meet in November. While it is too early for building contingency plans indicating how much space will have to relinquished, the goal is to minimize any disruption.

Inside maintenance on the Samson Building (heating systems, electrical, elevators, general care and updates to the building) will be the responsibility of Case, while the Cleveland Clinic will manage the outside of the building. The projected cost for this maintenance appears to be accurate although no financing costs are included in that number.

While there is one floor that is shell space, the cost to activate this floor would be very expensive (kitchenettes, custodial closets). The Clinic is potentially coming forth with concepts of populating this area. The increase in the MD program owed, in part, to the minimal amount of grants in the new building and an effort to offset these additional costs.

SOM, Dental and Nursing business officers are currently meeting with the University Budget Office, Provost's Office, UTech, Facilities and others to review the assumptions for year one and beyond.

Update from the Ad Hoc Committee on Faculty Representation (Cynthia Kubu)

Membership policies that are currently used to determine the make-up of Faculty Council were approved 20 years ago when the SOM was much smaller. Currently, Faculty Council representation will exceed 73 members with the addition of the anticipated new departments. The Ad Hoc Committee on Faculty Representation is charged with studying the membership structure of Faculty Council. The 10-member committee is composed of the following representatives: 2-SOM basic science, 2-UH, 2-MHMC, 2-VA, and 2-Cleveland Clinic. While there are general goals, the committee is very committed to increasing engagement and faculty involvement in SOM, with representation that reflects all stakeholders and all faculty. The committee will sunset in December.

The Faculty Council models of peer institutions (research medical schools -- Harvard, Stanford, etc.) were examined. An informative e-mail was sent and input requested to identify key individuals involved at the various institutions on faculty council, representation issues specific to their sites, and feedback for a survey that is nearly completed. This survey will soon be sent out to faculty. Assistance is requested in completing the survey and encouraging colleagues to participate.

Dr. Kubu was asked if she anticipated that the Ad Hoc Committee on Faculty Representation would be making recommendations that would affect article 3 of the bylaws, which addresses the composition of Faculty Council. She responded that based on feedback received to date, faculty appear eager to see a change in some ways.

In early 2018, a motion was made to study faculty representation as it continued to grow, in terms of a decision making body, and was proving difficult to reach a quorum with 73 voting

members. There are always vacancies on Faculty Council. It has proven difficult to get many faculty chairs, at affiliated hospitals, to hold elections within the department. While it appears to have more to do with engagement than location, physicians are constantly being pressured to see more patients.

To make faculty more aware of the value of Faculty Council, a summary of what has been accomplished, what is planned for the future, and what is currently being worked on, could be disseminated to faculty, soliciting their suggestions for agenda items and issues of interest. We have the opportunity to rebrand Faculty Council.

Amendments Discussion from the Bylaws Committee (Darin Croft) - see attached

It was suggested that since the information and recommendations that will be forthcoming from the Ad Hoc Committee on Faculty Representation could affect or impact the discussion of Article 3 of the Bylaws in today's meeting, it might be wise to wait for their report.

A motion was made and seconded to table the bylaws discussion scheduled for today on the amendments to Article 3 of the Bylaws until the recommendations are received from the Ad Hoc Committee on Faculty Representation. There being no further discussion, a vote was taken. 23 were in favor, 4 were opposed, and 1 abstained. The motion passes.

It was commented that the discussion to table all of Article 3 was much broader than that which would be addressed by the ad hoc committee. Changes in Article 3 to bring the bylaws in line with the Faculty Handbook have been in play for two years, with some of the changes proposed suggested by faculty. Perhaps it would have been prudent to table the specific parts within the purview of the ad hoc committee, rather than table the discussion for the entire article.

Bylaws Amendment to SOM Standing Committee on Minorities and Women (Darin Croft)

A motion was made and seconded to change the title of the SOM Standing Committee on Minorities and Women to the SOM Standing Committee on Minorities and Women Faculty. There being no further discussion, a vote was taken. 33 were in favor, 0 were opposed, and 2 abstained. The motion passes.

New Business

There being no new business to be addressed, Dr. Chakrapani adjourned the meeting at 4:53PM.

Respectfully submitted,

Joyce Helton





Case Western Reserve University

July 27, 2018

Pamela B. Davis, MD, PhD Dean, CWRU School of Medicine and Vice President for Medical Affairs Case Western Reserve University 10900 Euclid Avenue Cleveland, OH 44106

Dear Dean Davis:

It is my privilege to propose the creation of the Basic Sciences Academic Department of Biomedical Engineering (BME) at Cleveland Clinic Lerner College of Medicine of Case Western Reserve University. The Academic Chair of this new CCLCM Biomedical Engineering department would be the same person as the Clinical Chair of Biomedical Engineering in the Lerner Research Institute at Cleveland Clinic, who is D. Geoffrey Vince, PhD.

D. Geoffrey Vince, PhD, is the Virginia Lois Kennedy Chair of the Department of Biomedical Engineering at Cleveland Clinic's Lerner Research Institute. Originally from northern England, Dr. Vince earned his undergraduate degree in medical sciences and chemistry at DeMontford University in Leicester, England, and began his research career at the University of Liverpool, where he earned his PhD in Biomedical Engineering. He completed his postdoctoral fellowship in the United States at Cleveland Clinic's Department of Biomedical Engineering, where he and colleagues invented what became Virtual Histology™. To further develop that invention, Dr. Vince spent 6 years at Volcano Corporation (since February 2015, owned by Philips), a leader in the medical device industry, where he became Vice President of Clinical and Advanced Research & Development. He returned to Cleveland Clinic in his current role as Department Chair in 2011. As announced recently, Dr. Vince is the Co-Director of the BME alliance which is the joint initiative of the Departments of Biomedical Engineering at Cleveland Clinic and Case Western Reserve University.

1. The breadth and depth of the identified faculty's teaching and research productivity.

Staff in the Department of Biomedical Engineering, Lerner Research Institute, Cleveland Clinic – most of whom hold academic appointments through the Cleveland Clinic Lerner College of Medicine of Case Western Reserve University (CCLCM) – engage in a range of educational efforts, mentoring/training young scientists from high school through graduate students, postdoctoral fellows and residents, and foreign scholars.



Cleveland Clinic Lerner College of Medicine



Case Western Reserve University

Principal investigators in BME oversee research projects closely allied with most of Cleveland Clinic's disease-oriented areas of research, including neurologic, cardiovascular, musculoskeletal, and cancer efforts. Many labs engage in translational research and collaborate with clinical colleagues. BME leads both the Lerner Research Institute and Cleveland Clinic in such intellectual property metrics as patents filed, licenses granted, and paths to eventual commercialization of devices and techniques that help patients at the bedside. BME Staff with primary appointments number 45 researchers (Full, Associate, Assistant Staff; Staff Scientists; Project Staff; and Research Associates). Another 26 clinical Staff, including Cleveland Clinic's CEO, Dr. Tomislav Mihaljevic, hold joint appointments in the department.

BME has a dedicated "Supervisor of BME Education," Robin Crotty. Ms. Crotty is responsible for all recruitment, administrative, immigration, and grant interactions involving young scientists. She works primarily with our local affiliated universities and with two major international entities (see below): Case Western Reserve University, Cleveland State University, University of Akron, and Kent State University. She oversees all levels of students, fellows, residents, and visiting scholars while they work in a BME lab. BME maintains Web sites geared to facilitating queries from all outside parties regarding education possibilities here. Seminars, poster sessions, travel awards, and other opportunities are offered. At the graduate level, offerings include the following:

Case Western Reserve University:

- •Biomedical Engineering
- •Biomedical Scientist Training Program
- Molecular Medicine
- Physiology and Biophysics

Cleveland State University

- •Applied Biomedical Engineering
- Biology
- •Clinical-Bioanalytical Chemistry
- •Cellular and Molecular Medicine

University of Akron

•Integrated Bioscience Fellowship in Biomedicine

Undergraduates can take advantage of internships and co-op study by applying to areas and Staff who are doing research of interest to them. At the high school level, students can explore summer opportunities through Cleveland Clinic's Office of Civic Education Initiatives. Foreign-born personnel can participate in Lerner Research Institute's voluntary "Conversational English" program throughout the academic year. Two promising international "exchange" efforts, both based on philanthropic funding, have recently been established.





Case Western Reserve University

1) For 2015-2025, a Joint Program of Cleveland Clinic (and BME) with the University of Engineering and Technology (Universidad de Ingeniería & Tecnología, UTEC), Lima, Peru. As part of an international agreement endorsed by Delos M. Cosgrove, MD, immediate-past CEO of Cleveland Clinic, and Eduardo Hochschild, president of the Board of UTEC and member of the international board of Cleveland Clinic, the two institutions have established an interactive sharing of ideas, teaching, and intellectual property, as well as a program offering UTEC students a curriculum with an emphasis on biomedical engineering. In 2018, BME has already hosted two UTEC students in its labs.

2) For 2015-2020, a Joint Program of Cleveland Clinic (and BME) with the Hebrew University of Jerusalem, Israel (HUJI) to establish the Center for Transformative Nanomedicine. Establishment of this new Center is intended to foster high-impact research in medical nanotechnology and collaborative scientific exchange between CCF and HUJI in cardiovascular disease, cancer, and neurologic disease. These combined efforts are aimed at translating scientific discovery to clinical applications to prevent, detect, and treat human disease. Personnel from HUJI are expected to arrive for visits in BME labs beginning in 2018, supported by a \$400K grant from the Mt. Sinai Foundation to bring students from Israel to Cleveland.

6 BME labs hosted 3 of 10 total HS students for "Engineer for a Day"; 17 HS students participated in half-day visits to BME Labs60 total (30 were year- round workers); funding support from NSF Research Experiences for Undergraduates (NSF- REU) program in 10 labs for 10 weeks33 total1 Predoctoral23 Postdoctoral BME Joint BME/CSU "Applied Biomedical Engineering" (ABE) program (MS degree); 4 did thesis research in BME33 total1 Predoctoral23 Postdoctoral BME33 total CCLCM: 5 students in Joint BME/CSU "Applied Biomedical Engineering" (ABE) program (MS degree); 4 did thesis research in BME8 Visiting scientists	2015 High School	2015 Undergrad	2015 Graduate	2015 Postdoc/Other
Kent: 3 doctoral	6 BME labs hosted 3 of 10 total HS students for "Engineer for a Day"; 17 HS students participated in half-day visits to BME Labs	60 total (30 were year- round workers); funding support from NSF Research Experiences for Undergraduates (NSF- REU) program in 10 labs for 10 weeks	33 total CCLCM: 5 students in BME CSU: 11 students in Joint BME/CSU "Applied Biomedical Engineering" (ABE) program (MS degree); 4 did thesis research in BME CSU: 3 Clinical Chemistry doctoral students Kent: 3 doctoral	 Predoctoral Postdoctoral Research scholars Visiting scientists

A more modest but longer-term exchange has been ongoing with Mie University of Japan; each year, one to three students spend several months in a BME lab. BME also host a number of trainees per year:





CASE WESTERN RESERVE

Case Western Reserve University

		CWRU/Mol. Med = 2	
		doctoral and 2 Mol.	
		Med. in BME labs	
		Akron: 3 Integrated	
		BioScience doctoral	
		Mie Univ.: 2 students	
		for 6-mo internships	
2016 High School	2016 Undergrad	2016 Graduate	2016 Postdoc/Other
4 HS students total – 3 in	60 total (30 year-round)	35 total	1 Predoctoral
6 BME labs;	NSF- REU: 8 labs hosted	CCLCM: several	23 Postdoctoral
5 BME labs hosted 4 HS	students for 10 wks	students in BME	
students for "Engineer		11 students in Joint	6 Research scholars
for a Day";		BME/CSU "Applied	8 Visiting scientists
		Biomedical	
		Engineering" (ABE)	
		program (MS	
		degree); 5 did thesis	
		research in BME	
		CSU: 3 Clinical	
		Chemistry doctoral	
		students	
		Kent: 2 doctoral	
		CWRU/Mol. Med = 1	
		Case/BME doctoral; 1	
		MS BME student;	
		several Mol Med	
		students	
		Akron: 2 Integrated	
		BioScience doctoral	
2017 High School	2017 Undergrad	2017 Graduate	2017 Postdoc/Other
5 HS students, 4 in	64 total (30 year-round)	35 total	23 Postdoctoral
"Engineer for a Day"		CCICM. several	Several international
program in 5 BME labs		students	visitors for short-term
		students	



Cleveland Clinic Lerner College of Medicine



Case Western Reserve University

	12 students in Joint	research experience or
	BME/CSU "Applied	collaborations
	Biomedical	
	Engineering" (ABE)	
	program (MS	
	degree); 5 did thesis	
	research in BME	
	CSU: 3 Clinical	
	Chemistry doctoral	
	students	
	Kent: None in 2017	
	CWRU/Mol. Med = 1	
	Case/BME doctoral; 1	
	MS BME student:	
	several Mol Med	
	students	
	Akron: 1 Integrated	
	BioScience doctoral	

2. Any additional factors that are relevant to the proposed new department.

The proposal to create a Basic Sciences Academic Department of Biomedical Engineering at CCLCM comes at the request of Dean Pamela Davis. Faculty members of the department are actively involved in the teaching of medical students, residents and fellows, and it is fitting that they be recognized for the academic pursuits in this specialty. They are currently in the Academic Department of Molecular Medicine and would then transfer into the newly created Academic Department of Biomedical Engineering. At its inception, CCLCM purposefully started off with few departments, however as the College has matured, we believe that it is important to align our academic departments with those of the other institutions that are part of CWRU-SOM and that, in this case, Biomedical Engineering is sufficiently robust that it should stand apart from the Basic Sciences Academic Department of Molecular Medicine.

3. An analysis of the effect of establishment of the second department on existing departments of the School of Medicine.

Creation of this department would parallel the existence of such academic departments at other CWRU School of Medicine teaching hospitals, but would have no adverse impact on them and may facilitate academic interaction amongst them. The new academic department will clearly define the academic disciplines that already exist within our clinical department.



_ of ____



Case Western Reserve University

4. A statement that research publications authored by faculty with appointment in the new department will make note of the Case Western Reserve University faculty appointment.

Research publications authored by faculty with appointment in this new department will make note of their Case Western Reserve University faculty appointment.

5. A five-year business plan demonstrating how the second department will achieve and maintain financial viability or, in the alternative and if appropriate, the proposal should affirm that the new department will not require funding from the School of Medicine.

The creation of this department will have no financial impact on CWRU or the School of Medicine and will not require any funding from either.

Thank you for your consideration,

ne

Gene H. Barnett, MD, MBA Associate Dean for Faculty Affairs Cleveland Clinic Lerner College of Medicine of Case Western Reserve University





July 20, 2018

Pamela B. Davis, MD, PhD Dean, CWRU School of Medicine and Vice President for Medical Affairs Case Western Reserve University 10900 Euclid Avenue Cleveland, OH 44106

RE: D. Geoffrey Vince, PhD

Application for Appointment as Academic Chair, Department of Biomedical Engineering within Cleveland Clinic Lerner College of Medicine of Case Western Reserve University

Dear Dean Davis:

On behalf of Gene H. Barnett, MD, Cleveland Clinic Lerner College of Medicine Associate Dean of Faculty Affairs, our Faculty Appointment and Promotions Committee, and the Cleveland Clinic Lerner College of Medicine Executive Team, I would like to propose Dr. D. Geoffrey Vince, PhD as the new Chair for the Academic Department of Biomedical Engineering, within the Cleveland Clinic Lerner College of Medicine. Dr. Vince was chosen as he is the current Chair of the Department of Biomedical Engineering and is well suited to this leadership position. D. Geoffrey Vince, PhD, is the Virginia Lois Kennedy Chair of the Department of Biomedical Engineering at Cleveland Clinic's Lerner Research Institute. Originally from northern England, Dr. Vince earned his undergraduate degree in medical sciences and chemistry at DeMontford University in Leicester, England, and began his research career at the University of Liverpool, where he earned his PhD in Biomedical Engineering. He completed his postdoctoral fellowship in the United States at Cleveland Clinic's Department of Biomedical Engineering, where he and colleagues invented what became Virtual HistologyTM. To further develop that invention, Dr. Vince spent 6 years at Volcano Corporation (since February 2015, owned by Philips), a leader in the medical device industry, where he became Vice President of Clinical and Advanced Research & Development. He returned to Cleveland Clinic in his current role as Department Chair in 2011.

Dr. Vince's areas of research interest include vascular imaging, image and signal processing and atherosclerotic plaque characteristics, which are pertinent to heart disease and stroke. His team is developing mathematical algorithms based on quantitative ultrasound and acoustic radiation force impulse imaging that can more precisely analyze ultrasound images of carotid arteries.

J. Harry Isaacson M.D. | Interim Executive Dean, Associate Professor of Medicine, Cleveland Clinic Lerner College of Medicine, The Cleveland Clinic, 9500 Euclid Avenue, NA20, Cleveland, Ohio 44195 Office: 216/444-6286 | Fax: 216/636-1348 E-Mail: isaacsj@ccf.org The new system creates a spectrum by which different colors indicate where and how bad the plaque build-up is; this information from scattered ultrasound points is obtained but not considered during the creation of standard ultrasound images. The team's goal is to provide a tool that will predict which patients are imminently at increased risk of having a stroke and will aid the physician in determining the best treatment approach.

As announced recently, Dr. Vince is the Co-Director of the BME alliance which is the joint initiative of the Departments of Biomedical Engineering at Cleveland Clinic and Case Western Reserve University. "After many years of close collaboration, this formal alliance will push forward the teaching and research mission of our institutions." said Dr. Vince in the article. Dr. Vince's experience on the international corporate scene encompasses not only an understanding of the global interplay of research and clinical innovation but also aspects of corporate and federal funding and venture capital. This makes him a unique and productive part of Cleveland Clinic and helps lead the vision and funding of the Biomedical Engineering Department within the Lerner Research Institute.

In summary we are very enthused to have D. Geoffrey Vince, PhD be the chair of our new CCLCM Biomedical Engineering academic department. His enthusiasm and dedication will serve the students and faculty well at the Cleveland Clinic Lerner College of Medicine of Case Western Reserve University.

Please let me know if you have any questions. Sincerely,

J. Harry Isaacson, MD Interim Executive Dean, Cleveland Clinic Lerner College of Medicine Associate Professor of Medicine



Jonathan D. Smith, PhD

Chair and Professor of Dept. of Molecular Medicine Cleveland Clinic Lerner College of Medicine of CWRU Director of Molecular Medicine PhD Program Geoffrey Gund Endowed Chair for Cardiovascular Research Staff, Dept. of Cellular & Molecular Medicine, Cleveland Clinic Mail: Dept. of Cellular & Molecular Medicine, NC-10 Cleveland Clinic 9500 Euclid Avenue Cleveland OH 44195 Phone: 216-444-2248 FAX: 216-444-9404 E-mail: smithj4@ccf.org

July 3, 2018

Dr. Gene Barnett Associate Dean for Faculty Affairs at CCLCM

Dear Dr. Barnett,

As Chair of the Molecular Medicine Dept. of CCLCM, I give my approval for the Cleveland Clinic BME scientists to move their primary appointment to the BME Dept. at the Case S.O.M., and that these faculty may retain secondary appointments in the Molecular Medicine Dept. of CCLCM.

Sincerely,

formation

Jonathan D. Smith, PhD



BIOMEDICAL ENGINEERING - APPENDIX A & B

Gray = Appointed with CCLCM White = Will seek appointment in the future

Candidateslastname	Candidatefirstname	Credentials	Appointment	PrimaryClinicalDepartment	Notes
Alberts	Jay	Ph.D.	Assistant Professor	Biomedical Engineering	
Anand	Sanjay	Ph.D.	Assistant Professor	Biomedical Engineering	
Androjna	Caroline	DEng			1
Apte	Suneel	M.B.B.S., D.Phil	Associate Professor	Biomedical Engineering	T
Chaudhuri	Pinaki	PhD			1
Damaser	Margot	Ph.D.	Professor	Biomedical Engineering	
Das	Dola	Ph.D.	Adjunct Assistant Professor	Biomedical Engineering	
Derwin	Kathleen	M.D.	Assistant Professor	Biomedical Engineering	
Irdemir	Ahmet	Ph.D.	Assistant Professor	Biomedical Engineering	
edewa	Russell	Ph.D.	Adjunct Assistant Professor	Biomedical Engineering	
leischman	Aaron	Ph.D.	Assistant Professor	Biomedical Engineering	
ukamachi	Kiyotaka	M.D, Ph.D.	Professor	Biomedical Engineering	
shosh	Chaitali	Ph.D.	Assistant Professor	Biomedical Engineering	
Graham	Linda	M.D.	Professor	Biomedical Engineering	
Hascall	Vincent	Ph.D.	Professor	Biomedical Engineering	
lubert	Christopher	PhD			
un	Bong-Jae	Ph.D.	Assistant Professor	Biomedical Engineering	T
(arimov	Jamshid	MD, PhD	Adjunct Assistant Professor	Biomedical Engineering	
(rishna	Vijay	Ph.D.	Assistant Professor	Biomedical Engineering	
abhasetwar	Vinod	Ph.D.	Professor	Biomedical Engineering	
i	Xiaojuan	PhD			applying for full professor
.i	Zong-Ming	Ph.D.	Professor	Biomedical Engineering	
inder	Susan		Adjunct Assistant Professor	Biomedical Engineering	
√la	Jinjin	PhD			
Mack	Judith	Ph.D.	Instructor	Biomedical Engineering	
Mantripragada	Venkata	PhD			
Marasco	Paul	PhD	Adjunct Assistant Professor	Biomedical Engineering	
vlaytin	Edward	MD, PhD	Assistant Professor	Biomedical Engineering	applying for assoc. prof.
vlead	Timothy	PhD			
vlidura	Ronald	Ph.D.	Associate Professor	Biomedical Engineering	
Vakamura	Kunio	Ph.D.	Assistant Professor	Biomedical Engineering	
Vandadasa	Sumeda	PhD	Instructor	Biomedical Engineering	
Owings	Tammy	DEng	Adjunct Assistant Professor	Biomedical Engineering	
low	Ela	Ph.D.	Assistant Professor	Biomedical Engineering	
Ramamurthi	Anand	Ph.D.	Associate Professor	Biomedical Engineering	
ahoo	Sambit	M.B.B.S., Ph.D.	Instructor	Biomedical Engineering	
araswathy	Manju	PhD	Adjunct Assistant Professor	Biomedical Engineering	
/ijayaraghavalu	Sivakumar	PhD	Adjunct Assistant Professor	Biomedical Engineering	
/ince	D. Geoffrey	Ph.D.	Professor & Clinical Chair	Biomedical Engineering	
Wang	Aimin	Ph.D.	Instructor	Biomedical Engineering	
/ang	Jun	MD	Clinical Assistant Professor	Biomedical Engineering	
/ang	Mingrui	PhD			
	1				

D. Geoffrey Vince, Ph.D.

Address:	30403 Jefferson Way Westlake, Ohio 44145 Office: (216) 445-6980 Cell: (440) 714-7322 E-mail: vinceg@ccf.org
Date of birth:	March 25, 1963 Durham, England
Citizenship:	U.S./U.K. (Dual)
Education:	 Ph.D. Biomedical Engineering, Dept. of Clinical Engineering, University of Liverpool, Liverpool, United Kingdom, 1985-89 B.Sc. (Hons), Medical Sciences and Chemistry, De Montfort University, Leicester, United Kingdom, 1982-85
Appointments:	
7/2018 – pres.	<u>Co-Director, BME Alliance, a joint initiative of the</u> Departments of Biomedical Engineering of Cleveland Clinic and Case Western Reserve University, Cleveland, Ohio
2011 – pres.	<u>Chairman</u> , Dept. of Biomedical Engineering, Lerner Research Institute, Cleveland Clinic (holder of the Virginia Lois Kennedy Chair in Biomedical Engineering and Applied Therapeutics); and joint appointee (2012-pres.), Dept. of Cardiovascular Medicine, Miller Family Heart and Vascular Institute, Cleveland Clinic, Cleveland, Ohio; Professor (5/31/2014-pres.), Dept. of Molecular Medicine, Cleveland Clinic Lerner College of Medicine of Case Western Reserve University [School of Medicine, CWRU], Cleveland, Ohio
2006 – 2011	Vice-President, Clinical and Advanced R&D, Volcano Corporation, San Diego, California
2005 – 2006	Director of Research, Volcano Corporation, Cleveland, Ohio
2003 – 2005	<u>Associate Professor/Staff</u> , Dept. of Biomedical Engineering, Cleveland Clinic, Cleveland, Ohio; joint appointee (2003-5), Dept. of Cardiovascular Medicine, Division of Medicine, Cleveland Clinic, Cleveland, Ohio

July 20, 2018	Curriculum Vitae - D. Geoffrey Vince
1999 – 2003	<u>Assistant Professor/Staff</u> , Dept. of Biomedical Engineering, Cleveland Clinic, Cleveland, Ohio
1995 – 1999	<u>Project Staff</u> , Dept. of Biomedical Engineering, Cleveland Clinic, Cleveland, Ohio
1992 – 1995	<u>Research Fellow</u> , Dept. of Biomedical Engineering, Cleveland Clinic, Cleveland, Ohio
1989 – 1992	Senior Research Associate, Dept. of Clinical Engineering, University of Liverpool Medical School, Liverpool, United Kingdom
Adjunct Appointments	
2005 – 2011	<u>Adjunct Staff,</u> Dept. of Biomedical Engineering, Cleveland Clinic, Cleveland, Ohio
1999 – 2009	<u>Adjunct Associate Professor</u> , Dept. of Biomedical Engineering, Case Western Reserve University, Cleveland, Ohio
1999 – 2003	<u>Adjunct Assistant Professor</u> , Dept. of Chemical Engineering, Cleveland State University, Cleveland, Ohio
1997 – 2004	<u>Graduate Faculty</u> , Biomedical Engineering Center, The Ohio State University, Columbus, Ohio
1996 – 2005	<u>Assistant Professor</u> (Pathology), Dept. of Pathology, The Ohio State University, Columbus, Ohio
Recent Committee Servi	ce

NI-4 ootitut f Llooltk . .

National Institutes of Healt	<u>h</u>
2012 – 8/2015	NIH: NIH Centers for Accelerated Innovations (NCAI) (Cleveland Clinic site: <u>http://www.ncai-cc.ccf.org/</u>) Co-Principal Investigator of NCAI, Cleveland Clinic site NCAI Executive Committee NCAI Operations, Management, and Integration Working Group
8/2015 – pres.	NIH: NIH Centers for Accelerated Innovations (NCAI) Principal Investigator of NCAI, Cleveland Clinic site
12/5/2017	NIH: Center for Scientific Review – Special Emphasis Panels (Ad Hoc)

ZRG1 VH N 80 (Natalia Komissarova, PhD) and ZRG1 VH A 07 (Katherine Malinda, PhD)

National Academy of Inventors

9/2015 – pres.	Member representative for Cleveland Clinic
Cleveland Clinic:	
2011 – pres.	Member, Lerner Research Institute Leadership Council
2011 – 2013	Member, Commercialization Council, Cleveland Clinic
2012 – pres.	Member, Cleveland Clinic/NASA Glenn Partnership Governance Council
2013 – pres.	Cleveland Clinic Onboarding (Overview of Lerner Research Institute for new Staff of Cleveland Clinic; twice a month)
2013 – pres.	Chair, Lerner Research Institute Experience Council
4/2015 – 7/2016	Member, Search Committee for Chair of Department of Orthopaedic Surgery, Cleveland Clinic
1/2018 – pres.	Member, OPSA Advisory Council, Office of Professional Staff Affairs, Cleveland Clinic

Joint Committee – Clinical and Translational Science Collaborative

(Case Western Reserve University, Cleveland Clinic, MetroHealth Medical Center, University Hospitals Case Medical Center, and the Louis Stokes Cleveland VA Medical Center - https://casemed.case.edu/ctsc/education/kl2/): Member, Cleveland Clinic 2012 – pres.

Board Memberships

Academia	
11/2015 – pres.	Member, Board of Directors, Cleveland State University Research Corporation (CSURC; technology transfer arm of Cleveland State University, Cleveland, Ohio)
Industry	
11/2015 – pres.	Member, Board of Directors, Cleveland Heart, Inc. (Cleveland Clinic spinoff company), Cleveland, Ohio
04/2016 – pres.	Member, Joint Management Committee (Cleveland Clinic and Parker Hannifin), Parker Hannifin Corp., Cleveland, Ohio

Current Grant Funding as Principal Investigator

2013 – 2020	NIH: National Heart, Lung, and Blood Institute – U54
	(Specialized CenterCooperative Agreements) –
	U54HL119810-01 – \$10.2M – The Cleveland Clinic
	Innovation Accelerator – Principal Investigator: D. Geoffrey
	Vince, PhD.
	One of 3 NIH Centers for Accelerated Innovations (NCAIs)

	nationwide; part of the National Institutes of Health's initiative to improve how basic science advances and discoveries are translated into commercially viable products. NCAIs, funded by the National Heart, Lung, and Blood Institute, target technologies to improve the diagnosis, treatment, prevention, and management of heart, lung, blood, and sleep disorders and diseases.
2015 – 2025	 Philanthropic Funds: Joint Program of Cleveland Clinic, Cleveland, Ohio, USA (and its Department of Biomedical Engineering) with the University of Engineering and Technology (Universidad de Ingeniería & Tecnología, UTEC), Lima, Peru –\$2M gift – 10 years – Department of Biomedical Engineering and UTEC Strategic Collaboration – Principal Investigator: D. Geoffrey Vince, PhD. As part of an international agreement endorsed by Delos M. Cosgrove, CEO of Cleveland Clinic, and Eduardo Hochschild, president of the Board of UTEC and member of the international board of Cleveland Clinic, the two institutions have established an interactive sharing of ideas, teaching, and intellectual property, as well as a program offering UTEC students a curriculum with an emphasis on biomedical engineering.
2015 – 2020	Philanthropic Funds: Joint Program of Cleveland Clinic, Cleveland, Ohio, USA (and its Department of Biomedical Engineering) with the Hebrew University of Jerusalem, Israel (HUJI) –\$15M gift – 5 years – <i>Center for Transformative</i> <i>Nanomedicine</i> – Co-Principal Investigator: <u>D. Geoffrey</u> <u>Vince, PhD. (with Prof. Simon Benita – HUJI)</u> Establishment of this new Center is intended to foster high- impact research in medical nanotechnology and collaborative scientific exchange between CCF and HUJI in cardiovascular disease, cancer, and neurologic disease. These combined efforts are aimed at translating scientific discovery to clinical applications to prevent, detect, and treat human disease. [Press release at http://consultqd.clevelandclinic.org/2015/10/cleveland-clinic- and-the-hebrew-university-of-jerusalem-join-to-develop- global-center-for-transformative-nanomedicine/]
2016 – 2019	U.S. Army Research Office/Department of Defense: W81XWH-16-1-0608 \$1.8M – Vascular Plaque Determination for Stroke Risk Assessment – Principal Investigator, D. Geoffrey Vince, PhD. The aim is to determine composition of human carotid artery plaque during

a standard clinical ultrasound exam, based on spectral analysis of ultrasonic backscatter.

Previous Grant Funding as Principal Investigator

1994 – 1996	American Heart Association (AHA)/Ohio Affiliate Fellowship Award: <i>Quantitative Analysis of Coronary Plaque Rupture</i> – \$61,074 – Principal Investigator
1995 – 1996	AMRESCO Inc Industrial Contract: Comparative Immunohistologic Evaluation of Human Tissue Antigens Processed in Histochoice and Neutral Buffered Formalin – \$16,455 – Vince & Tbakhi, co-PIs
1997 – 1999	AHA/Ohio Affiliate Grant-in-Aid: <i>Determination of Coronary</i> <i>Plaque Morphology and Composition using Intravascular</i> <i>Ultrasound</i> – \$61,860 – Principal Investigator
1998 – 2000	Guidant Corporation Industrial Contract: <i>Evaluation of</i> <i>Ultrasonic Ablation of Stenosed Coronary Arteries</i> – \$39,397 – Principal Investigator
1998 – 2001	Whitaker Foundation: <i>Effects of Diabetes on the Structural and Material Properties of Atherosclerotic Plaques</i> – \$203,000 – Principal Investigator
1998 – 2004	Guidant Corporation: <i>Determination of Vascular Wall</i> Mechanics – \$137,837 – Principal Investigator
2002 – 2006	NIH R01 HL64686: <i>Identification of Vulnerable Plaques</i> – \$1,200,000 – Principal Investigator
2002 – 2007	NIH R01 HL69094: <i>High Frequency Nonlinear Acoustic</i> Intravascular Imaging. – \$3,100,000 – Principal Investigator
2003 – 2004	Volcano Therapeutics, Inc.: <i>Development of IVUSLab</i> <i>Intravascular Ultrasound Analysis Software</i> – \$37, 500 – Principal Investigator
2003 – 2005	Pfizer Inc.: <i>Efficacy Study of Non -Invasive Ultrasound</i> <i>Atherosclerotic Plaque Identification Technique</i> – \$100,000 – Principal Investigator
2006 – 2007	NIH R43 HL084775-01: <i>Micromachined Intravascular</i> <i>Ultrasound transducer</i> – \$100,000 – Principal Investigator
Sponsored Students:	AHA Ohio Affiliate Pre-doctoral Fellowship: (Jon D. Klingensmith, M.S.) <i>Real-time in vivo three-dimensional reconstruction of coronary arteries using intravascular ultrasound</i> – \$17,000/year for 2 years
	AHA Ohio Affiliate Pre-doctoral Fellowship: (Anuja Nair, M.S.) <i>Determining atherosclerotic plaque composition by</i>

analysis of intravascular ultrasound backscattered signals – \$17,000/year for 2 years

Previous Grant Funding as Co-Investigator

1999 – 2002	U.S. Department of Defense: <i>Tissue Engineering Initiative</i> – \$3.2M — PI: V. Hascall, PhD; D.G. Vince, Director, Imaging Core
2000	NIH: 1R43HL064484 <i>Non-invasive IVUS Transducer</i> <i>Tracking System.</i> – \$100,000 – PI: Abed Kanaan; D. G. Vince, PI on subcontract.
2003 – 2008	NIH: R01 HL075721 – <i>Clinical Implications of Peripheral Plaque Morphology</i> – PI: K. Ouriel, MD; D.G. Vince, Co-Investigator
2014 – 2016	NIH: National Institute of Arthritis and Musculoskeletal and Skin Diseases: R21 (Exploratory/Developmental Research Grant Award) 1R21AR064957 – \$383,570 – ARFI [Acoustic Radiation Force Impulse] and B-Mode Ultrasound Imaging for Transverse Carpal Ligament Pathomechanics – PI: Z.M. Li, PhD; Co-Investigator, D.G. Vince, PhD
Awards:	 AHA Ohio Affiliate - Harriet B. Lawrence Award – 1994 Young Investigator Finalist: Xlth International Symposium on Atherosclerosis, Paris, France, 1997. Innovator Award, Cleveland Clinic – 2011, 2012, 2013 Election to American Institute for Medical and Biological Engineering (AIMBE) College of Fellows, March 2015

Patents: Selected from more than **60** patents and patent applications:

9,055,921: Plaque characterization using multiple intravascular ultrasound datasets having distinct filter bands. Nair A, <u>Vince DG</u>, Margolis MP, Waters KR. Issued June 16, 2015.

- 8,808,183: **System and method for determining a transfer function.** Nair A, <u>Vince DG</u>, Klingensmith JD, Kuban, BD. Issued August 19, 2014.
- 8,630,492: **System and method for identifying a vascular border.** Klingensmith JD, <u>Vince DG</u>, Nair A, Kuban BD. Issued January 14, 2014.
- 8,622,910: **System and Method of Acquiring Blood-Vessel Data.** Kuban BD, Klingensmith JD, <u>Vince DG</u>, Nair A.

Issued January 7, 2014.

- 8,449,465: **System and Method for Characterizing Vascular Tissue.** Nair A, Kuban BD, <u>Vince DG</u>, Klingensmith JD. Issued May 28, 2013.
- 7,215,802: **System and Method for Vascular Border Detection.** Klingensmith JD, Nair A, Kuban BD, <u>Vince DG</u>. Issued May 8, 2007.
- 7,175,597: **Non-Invasive Tissue Characterization System and Method.** <u>Vince DG</u>, Nair A, Klingensmith JD. Issued February 13, 2007.
- 7,074,188: **System and Method of Characterizing Vascular Tissue.** Nair A, <u>Vince DG</u>, Klingensmith JD, Kuban BD. Issued July 11, 2006.
- 6,381,350: Intravascular Ultrasonic Analysis Using Active Contour Method and System.

Klingensmith JD, <u>Vince DG</u>, Shekhar R. Issued April 30, 2002.

6,200,268: **Vascular Plaque Characterization.** <u>Vince DG</u>, Kuban BD, Nair A. Issued March 13, 2001.

Publications (Peer Reviewed):

- 1. **Vince DG** and Williams DF. Determination of Silver in Blood and Urine by Graphite Furnace Atomic Absorption Spectrometry, *Analyst*, 112: 1627-1629, 1987.
- 2. **Vince DG** and Williams DF. Visualization of the Spatial Distribution of Silver in Histological Sections, *Biomaterials*, 10: 353-355, 1989.
- 3. Williams RL, Doherty PJ, **Vince DG**, Grashoff G, and Williams DF, The Biocompatibility of Silver, *Crit. Rev. Biocompat.*, 5: 221-244, 1989.
- 4. **Vince DG**, Hunt JA, and Williams DF. Quantitative Assessment of the Tissue Response to Implanted Biomaterials, *Biomaterials*, 12: 731-6, 1991.
- 5. Hunt JA, **Vince DG**, and Williams DF. Image Analysis in the Evaluation of Biomaterials, *Biomed. Eng*, 15: 39-45, 1993.
- 6. **Vince DG**, Herderick EE, Shekhar R, and Cornhill JF. Three Dimensional Analysis of Coronary Plaques, *Histoviews*, 2: 2-3, 1994.

- 7. Cornhill JF, Herderick EE, **Vince DG**, and the PDAY Research Group. The Clinical Morphology of Human Atherosclerotic Lesions Lessons from the PDAY Study, *Wien Klin Wochenschr*, 107(18): 540-543, 1995.
- 8. **Vince DG**, Demirkaya O, Cothren RM, and Cornhill JF. Quantitative Analysis of Inflammatory Cells in Aortic Atherosclerosis of Young Adults, *Cardiovascular Pathology*, 5(1): 3-10, 1996.
- 9. Horrigan MCG, MacIsaac AL, Nicolini FA, **Vince DG**, Lee P, Ellis SG, and Topol EJ. Reduction in Myocardial Infarct Size by Basic Fibroblastic Growth Factor Following Temporary Coronary Occlusion in the Canine Model, *Circulation*, 94: 1927-1933, 1996.
- 10. *Shekhar R, Cothren RM, **Vince DG**, Cornhill JF, Spatio-temporal Localization of Intravascular Ultrasound Data for Accurate 3D Reconstruction of Coronary Arteries, *Proceedings of IEEE Engineering in Medicine and Biology Society*, 2: 668-669, 1996.
- 11. *Meier DS, Cothren RM, **Vince DG**, Cornhill JF. Automated Morphometry of Coronary Arteries Using Digital Image Analysis of Ultrasound. *American Heart Journal*, 133:681-90, 1997.
- 12. **Vince DG**, Tbakhi A, Gaddipati A, Cothren RM, Cornhill JF, and Tubbs RR. Quantitative Comparison of Immunohistochemical Staining Intensity in Tissues Fixed in Formalin and HistoChoice, *Analytical Cellular Pathology*, 15(2): 119-129, 1997.
- 13. Masseroli M, Cothren RM, Meier DS, Tuzcu EM, **Vince DG**, Nissen SE, Thomas JD, and Cornhill JF. Quantification of Intramural Calcification in Coronary Intravascular Ultrasound Images Using Automated Image Analysis. *American Heart Journal*, 136: 78-86, 1998.
- 14. *Gaddipatti A, **Vince DG**, Cothren RM, Cornhill JF. Color microscopy image segmentation using competitive learning and fuzzy-Kohonen networks. *SPIE Proceedings Series*, 3338(1-2):616-628, 1998.
- 15. *Demirkaya O, Cothren RM, **Vince DG**, Cornhill JF. Automated Identification of Stained Cells in Tissue Sections Using Digital Image Analysis. *Analytical and Quantitative Cytology and Histology*. 21: (2) 93-102 Apr 1999.
- *Klingensmith JD, Vince DG, Shekhar R, Kuban BD, Tuzcu EM, Cornhill JF. Quantification of coronary arterial plaque volume using 3D reconstructions formed by fusing intravascular ultrasound and biplane angiography. SPIE Medical Imaging, 3660,343-350,1999.
- 17. Shekhar R, Cothren RM, **Vince DG**, Chandra S, Thomas JD, Cornhill JF Threedimensional segmentation of luminal and adventitial borders in serial

intravascular ultrasound images. *Computerized Medical Imaging and Graphics*. 23(6) 299-309, 1999.

- 18. *Veress AI, **Vince DG**, Anderson PM, Cornhill JF, Herderick EE, Klingensmith JD, Kuban BD, Greenberg NL, Thomas JD. Vascular mechanics of the coronary artery. *Z Kardiol.* 89 Suppl 2:II92-II100, 2000.
- 19. Cothren RM, Shekhar R, Nissen SE, Tuzcu EM, Cornhill JF, **Vince DG**. Threedimensional Reconstruction of the Coronary Artery Wall by Image Fusion of Intravascular Ultrasound and Bi-plane Angiography. *International Journal of Cardiac Imaging*. 16(2) 69-85, 2000.
- 20. *Klingensmith JD, **Vince DG**, Kuban BD, Shekhar R, Tuzcu EM, Nissen SE, Cornhill JF. Assessment of Coronary Compensatory Enlargement by Threedimensional Intravascular Ultrasound. *International Journal of Cardiac Imaging*. 16(2) 87-98, 2000.
- 21. **Vince DG**, Dixon KJ, Cothren RM, Cornhill JF. Comparison of Texture Analysis Methods for the Characterization of Coronary Plaques in Intravascular Ultrasound Images. *Computerized Medical Imaging and Graphics*. 24: (4) 221-229, 2000.
- 22. *Klingensmith JD, Shekhar R, **Vince DG**. Evaluation of three-dimensional segmentation algorithms for the identification of luminal and medial-adventitial borders in intravascular ultrasound images. *IEEE Transactions on Medical Imaging*, 19:(10) 1-17, 2000.
- Tsutsui H, Ziada KM, Schoenhagen P, Iyisoy A, Magyar WA, Crowe TD, Klingensmith JD, Vince DG, Rincon G, Hobbs RE, Yamagishi M, Nissen SE, Tuzcu EM. Lumen Loss in Transplant Coronary Artery Disease is a Biphasic Process Involving Early Intimal Thickening and Late Constrictive Remodeling: Results from a 5-Year Serial Intravascular Ultrasound Study. *Circulation*. 104(6):653-657, 2001.
- 24. Schoenhagen P, **Vince DG**, Ziada KM, Tsutsui H, Jeremias A, Crowe TD, Nissen SE, Tuzcu EM. Association of Arterial Expansion (Expansive Remodeling) of Bifurcation Lesions Determined by Intravascular Ultrasonography with Unstable Clinical Presentation. *American Journal of Cardiology*, 88:785-787, 2001
- 25. *Nair A, Kuban BD, Obuchowski N, **Vince DG**. Assessing spectral algorithms to predict atherosclerotic plaque composition with normalized and raw intravascular ultrasound data. *Ultrasound in Medicine and Biology*:27(10) 1319-1331, 2001
- 26. Schoenhagen P, Ziada KM, **Vince DG**, Nissen SE, Tuzcu EM. Arterial Remodeling and Coronary Artery Disease. The Concept of "Dilated" versus

"Obstructive" Coronary Atherosclerosis. *Journal of the American College of Cardiology*, 38(2):297-306, 2001

- 27. Schoenhagen P, Halliburton SS, White RD, **Vince DG**, Nissen SE, Tuzcu EM. Characterization of Coronary Atherosclerotic Plaques and the Significance of Vessel Calcification. *Applied Radiology*, 30(11): 46-53, 2001.
- 28. Tsutsui H, Schoenhagen P, Klingensmith JD, **Vince DG**, Nissen SE, Tuzcu EM. Regression of a donor atheroma after cardiac transplantation: serial observations with intravascular ultrasound. *Circulation*.;104(23):2874, 2001.
- 29. Schoenhagen P, **Vince DG**, Ziada KM, Kapadia SR, Lauer MA, Crowe TD, Nissen SE, Tuzcu EM. Relation of matrix-metalloprotinase 3 found in coronary lesions retrieved by directional coronary atherectomy to intravascular ultrasound observations on coronary remodeling. *American Journal of Cardiology*; 89(12):1354-1359, 2002.
- 30. Yamani MH, Tuzcu EM, Starling RC, Ratliff NB, Yu Y, **Vince DG**, Powell KA; Cook D, McCarthy P, Young JB. Myocardial Ischemic Injury After Heart Transplantation Is Associated With Upregulation of Vitronectin Receptor ($\alpha_{v}\beta_{3}$), Activation of the Matrix Metalloproteinase Induction System, and Subsequent Development of Coronary Vasculopathy. *Circulation*, 105:1955 -1961,2002.
- 31. *Nair A, Kuban BD, Tuzcu EM, Schoenhagen P, Nissen SE, **Vince DG**. Coronary Plaque Classification using Intravascular Ultrasound Radiofrequency Data Analysis. *Circulation*106:2200-2206, 2002.
- 32. *Klingensmith JD, **Vince DG**. B-spline Methods for Interactive Segmentation and Modeling of Lumen and Vessel Surfaces in Three-dimensional Intravascular Ultrasound. *Computerized Medical Imaging and Graphics*, 26(6) 429-438, 2002.
- 33. Yamani MH, Starling RC, Young JB, Cook D, Yu Y, Vince DG, McCarthy P, Ratliff NB. Acute vascular rejection is associated with up-regulation of vitronectin receptor (alphavbeta3), increased expression of tissue factor, and activation of the extracellular matrix metalloproteinase induction system. J Heart Lung Transplant 21(9):983-9, 2002
- 34. Veress AI, Weiss JA, Gullberg GT, **Vince DG**, Rabbitt RD. Strain Measurement in Coronary Arteries using Intravascular Ultrasound and Deformable Images. *Journal of Biomechanical Engineering*, 124:734-741, 2002.
- 35. *Tajaddini A, Kilpatrick D, **Vince DG**, A Novel Experimental Method to Estimate Stress-Strain Behavior of Intact Coronary Arteries Using Intravascular Ultrasound (IVUS). *Journal of Biomechanical Engineering*, 125(1):120-123, 2002

- 36. Gurm HS, **Vince DG**, Schoenhagen P, Tuzcu EM, Nissen SE. Relation of cyclooxygenase isoenzyme expression and coronary artery remodeling. *Am J Cardiol.*;91(1):72-75, 2003
- 37. *Klingensmith JD, Tuzcu EM, Nissen SE, **Vince DG**. Validation of an automated system for luminal and medial-adventitial border detection in three-dimensional Intravascular ultrasound. *International Journal of Cardiovascular Imaging*, 19: 93-104, 2003
- Schoenhagen P, Sapp SK, Tuzcu EM, Magyar WA, Popovich J, Boumitri M, Vince DG, Crowe T, Nissen SE. Variability of Area Measurements Obtained with Different Intravascular Ultrasound Catheter Systems. Impact on Clinical Trials and A Method for Accurate Calibration. *Journal of the American Society* of Echocardiography, 16: 277-84, 2003
- *Klingensmith JD, Schoenhagen P, Tajaddini A; Halliburton SS, Tuzcu EM, Nissen SE, Vince DG. Automated three-dimensional assessment of coronary artery anatomy with intravascular ultrasound scanning. *American Heart Journal*,145(5):795-805. 2003
- Schoenhagen P, Stone GW, Nissen SE, Grines CL, Griffin J, Clemson BS, Vince DG; Ziada K; Crowe T; Mstat C, Kapadia SR, Tuzcu EM. Coronary Plaque Morphology and Frequency of Ulceration Distant From Culprit Lesions In Patients With Unstable and Stable Presentation. *Arterioscler Thromb Vasc Biol.* 23(10):1895-900, 2003
- 41. Tsutsui H. Schoenhagen P, Ziada KM, Crowe TD, Klingensmith JD, **Vince DG**, Bott-Silverman C, Starling R, Hobbs RE, Young J, Nissen SE, Tuzcu EM. Early constriction or expansion of the external elastic membrane area determines the late remodeling response and cumulative lumen loss in transplant vasculopathy: An intravascular ultrasound study with a 4-year follow up. *J Heart Lung Transplant* 2003, 22:519-525.
- 42. Tsutsui H, Schoenhagen P, Crowe TD, Klingensmith JD, **Vince DG**, Nissen SE, Tuzcu EM. Influence of coronary pulsation on volumetric measurements performed without ECG-gating. Validation in vessel segments with minimal disease. *Int J Cardiovascular Imaging* 2003, 19:51-57.
- 43. Kharin NA and **Vince DG**. Moderately nonlinear ultrasound propagation in blood-mimicking fluid, *Ultrasound in Medicine and Biology*, 30 (4): 501-509, 2004
- 44. *Nair A, Calvetti D, **Vince DG**. Regularized Autoregressive Analysis of Intravascular Ultrasound Backscatter: Improvement in Spatial Accuracy of Tissue Maps. *IEEE Ultrasonics, Ferroelectrics, and Frequency Control,* 51 (4): 420-431, 2004

- 45. **Vince DG**, Davies SC. Peripheral Application of Intravascular Ultrasound Virtual Histology. Seminars in Vascular Surgery, 17(2): 119-125, 2004.
- 46. Jeremias A, Dusa C, Forudi F, Jacobsen D, **Vince DG**, Nissen SE, Tuzcu EM. N-Acetyl-Cysteine in the Prevention of Vascular Restenosis after Percutaneous Balloon Angioplasty. Int J Cardiol.95(2-3):255-60, 2004.
- 47. Tajaddini A, Kilpatrick DL, Schoenhagen P, Tuzcu EM, Lieber M, **Vince DG**. Impact of age and hyperglycemia on the mechanical behavior of intact human coronary arteries: an ex vivo intravascular ultrasound study. *American Journal of Physiology: Heart and Circulatory Physiology*, H250-H255, 2005
- 48. *Nair A, Klingensmith JD, **Vince DG.** Real-time plaque characterization and visualization with spectral analysis of intravascular ultrasound data. *Stud Health Technol Inform.* 113:300-20; 2005
- Kamohara K, Fukamachi K, Ootaki Y, Akiyama M, Cingoz F, Ootaki C, Vince DG, Popovic ZB, Kopcak MW Jr, Dessoffy R, Liu J, Gillinov AM. Evaluation of a novel device for left atrial appendage exclusion: the second-generation atrial exclusion device. J. *Thorac Cardiovasc Surg*;132(2):340-6 2006
- 50. Rodriguez-Granillo GA, Serruys PW, McFadden EP, van Mieghem CA, Goedhart D, Bruining N, van der Steen AF, van der Giessen WJ, de Jaegere P, Vince DG, Sianos G, Kaplow J, Zalewski A, de Feyter PJ. First-in-man prospective evaluation of temporal changes in coronary plaque composition by in vivo intravascular ultrasound radiofrequency data analysis: an Integrated Biomarker and Imaging Study (IBIS) substudy. *EuroIntervention.* 1(3):282-8; 2005.
- 51. Nasu K, Tsuchikane E, Katoh O, Vince DG, Virmani R, Surmely JF, Murata A, Takeda Y, Ito T, Ehara M, Matsubara T, Terashima M, Suzuki T. Accuracy of in vivo coronary plaque morphology assessment: a validation study of in vivo virtual histology compared with in vitro histopathology. *J Am Coll Cardiol.* 20; 47(12):2405-12. 2006.
- 52. Halliburton SS, Schoenhagen P, Nair A, Stillman A, Lieber M, Tuzcu EM, **Vince DG** and White RD. Contrast enhancement of coronary atherosclerotic plaque: a high-resolution, multidetector-row computed tomography study of pressure-perfused, human ex-vivo coronary arteries. *Coronary Artery Disease*, 17:553–560. 2006
- 53. Nair A, Margolis MP, Kuban BD, **Vince DG**. Automated coronary plaque characterization with intravascular ultrasound backscatter: *ex vivo* validation. *EuroIntervention*, 3; 113-120. 2007
- 54. Nasu K, Tsuchikane E, Katoh O, **Vince DG**, Margolis PM, Virmani R, Surmely JF, Ehara M, Kinoshita Y, Fujita H, Kimura M, Asakura K, Asakura Y, Matsubara T, Terashima M, Suzuki T. Impact of intramural thrombus in

^{* =} student working under supervision

coronary arteries on the accuracy of tissue characterization by in vivo intravascular ultrasound radiofrequency data analysis. *Am J. Cardiol*, 101(8):1079-83, 2008

- 55. Sareen M, Waters K, Nair A, **Vince DG**. Normalization and backscatter spectral analysis of human carotid arterial data acquired using a clinical linear array ultrasound imaging system.. IEEE Eng Med Biol Soc.: 2968-71. 2008
- 56. Fumoto H, Gillinov AM, Ootaki Y, Akiyama M, Saeed D, Horai T, Ootaki C, Vince DG, Popović ZB, Dessoffy R, Massiello A, Catanese J, Fukamachi K . A novel device for left atrial appendage exclusion: the third-generation atrial exclusion device. J Thorac Cardiovasc Surg.136(4):1019-27. 2008
- 57. Serruys PW, García-García HM, Buszman P, Erne P, Verheye S, Aschermann M, Duckers H, Bleie O, Dudek D, Bøtker HE, von Birgelen C, D'Amico D, Hutchinson T, Zambanini A, Mastik F, van Es GA, van der Steen AF, Vince DG, Ganz P, Hamm CW, Wijns W, Zalewski A; Integrated Biomarker and Imaging Study-2 Investigators. Effects of the direct lipoprotein-associated phospholipase A(2) inhibitor darapladib on human coronary atherosclerotic plaque, *Circulation*, 118(11); 1172-82. 2008
- 58. García-García HM, Mintz GS, Lerman A, **Vince DG**, Margolis MP, van Es GA, Morel MA, Nair A, Virmani R, Burke AP, Stone GW, Serruys PW. Tissue characterisation using intravascular radiofrequency data analysis: recommendations for acquisition, analysis, interpretation and reporting. *EuroIntervention*. 2009 Jun;5(2):177-89. Review.
- 59. Chandrana C, Kharin N, **Vince DG**, Roy S; Fleischman A; Demonstration of Second Harmonic IVUS feasibility with Focused Broadband Miniature Transducers. *IEEE Ultrasonics, Ferroelectrics, and Frequency Control* 2010;57(5):1077-1085. [Erratum (text in reference to Fig. 7). *IEEE Trans Ultrason Ferroelectr Freq Control* 2010;57(12):2850.]
- 60. Fumoto H, Gillinov AM, **Vince DG**, Akiyama M, Saeed D, Fukamachi K. Histologic evaluation of stapled right atrial appendages with fabric buttressing. *Innovations: Technology and Techniques in Cardiothoracic and Vascular Surgery* 2010;5(5):359-363.
- 61. Fumoto H, Gillinov AM, Saraiva RM, Horai T, Anzai T, Takaseya T, Shiose A, Arakawa Y, **Vince DG**, Dessoffy R, Fukamachi K. Left atrial appendage occlusion: Pilot study of a fourth-generation, minimally invasive device. *Innovations: Technology and Techniques in Cardiothoracic and Vascular Surgery* 2012;7(3):195-200.
- 62. Shen ZL, **Vince DG**, Li ZM. *In Vivo* Study of Transverse Carpal Ligament Stiffness Using Acoustic Radiation Force Impulse (ARFI) Imaging. *PLoS ONE* 2013;8(7):e68569. PMCID: PMC3702590.

- 63. Schoenhagen P, **Vince DG.** Intravascular photoacoustic tomography of coronary atherosclerosis: riding the waves of light and sound. *J Am Coll Cardiol* 2014;64:391-3.
- 64. Campos CM, Fedewa RJ, Garcia-Garcia HM, **Vince DG**, Margolis MP, Lemos PA, Stone GW, Serruys PW, Nair A. *Ex vivo* validation of 45 MHz intravascular ultrasound backscatter tissue characterization. *Eur Heart J Cardiovasc Imaging*. *Eur Heart J Cardiovasc Imaging*. 2015 Oct;16(10):1112-9.
- 65. Antman EM, DiCorleto PE, Freeman MW, Ganz T, Golan DE, Kitterman R, Loscalzo J, Low M, McKenna E, O'Connor AC, Palazzolo M, Parrish J, Reizes O, Ross RS, Vaughan C, **Vince DG,** Watts L. NIH Centers for Accelerated Innovations. NIH Centers for Accelerated Innovations Program: principles, practices, successes and challenges. *Nat Rev Drug Discov*. 2017;16:663-664.
- 66. Klingensmith JD, Haggard A, Fedewa RJ, Qiang B, Cummings K 3rd, DeGrande S, **Vince DG**, Elsharkawy H. Spectral analysis of ultrasound radiofrequency backscatter for the detection of intercostal blood vessels. *Ultrasound Med Biol.* 2018;44:1411-1422.

Book Chapters:

Vince DG, Nair A, Klingensmith JD, Moore MP, Burgess V. Radiofrequency Tissue Characterization and Virtual Histology. In: Waksman R, Serruys P, eds. *Handbook of the Vulnerable Plaque*. London: Martin Dunitz Limited, 2003.

DeFranco AC, Tuzcu EM, **Vince DG**, and Nissen SE. Endoluminal Assessment of the Unstable Atheroma: Insights from New Imaging Modalities. In Fuster V, Nabel E, and Topol, EJ. *eds. Atherosclerosis and Coronary Artery Disease*. Lippincott Williams & Wilkins, New York.

Nair A, Klingensmith JD, and **Vince DG.** Real-Time Plaque Characterization and Visualization with Spectral Analysis of Intravascular Ultrasound Data. In: Jasjit Suri, Chun Yaun, David L Wilson, and Swamy Laxminarayan, eds. *Plaque Imaging: Pixel to Molecular Level*. Amsterdam; Washington, DC: IOS Press, 2005;300-320.

Vince DG, and Nair A. Intravascular Ultrasound for Plaque Characterization. In: Virmani R, Narula J, Leon MB, Willerson JT, eds. *The Vulnerable Atherosclerotic Plaque: Strategies for Diagnosis and Management.* Malden, Mass.: Blackwell Futura, 2007.

Abstracts:

Over 150 abstracts presented at conferences such as the American Heart Association (AHA) Scientific sessions, Transcatheter Therapies (TCT), IEEE Computer Society, Computers in Cardiology, European Society of Cardiology (ESC), and Paris Course on Revascularisation (PCR).

Grant Executive Committee:

National Institutes of Health – National Heart, Lung, and Blood Institute

 NIH Centers for Accelerated Innovations (NCAI) – Executive Committee, 2013 – pres.

Grant Review Study Sections:

National Institutes of Health

- NIH Surgery & Bioengineering study section (SB); *ad hoc*; 2002
- NIH Surgery, Radiology, and Bioengineering IRG
 - Bioelectromagnetics and Ultrasound Study Section [SSS-X]; 2002
 - Bioelectromagnetics and Ultrasound Study Section [SSS-X];2003
- NIH RFA study section (ZRG1-SRB 52R); 2003
- NIH Biomedical Imaging Technology (BMIT); 2004
- NIH SBMI-R-12 study section (ZRG1-SBMI); 2005
- NIH ZEB1-OSR-C (M1)P Renewal of P41EB002182; 2011

American Heart Association

- American Heart Association, National, Bioengineering and Biotechnology Peer Review Study Group, 2004 - present
- American Heart Association, Southern/Ohio Valley, Research Study Committee 1B; 2001 2003.

Manuscript Review:

American Heart Journal American Journal of Physiology Annals of Biomedical Engineering Biomaterials Circulation
IEEE Transactions on Medical Imaging

Journal of Biomechanical Engineering

Journal of Endocrinology

Journal of Material Science: Materials in Medicine

Lasers in Surgery and Medicine

PLoS One

Ultrasound in Medicine and Biology

TCT/TCT Asia Pacific – 2005 through 2009 Abstract review committee

Teaching:

1999 (Fall EBME 528 - Case Western Reserve University: *Histopathological Analysis* Semester) of Normal and Diseased Tissue. – Course Director

Mentorship:

11/2015 – pres. <u>Mentor for Clinical and Translational Scientist Training Program at</u> <u>Case Western Reserve University (C.V. Harding, MD, PhD,</u> <u>Director)</u> <u>Research Training Program – TL1)</u>

Mentor for NIH Mentored Research Career Development Program Award (KL2)

Balaji Tamarappoo, MD, PhD – Staff, Depts. of Cardiovascular Medicine and Diagnostic Radiology, Cleveland Clinic, Cleveland, Ohio. Completed: Now at Dept. of Imaging (Div. of Nuclear Medicine), Medicine, and Biomedical Sciences, Cedars-Sinai Medical Center, Los Angeles, California.

Jacqueline Chen, PhD – Completed: Now Project Staff, Dept. of Neurosciences, Lerner Research Institute, Cleveland Clinic, Cleveland, Ohio

Thesis Supervision:

Ph.D. Theses

- Omer Demirkaya Automated Quantitative Cellular Analysis of Immunohistochemically Stained Tissue Sections. The Ohio State University -1997
- Ajeetkumar Gaddipati *Automated Color Segmentation in Quantitative Microscopy*. The Ohio State University -1998
- Azita Tajaddini A study of the vascular mechanics of coronary arteries using intravascular ultrasound with an emphasis on diabetic atherosclerosis. -Cleveland State University - 2002

- Anuja Nair Characterising Coronary Atherosclerosis with Intravascular Ultrasound. - Case Western Reserve University - 2002
- Jon Klingensmith Assessment of Coronary Plaque Volume Using 3D Intravascular Ultrasound - Case Western Reserve University - 2003
- Meghna Sareen Determination of carotid plaque composition using spectral analysis. - Case Western Reserve University - 2007

M.S. Theses

- Karla Dixon Characterization of Coronary Plaque in Intravascular Ultrasound Images Using Histological Correlation - The Ohio State University, 1998
- Jon Klingensmith Quantitative Analysis of Coronary Intravascular Ultrasound -The Ohio State University - 1999
- Anuja Nair Comparison of the Ability of Spectral Algorithms to Predict Atherosclerotic Plaque Composition with Radiofrequency Intravascular Ultrasound Data. - Case Western Reserve University - 2000
- Devyani Bedekar Application of Image and Signal Processing Methods to IVUS Data. - Case Western Reserve University - 2005



BIOMEDICAL ENGINEERING

GRANTS 2015 -2018

PI NAME	TITLE OF GRANT	GRANT AMOUNT	START	END	SOURCE
	The Effects of Dual Task Training on Motor and Non-Motor	\$99,035.00			
Alberts	Function in Individuals with Parkinson's Disease		8/1/2015	7/31/2017	Davis Phinney
	Determining Loss of Consciousness in Fighters and	\$687,111.00			
Alberts	Development of Associated Injury Assessmetn Reference		8/1/2015	7/31/2017	DOD
	MR141261: The Quantification of Visual Function and	\$1,499,987.00			
	Posutural Stability under Single and Dual-Task Conditions		2/15/2016	2/44/2040	
Alberts	using Mobile Technology	A O 440 000 00	2/15/2016	2/14/2019	
Alborto	Human Head Impact Dose Concussion Risk Functions and	\$2,443,020.00	1 /1 /2017	12/21/2010	DOD
Alberts	Sensor-Based Military-Specific Environmental Monitoring	¢400.000.00	1/1/2017	12/31/2019	
Apte	Fibrillin microfibril regulation by ADAMITSL3	\$100,000.00	1/1/201/	12/31/2018	Marfans Foundation
Anto	Forward and reverse degradomics of cardiovascular	\$1,500,000.00	10/1/2017	0/20/2020	
Apte		¢40.004.00	10/1/2017	9/30/2020	
	Sim vitro	\$49,994.00			Ohio Development Services
Colbrunn			3/23/2015	4/30/2016	Agency
	Stem Cell Therapy Combined with Growth Factors for Stress	\$22,368.00			
Damaser	Urinary Incontinence		9/18/2014	8/31/2015	NIH Subcontract
	The Urocapsule	\$50,000.00			Ohio Development Services
Damaser			8/3/2015	8/3/2016	Agency
Damaser	Case Urology Translational Research Training Program	\$119,677.00	7/1/2015	6/30/2017	NIH Subcontract
	Conscious ambulatory bladder monitoring to understand	\$561,225.00			
Damaser	neural control of lower urinary tract infection		2/1/2017	11/30/2018	NIH
Damaser	Pharmaceutical Intervention for Stress Urinary Incontinence	\$109,899.00	8/10/2017	9/3/2018	Novartis
	Conscious ambulatory bladder monitoring to understand	\$1,013,747.00			
Damaser	neural control of lower urinary tract infection		2/1/2018	11/30/2018	NIH
	Failure with continuity and its Relation to Rotator Cuff Repair	\$3,133,048.00			
Derwin	Clinical Outcomes		4/1/2016	3/31/2021	NIH
erdemir	Reference Models for Multi-Layer Tissue Structures	\$3,588,196.00	9/1/2015	8/31/2018	DOD
	Automated patient specific artery modeling using ultrasound	\$594,378.00			
erdemir	virtual histology		4/1/2016	12/31/2018	NIH Subcontract
	Reproducibility in simulation-based prediction of natural knee	\$722,382.00			
erdemir	mechanics		9/21/2017	6/30/2021	NIH
	Ultrasonic Determination of Human Carotid Plaque	\$308,000.00	- / . /		
Fedewa	Composition		7/1/2015	6/30/2018	АНА
Fleischman	I elemetric Microsensor for Glaucoma	\$32,380.00	12/1/2015	5/31/2017	NIH Subcontract
L	NCAI-16-6-APP-CCF-Fleischman Project High Resolution	\$108,996.00			l
Fleischman	IVUS		1/1/2017	7/31/2018	NIH

	Motion-activated system (MAS) to prevent chest tube	\$135,496.00			
Fukamachi	clogging.		3/1/2015	2/29/2016	NIH
	Implantable Ventricular Assist Device Directed to Long Term	\$74,707.00	- /. /		
Fukamachi	Right Side Support	A	5/1/2015	12/14/2015	NIH Subcontract
Fukamachi	Labtype to Preclinical Prototype VAD	\$578,071.00	5/1/2015	12/31/2016	NIH Subcontract
- · · ·	Evaluation of VentriFlo True Pulse Pump (TPP) in an Acute	\$229,441.00	40/4/2045	0/0/0040	
Fukamachi	Pig Model	* 400 00 4 00	10/1/2015	9/3/2018	Design Mentor
Eukamachi	Advanced Ventricular Assist Device with Pulse Augmentation	\$430,294.00	7/15/2016	0/20/2010	NIH
Fukamashi	Solf-regulating continuous-flow total artificial heart	\$5 426 310 00	7/15/2010	3/30/2013 c/20/2020	
	Sein-regulating continuous-now total artificial heart	\$3,420,510.00 \$72,666,00	//15/2010	6/30/2020	
Fukamachi	Small Diameter, High Output, Durable Transapical LVAD	\$72,000.00	1/1/2018	11/30/2018	NIH Subcontract
Fukamachi	Development of a Miniaturized, Pediatric Continuous-Flow	\$3,026,814.00	1/1/2010	2/20/2022	
Fukamachi	I otal Artificial Heart with a single moving part	¢40.000.00	4/1/2018	2/28/2022	
	induced neurotoxicity	\$40,000.00			Alternatives Research &
Ghosh			8/1/2015	7/31/2016	Development Foundation
Charle	Cytochrome P450-mediated drug interactions at the human	\$1,738,711.00	4/4/2047	42/24/2017	N1111
Ghosh	blood-brain barrier	\$10,000,00	4/1/2017	12/31/2017	NIH
Chosh	Drug development for tuberous scierosis complex and other	\$18,992.00	7/21/2017	6/20/2022	NIH Subcontract
GHOSH	Pediatric epileptogenic	¢154,000,00	//21/201/	0/30/2022	
Graham	mbb blocks TRPC5 activation and preserves endotrienal cell	φ154,000.00	7/1/2016	6/30/2018	ана
Graham	Effect of Linids on Vascular Graft Healing	\$3,006,927,00	12/15/2017	11/20/2021	NIH
Granan	Hvaluronan (HA) assembly and its Role in Bone Mornhogenic	\$57,928,00	12/13/2017	11/30/2021	
	Protein-7 Driven Antagonism of Renal Fibrosis	ψ01,020.00			
Hascall	Totom P Briton Anagomon of Konal Historio		5/1/2013	4/30/2017	Cardiff University
Janigro	Stroke Biomarker: Correlation with Treatment Outcomes	\$41,429.00	12/2/2014	12/1/2017	, ShimoJani
	Biorepository Core Lab for the PTSD – TIB Clinical	\$292.344.00			
Janigro	Consortium	·,- · · · · · ·	9/1/2014	8/31/2015	Duke
-	Transcatheter Cardiac Deairing System (TCDS) for Minimally	\$117,581.00			
Karimov	Invasive Cardiac Surgery		7/1/2018	12/31/2018	NIH
	Polyhydroxy Fullerene Sunscreen For Preventing Uv-Induced	\$442,358.00			
Krishna	Skin Cancer		9/30/2015	9/29/2017	DOD
	Engineered Photonic Nanoparticles For In Situ Stimulation Of	\$174,542.00	- // /00/ 0		
Krishna	Cancer Immunotherapy	.	7/1/2016	6/30/2016	Elsa Pardee
labhasetwar	Neuronal Protective Nanoparticles for Treating Acute SCI	\$2,247,025.00	4/1/2015	3/31/2020	NIH
labhasetwar	Nanoparticle-mediated treatment for bone metastasis	\$1,562,810.00	5/4/2016	4/30/2021	NIH
labhasetwar	Developing Pro-NP for Acute Spinal Cord Injury	\$1,723,656.00	9/30/2016	9/29/2019	DOD
	Nanoparticle-based therapy for photoreceptor degeneration	\$1,188,750.00			
labhasetwar			9/30/2016	8/31/2019	NIH
	Multi-site multi-vendor cross-validation of cartilage T1RHO	\$115,640.00			
Li, X	and T2 imaging		10/1/2017	9/30/158	Arthritis Foundation
	Longitudinal changes in marrow fat, other fat depots and	\$53,153.00		F /24 /2010	
LI, X	bone		6/1/2017	5/31/2018	NIH Subcontract

	Biomarkers of Synovial Fluids after Hyaluronic Acid Injection	\$124,626.00			
Li, X			6/6/2018	4/30/2019	Ferring Pharma
Li, Z	Biomechanical Treatment of Carpal Tunnel Syndrome	\$3,228,323.00	7/1/2015	6/30/2020	NIH
	Non-obtrusive tissue manipulation device for treatment of	\$168,527.00			
Li, Z	carpal tunnel syndrome		6/15/2017	5/31/2019	NIH Subcontract
	Heart-Brain Retraining: Forced Aerobic Exercise for Stroke	\$120,981.00	- / / /		
Linder	Rehabilitation	* 0 = 00 (00 00	//1/2015	6/30/201/	АНА
Maracco	Functional metrics for humans with bi-directionally integrated	\$2,530,100.00	7/27/2016	6/20/2010	
	Prostnetic limbs Molocular Response and Imaging based Combination	\$600 550 00	//2//2010	0/30/2019	000
Maytin	Strategies for Ontimal PDT	φ000,550.00	3/11/2015	12/31/2019	NIH Subcontract
Maytin	Pilot Trial of PDT of BCC in Patients with BCNS	\$94 719 00	4/14/2015	1/13/2020	
Maytin	Painless PDT in AK's - DLISA	\$48,773,00	7/1/2015	6/20/2010	
Iviaytiii	Vitamin D and Photodynamic Therapy for Human Skin	\$2 337 110 00	7/1/2013	0/30/2019	DUSA
Mavtin	Cancer (SCC and BCC)	φ2,337,110.00	12/27/2016	11/30/2021	NIH
Maytin	Painless PDT Ambient Arm	\$39,284,00	10/1/2017	9/30/2020	SUN Pharmaceuticals
	BTGL - Ltr of Intent- Study of Occ Radiation Dose/ Y-90	\$20,000,00	10/1/201/	3,33,2020	
Mclennan	Radioembolic Products	\$20,000.00	10/1/2014	9/30/2017	BTG International
	Measurement of Blood flow using digital Subtraction	\$5,000.00			
Mclennan	angiography for fistulography		5/1/2016	4/30/2017	CSU
Mclennan	InVitro III AT	\$56,540.00	5/1/2016	4/30/2017	Siemens Medical Solutions
	Optimizing PEMF to Reduce Bone Loss Associated with	\$684,035.00			
Midura	Osteoporosis:		3/15/2016	6/15/2016	Orthofix
	PEMF Stimulation of Mechanosensory Nerves Affecting Bone	\$351,737.00		- / / /	
Midura		A	6/2/2016	//1/201/	Orthofix
Muschlor	Adaptive Orthopedic Biologics for Highly Targeted	\$752,558.00	2/1/2016	0/10/2010	Conova Foundation
wuschief	Regeneration	¢400.000.00	5/1/2010	6/19/2019	
	quality-by-design approach to create synovial cells from	φ400,000.00	- // /20/0		Rheumatology Research
Muschler		• •••••••	//1/2016	6/30/201/	Foundatoin
Muschlor	Clinical Evaluation of Decellularized Nerve Allograft with	\$67,978.00	г /1 /2017	6/20/2019	Henry Jackson Foundatoin
wuschief	Autologous Bone Marrow Clinical Evaluation of Decollularized Nerve allograft with	¢250.496.00	5/1/2017	0/30/2018	
Muschler		φ250,400.00	5/1/2017	6/30/2018	Henry Jackson Foundatoin
Muserner	Automated Patient-Specific Analysis and Stem Cell Colony	\$250,000,00	3/1/201/	0,00,2010	
Muschlor	Selection for Bone and Cartilage Regeneration	φ200,000.00	12/1/2017	11/20/2010	Lisa Doan Masolov Foundatoin
wuschief	NCAL 17 7 APP CCE Muschler: Coll X Dovice Validation for	¢114 663 00	12/1/2017	11/30/2019	
Muschler	iPS Clope Selection and Cardiomyocyte Eabrication	φ114,003.00	8/1/2017	7/31/2018	NIH
Nakamura	VBM2	\$51,176,00	12/18/2015	2/17/2016	Biogen
Nakamura	VBM3	\$4 897 00	11/28/2016	4/30/2017	Biogen
Nakamura	Analysis of Brain Atronby from MPIs Acquired for Conzyma's	\$454.084.00	11/20/2010	4/30/2017	biogen
	Phase IIIB-IV I ong Term follow-up Study for Patients Who	φ+3+,004.00			
Nakamura	Participated in CAMMS03419		11/1/2016	5/31/2020	NeuroRX
Nakamura	BPF analysis of MRI's Acquired for the DEFINE Trial	\$233,153.00	8/18/2015	8/17/2016	Biogen

	Advanced Medical Electronics R43	\$20,050.00			
Owings			10/1/2015	7/30/2016	Advanced Medical Electronics
Owings	Advanced in-shoe orthotic treatment for foot pain	\$153,954.00	6/1/2016	5/31/2017	Diapedia
	Improving Spinal Cord Injury Rehabilitation Interventions by	\$100,000.00			
Plow	Retraining the Brain with stimulation		10/1/2015	9/30/2016	Conquer Paralysis Now
	Novel brain stimulation therapies in stroke guided by	\$154,000.00			
Plow	expressions of plasticity		1/1/2016	12/31/2018	АНА
	Improving Spinal Cord Injury Rehabilitation Interventions by	\$2,478,681.00	0/20/2010	0 /00 /0000	202
Plow	Retraining the Brain with stimulation		9/30/2018	9/29/2022	טטט
Plow	A Novel Approach for Brain Stimulation in Severe Stroke	\$300,000.00	7/1/2018	6/30/2021	АНА
	Collaborative Research: Stem cell-inspired nanotherapeutics	\$300,000.00	- / / /		
Ramamurthi	for regenerative repair of elastic matrix		//1/2015	6/30/2018	NSF
Design of the	Minimally Invasive Regenerative Therapy for Small	\$150,000.00	1/1/2016	42/24/2040	
Ramamurthi	Abdominal Aortic Aneurysms	* ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	1/1/2016	12/31/2018	АНА
Domomurthi	Regenerative nanopharmacotherapy for small abdominal	\$396,250.00	0/15/2016	0/21/2017	
Kalilalliurulli	aorric aneurysms	¢E0.000.00	9/15/2010	8/51/2017	NIT
Pamamurthi	Exploring commercialization opportunities for a tissue	\$50,000.00	6/15/2017	11/20/2018	NISE
	Multimodal papotherapy to improve surgical mesh outcomes	\$240,000,00	0/13/2017	11/30/2018	
Ramamurthi	in organ prolanse	φ240,000.00	9/11/2017	5/31/2019	NIH
	NCAI-17-7-APP-CCE-Ramamurthi: Developing Antibody-	\$118 875 00	0, ==, =0=;	0,01,1010	
	Targeted Nanoparticle-Drug Conjugates as a Non-Surgical	\$110,010.00			
Ramamurthi	Treatment for AAAs		8/1/2017	7/31/2018	NIH
	Matrix Regenerative Nanotherapeutics for Small Abdominal	\$1,603,542.00			
Ramamurthi	Aortic Aneurysm Repair		12/15/2017	11/30/2021	NIH
	Altering Parkinson's Disease Progression through a	\$96,608.00			
Rosenfeldt	Community Based Pedling for Parkinson's Program		9/1/2018	8/31/2020	Davis Phinney
	Hyaluronan Barrier Coating as a Strategy to Improve	\$435,875.00			
Sahoo	Durability of Biologic Hernia		9/26/2016	7/31/2018	NIH
	Vascular Plaque Determination for Stroke Risk Assessment	\$1,756,026.00			
Vince			9/15/2016	9/14/2019	DOD
N.C	NCAI: The Cleveland Clinic Innovation Accelerator-	\$10,124,944.00	0/4/2045	7/20/2020	
Vince	Supplement	¢=0.000.00	8/1/2015	//30/2020	
West	Electromagnetic Accuracy Project	\$50,000.00	11/10/2015	4/30/2016	Centerline Biomedical
West	AugMed3D	\$118,740.00	4/15/2016	12/31/2018	Centerline Biomedical
	Validation of IOPS guidewire catheter tracking and software	\$31,570.00			
West	platforms	A	4/15/2016	12/31/2018	Centerline Biomedical
West	IOPS Technology	\$393,750.00	1/1/2017	12/31/2017	Centerline Biomedical
	3D Image Guidance System to Reduce Fluoroscopic	\$133,826.00			
West	Radiation Dose during Endovascula	•	2/15/2018	8/14/2019	Centerline Biomedical
	Holograhic Visualizatin for Performance of Percutaneous	\$68,488.00	1/1/2010	0/04/0040	
west	Ablation of Solid Tumors	\$ 100 1FC 00	4/1/2018	3/31/2019	veiosano
Zborowski	PEME vibrational study in bone in-vitro and in-vivo	\$463,456.00	6/21/2016	12/20/2017	Orthofix
_ ,	Fractionation of aged RBCs based on hemoglobin content	\$449,643.00		10/04/0000	
Zborowski			1/1/2017	12/31/2020	NIH Subcontract

	Simulation of PEMF-induced E field for comparison with AC E	\$39,122.00			
Zborowski	field for insulated e		8/14/2017	8/13/2018	Orthofix
Zborowski	Orthofix contract	\$727,804.00	4/1/2018	3/31/2020	Orthofix
	TOTAL OF GRANTS FOR CLEVELAND CLINIC BME	\$ 73,637,592.00			

CLEVELAND CLINIC ~ BIOMEDICAL ENGINEERING DEPARTMENT

PUBLICATIONS 2015 - 2017

Pubmed ID	Article Title	Authors	Source	Vol	Issue	Pages	Year
MEDLINE:25999946	Interactions between hyaluronan and its receptors (Misra, Suniti; Hascall, Vincent C.; I	FRONTIERS IN IMM	6	n/a	n/a	2015
MEDLINE:25916966	Metalloproteinases: A parade of functions in matrix	Apte, Suneel S.; Parks, William C.	MATRIX BIOLOGY	44-46	n/a	6-Jan	2015
MEDLINE:25641114	Mechanisms of Tendon Injury and Repair	Thomopoulos, Stavros; Parks, Will	JOURNAL OF ORTH	33	6	832-839	2015
MEDLINE:25451858	Stem cells as drug delivery methods: Application of s	Tran, Christine; Damaser, Margot	ADVANCED DRUG	82-83	n/a	11-Jan	2015
MEDLINE:26343846	Drug delivery, cell-based therapies, and tissue engin	Kabu, Shushi; Gao, Yue; Kwon, Bri	JOURNAL OF CONTI	219	n/a	141-154	2015
MEDLINE:26049148	Diurnal fluctuations in brain volume: Statistical analy	Nakamura, Kunio; Nakamura, Kun	NEUROIMAGE	118	n/a	126-132	2015
MEDLINE:25770910	Insights on ADAMTS proteases and ADAMTS-like pro	Dubail, Johanne; Apte, Suneel S.	MATRIX BIOLOGY	44-46	n/a	24-37	2015
MEDLINE:25849143	Structural mechanism of integrin inactivation by filar	r Liu, Jianmin; Das, Mitali; Yang, Jur	NATURE STRUCTUR	22	5	383-U54	2015
MEDLINE:24951091	Rethinking Stimulation of the Brain in Stroke Rehabi	l Plow, Ela B.; Cunningham, David A	NEUROSCIENTIST	21	3	225-240	2015
MEDLINE:26222421	Tailoring the surface charge of dextran-based polym	Barrow, Michael; Taylor, Arthur; N	BIOMATERIALS SCIE	3	4	608-616	2015
MEDLINE:26000961	Arginine-rich polyplexes for gene delivery to neuron	Morris, Viola B.; Labhasetwar, Vin	BIOMATERIALS	60	n/a	151-160	2015
MEDLINE:26024446	Blast-Associated Shock Waves Result in Increased Br	Kabu, Shushi; Jaffer, Hayder; Petro	PLOS ONE	10	5	n/a	2015
MEDLINE:25377914	Mesenchymal stem cells and their secretome partial	Deng, Kangli; Deng, Kangli; Deng,	AMERICAN JOURNA	308	2	F92-F100	2015
MEDLINE:25957949	ADAMTS proteins as modulators of microfibril forma	Hubmacher, Dirk; Apte, Suneel S.	MATRIX BIOLOGY	47	n/a	34-43	2015
MEDLINE:25447568	Does pulsatility matter in the era of continuous-flow	Moazami, Nader; Dembitsky, Wal	JOURNAL OF HEART	34	8	999-1004	2015
MEDLINE:25194451	Assessment of Inter-Hemispheric Imbalance Using Ir	Cunningham, David A.; Cunningha	ARCHIVES OF PHYSI	96	4	S94-S103	2015
MEDLINE:24889422	Investigating muscle regeneration with a dermis/sm	Ma, Jinjin; Sahoo, Sambit; Baker, A	JOURNAL OF BIOMI	103	2	355-364	2015
MEDLINE:26484700	Stimulation targeting higher motor areas in stroke re	Cunningham, David A.; Cunningha	RESTORATIVE NEUF	33	6	911-926	2015
MEDLINE:25878309	Three-Dimensional Imaging and Templating Improve	lannotti, Joseph P.; Weiner, Scott;	JOURNAL OF BONE	97A	8	651-658	2015
MEDLINE:25809137	Objective Assessment of Postural Stability in Parkins	Ozinga, Sarah J.; Ozinga, Sarah J.;	MOVEMENT DISOR	30	9	1214-1221	2015
MEDLINE:25782693	The HAAPI (Home Arm Assistance Progression Initiat	: Wolf, Steven L.; Wolf, Steven L.; W	NEUROREHABILITA	29	10	958-968	2015
MEDLINE:26173607	First report of 90-day support of 2 calves with a cont	: Karimov, Jamshid H.; Moazami, Na	JOURNAL OF THOR	150	3	687-+	2015
MEDLINE:25591125	Codelivery of DNA and siRNA via Arginine-Rich PEI-B	Lu, Shan; Lu, Shan; Morris, Viola B	MOLECULAR PHARM	12	2	621-629	2015
MEDLINE:25844153	Multiscale cartilage biomechanics: technical challeng	Erdemir, Ahmet; Bennetts, Craig;	INTERFACE FOCUS	5	2	n/a	2015
MEDLINE:25546857	Transcranial Assessment and Visualization of Acoust	i Arvanitis, Costas D.; Clement, Gre	IEEE TRANSACTION	34	6	1270-1281	2015
MEDLINE:25712788	Vitamin D enhances the efficacy of photodynamic th	Rollakanti, Kishore R.; Rollakanti, I	CANCER MEDICINE	4	5	633-642	2015
MEDLINE:24877682	Carpal tunnel syndrome impairs sustained precision	Li, KE; Evans, Peter J.; Seitz, Willia	CLINICAL NEUROPH	126	1	194-201	2015
MEDLINE:25813373	It Takes Two: Noninvasive Brain Stimulation Combin	Page, Stephen J.; Page, Stephen J.	ARCHIVES OF PHYSI	96	4	S89-S93	2015
MEDLINE:26209637	Hyaluronan and Its Heavy Chain Modification in Asth	Lauer, Mark E.; Majors, Alana K.; (JOURNAL OF BIOLO	290	38	23124-23134	2015
MEDLINE:26027930	ADAMTS9-Mediated Extracellular Matrix Dynamics F	Nandadasa, Sumeda; Nelson, Cou	CELL REPORTS	11	10	1519-1528	2015
MEDLINE:25716319	Hyaluronan Regulates Bone Morphogenetic Protein-	Midgley, Adam C.; Duggal, Lucy; Je	JOURNAL OF BIOLO	290	18	11218-11234	2015
MEDLINE:26378948	Quantification of the Balance Error Scoring System v	Alberts, Jay L.; Thota, Anil; Hirsch,	MEDICINE AND SCIE	47	10	2233-2240	2015
MEDLINE:26125413	Apolipoprotein A-I mimetic peptide reverses impaire	Rosenbaum, Michael A.; Rosenba	ATHEROSCLEROSIS	241	2	709-715	2015

MEDUR:25879588 Disparate wore based morphometry (VBM) results N ajagopalan, Venkateswaran, Raji BMC NUROLOGY17.1882015MEDUR:256403175 Disruption of murine AdamtsI4 results in zonular fibs Collin, Gayle B.; Hubmacher, Dirk; HUMAN MOLECUL/24246958-69742015MEDUR:256403175 Disruption of murine AdamtsI4 results in zonular fibs Collin, Gayle B.; Hubmacher, Dirk; HUMAN MOLECUL/24246958-69742015MEDUR:256101210 nog-Term Effects of simulated Childbirth Injury on Tosng, Ch-Xiang; Song,	MEDLINE:25844853 Using Accelerometer and Gyroscopic Measures to QI Alberts, Jay L.; Alberts, Jay L.; Hirs JOURNAL OF ATHLE 50	6	578-588	2015
MEDURE:25460414(Linically relevant mechanical testing of hernia graft Sahoo, Sambit; Delozier, Katherinu/DURNAL OF THE V41 n/a 177-188 2015 MEDURE:2640171 Disrugtion of murine Admits fessults in zonular fike Colin, Gayle B.; Hubmacher, Dirk; HUMAN MOLEOUZ 4 698-8697 2015 MEDURE:26402845tratilation of the CYBA4 deepe Ghosh, Chatality, Hossain, Mohamr EPILEPSA 54 34.494 2015 MEDURE:25502845tratilation of the CYBA4 deepe Ghosh, Chatality, Hossain, Mohamr EPILEPSA 56 439-4492 2015 MEDURE:25502754EVALUATION OF RHBMP-2/CULLAGEN/TCP-HA BONI Luangphadry, V.; Shinchara, K.; PELUROPEANCELLS & 20 n/a 573-56 2015 MEDURE:255279754EVALUATION OF RHBMP-2/CULLAGEN/TCP-HA BONI Luangphadry, V.; Shinchara, K.; PELUROPEANCELLS & 20 n/a 2015 MEDURE:255279754EVALUATION OF RHBMP-2/CULLAGEN/TCP-HA BONI Luangphadry, V.; Shinchara, K.; PELUROPEANCILLS & 20 n/a 2015 MEDURE:25623027 Stantalge Deigenetic Drug Delivery Depletes Cholest Raghavan, Vilay: Vijayaraghavalu, LANGMUIR 1156+11573 2015 MEDURE:2562302 Statistical deligenetic Drug Delivery Depletes Cholest, Daniel J.; Xao, Wanfkarg, XMATIK BIOLOGY n/a 66.44 2015 MEDURE:2562302 Costingend Dalamis nigrauduation Mills, Kelly A.; Mills, Kelly A.; MarkJOURNAL OF THEU MS 4 444-4402 2015	MEDLINE:25879588 Disparate voxel based morphometry (VBM) results b Rajagopalan, Venkateswaran; Raja BMC NEUROLOGY 15	n/a	n/a	2015
MEDURE:26403172 Disruption of murine Adamtski results in zonular fibs Collin, Gayle B, Hubmacher, Dirk, HUMAN MOLECUL 24 24 6958-6974 2015 MEDURE:2550887 Multiaboratory Study of forbunduced Hompkisu U Herberston, Luke H, JOIn, Salim E, ARTHICHA, ORGAN.39 247-1148 2015 MEDUNE:2550824 Settraline-induced potentiation of the CYP3A4-depe Ghosh, Chaitali, Hossain, Moham TEJEPSIA 5 3 439-449 2015 MEDUNE:2550754 CVALUATION OF RHBMP 2/COLLAGEN/TCP-HA BONL Langphakdy, V; Shinohara, K, PELROPEAN CELLS & V 8 1037-1043 2015 MEDUNE:25579754 CVALUATION OF RHBMP 2/COLLAGEN/TCP-HA BONL Langphakdy, V; Shinohara, K, PELROPEAN CELLS & V 8 1037-1043 2015 MEDUNE:25579756 CVALUATION OF RHBMP 2/COLLAGEN/TCP-HA BONL Langphakdy, V; Shinohara, K, PELROPEAN CELLS & V 8 1037-1043 2015 MEDUNE:2564380C Sustained Explerentic Drug Delivery Depleters Cholest Raghavan, Vijay; Vijayaraghavalu, LANGMUIR 31 2 11564-11373 2015 MEDUNE:2564380C Sustained EDAMMS 30 const affect agrescan or ve Gorsk, Daniel J, Xãou, Venefneg; XMATRIK BIOLOGY 47 7 66482 2015 MEDUNE:2564303C Biocompatibility evaluation of a thermoplastic rubbe Yang, Lang, Charlin, Andrea C, PuskJOURNAL OF FLEN 85 487-499 2015 MEDUNE:2564256 Hepanin intreceptoru hypregiveriu Mang, Marine Sankaranarayanan, MATRIK BIO	MEDLINE:25460414 Clinically relevant mechanical testing of hernia graft Sahoo, Sambit; Delozier, Katherin: JOURNAL OF THE N 41	n/a	177-188	2015
MEDURE2580887Multilaboratory Study of Flow-Induced Hemolysis Us Herbertson, Luke H.; Olia, Saim E. ARTIFICIAL ORGAN 393227-U1482015MEDURE2580018Liong-Term Effects of Simulated Childbirth Injury on I Song, Qi-Xiang; Son NEUROUROLOGY A34381-3862015MEDUNE25502437Comparing brain structural MRI and metabolic FDG-I Rajagopalan, Venkateswaran, Raji JORNAL OF NEURAS9952-9582015MEDUNE25779055Weakening of Corticomuscular Signal Coupling Durin Bayram, Mehmed Bugrahan, Bayr JORNAL OF FREINE81037-10432015MEDUNE25797935Weakening of Corticomuscular Signal Coupling Durin Bayram, Mehmed Bugrahan, Bayr JORNALS OF GRR /081037-10432015MEDUNE25795Yanalysis of the Heavy-Chain Modification and TSG-6 Lauer, Mark E; Lofits, Jacqueline; GLYCOSAMINOGLY112912r/a2015MEDUNE2569302CSustined Epigenetic Drug Delivery Depletes Cholest Raghavan, Vijayr Vijayraghavalu, LONGNIR34211564-115732015MEDUNE25640345 Deletion of ADAMTS5 does not affect aggrecan or ve Gorski, Daniel Li, Xiao, Wenfeng; XMATIK BIOLOGY /1n/a8:482015MEDUNE2576257CAdamts12 deletion results in bronchial fibrillin microf Hubmacher, Dirk; Wang, Lauren VDISASE MODELS &5487-499215MEDUNE25582563Heparin interaction with a receptor on hyperglycemi Wang, Aimir, Sankaranarayanan, MATIK BIOLOGY /1n/a8:462015MEDUNE256927CAdumts12 deletion results in bronchial fibrillin microf Hubmacher, Dirk; Wang, Lauren VDISASE MODELS &5487-499215MEDUNE2576257CAdmts12 deletion results in bronchial fibrillin microf Hubmacher, Jork; Wang, Lauren VDISASE MODELS &5487-492	MEDLINE:26405179 Disruption of murine Adamtsl4 results in zonular fibe Collin, Gayle B.; Hubmacher, Dirk; HUMAN MOLECUL/24	24	6958-6974	2015
MEDURE-23501018 Long-Term Effects of Simulated Childbirth Injury on ISong, Qi-Xiang; Song, Qi-Xiang; Song, Qi-Xiang; Song, URADNALOS Y A34381-3862015MEDURE-2356043 Sertraline-induced potentiation of the CYP3A4-depe (hosh, Chaitali; Hossian, Moham: PILEPSIA563439-4492015MEDURE-2557354 ISVALUATION OF RHBMP-2/COLLAGEN/TCP-HA BONL Langphakdy, V.; Shinohara, K.P.; PLROPEAN CELLS 2.9n/a57-692015MEDURE-2557354 STALUATION OF RHBMP-2/COLLAGEN/TCP-HA BONL Langphakdy, V.; Shinohara, K.P.; PLROPEAN CELLS 2.9n/a537-10432015MEDURE-255203575 CAULATION OF RHBMP-2/COLLAGEN/TCP-HA BONL Langphakdy, V.; Shinohara, K.P.; PLROPEAN CELLS 2.9n/a543-5482015MEDURE-25540367 Change of Corticomuscular Signal Coupling Durin Bayram, Milym, Wagaraghavalu, LANGMUR1211564-115732015MEDURE-2540306 Sustained Egigenetic Drug Delivery Depletes Cholest Raghavan, Vilay, Vilayraghavalu, LANGNUR14404-4092015MEDURE-2542300 Reproducibility of Intravascular ultrasound radiofreq Muramatsu, Takashi; Muramatsu, JOUNAL OF NEUR865487-4992015MEDURE-25627 Chardms12 deletion results in bronchal filter taggrecan or ve Gorski, Janiel J.; Xiao, Wenfeng; MATRIX BIOLOGY 4n/a83-892015MEDURE-25672 Chardms12 deletion results in bronchal filter daggreem or ve Gorski, Janiel J.; Xiao, Wang, Lauren VDISEA54 MOELS 85487-4992015MEDURE-25672 Chardms12 deletion results in bronchal filter daggreem dange, Janie,	MEDLINE:25180887 Multilaboratory Study of Flow-Induced Hemolysis Us Herbertson, Luke H.; Olia, Salim E. ARTIFICIAL ORGAN: 39	3	237-U148	2015
MEDLINE:2565284 servaline-induced potentiation of the CYP3A4-depe Ghosh, Chaiali, Hossain, Mohame PPILEPSIA563439-4492015MEDLINE:25520437 comparing brain structural MRI and metabolic FDG-1Rajagopalan, Venkateswaran, Raji-JOURNALO F NEUNRE9952-9582015MEDLINE:2573095 Weakening of Corticomuscular Signal Coupling Durin Bayram, Mehmed Bugrahan, Bayr JOURNALO F CERK7081037-10432015MEDLINE:2573095 Weakening of Corticomuscular Signal Coupling Durin Bayram, Mehmed Bugrahan, Bayr JOURNALO F NEUNRE142015n/amproving Quality of Life and Depression After Strok Linder, Susan MJ; Rosenfeldt, NarvMERICAN JOURNAL OF NEUR864404-4092015MEDLINE:25423045D eletion of ADAMTS5 does not affect aggresan or ve Gorski, Daniel L; Xiao, Wenfeng; XMATRIX BIOLOGY 47n/a66-842015MEDLINE:25423024D enproducibility of intravascular during roummatus, Takashi, Muramatsu, JOURNAL OF THE VAS1141-1222015MEDLINE:25423024D enproducibility of intravascular durinsound radiofreq Muramatsu, Takashi, Muramatsu, JOURNAL OF THE VASn/a83-892015MEDLINE:25423231EX twivo adiation of 3 MHz Intravascular durinsound compos, Carlo KJ, Campos, Carle KJ, C	MEDLINE:24501018 Long-Term Effects of Simulated Childbirth Injury on FSong, Qi-Xiang; Song, Qi-Xiang; So NEUROUROLOGY A 34	4	381-386	2015
MEDLINE:2552975A EVALUATION OF RHBMP-2/COLLAGEN/TCP-HA BONL Lungphakdy, V.; Shinohara, K.; Pt EUROPEAN CELLS 8:29952-9582015MEDLINE:25579754 EVALUATION OF RHBMP-2/COLLAGEN/TCP-HA BONL Lungphakdy, V.; Shinohara, K.; Pt EUROPEAN CELLS 8:21037-10432015MEDLINE:25579575 EVAckening of Corticomuscular Signal Coupling Durin Bayram, Mehmed Bugrahan; Bayr JOURNALS OF CER(7)81037-10432015MEDLINE:2552957 Analysis of the Heavy-Chain Modification and TSG-6 Lauer, MARK E.; Loftis, Jacquellen; GLYCOSAMINOGLY 1220n/a543-5482015MEDLINE:2543980C Sustained Epigenetic Drug Delivery Depletes Cholest Raghavan, Vijay; Vijayaraghavalu, LANGMUIR3211564-115732015MEDLINE:25403425 Deletion of ADAMTS5 does not affect argercan or ve Gorski, Daniel J.; Niao, Wenfeng; MARTIKI BIOLOCY 7n/a66-842015MEDLINE:254230C Reproducibility or intravascular ultrasound radiofreq Muramatsu, Takashi; Muramatsu, JOURNAL OF CARDIS2.Jan131-1422015MEDLINE:2576257 Adamts12 deletion results in bronchi filpillim micrich Humacher, Dirk, Wang, Lauren V DISASE MODELS7a36-412015MEDLINE:2576257 Adamts12 deletion results in bronchi filpillim micrich Humacher, Dirk, Wang, Lauren V DISASE MODELS847-4992015MEDLINE:2576257 Adamts12 deletion results in bronchi filpillim micrich Humacher, Dirk, Wang, Carl EUROPEAN HEART. 16101112-11192015MEDLINE:2576257 Adamts12 deletion results in bronchi filpillim micrich Humacher, Nick, Wang, Lauren V DISASE MODELS & 348-442015MEDLINE:2576257 Adamts12 deletion results in bronchi filpillim micrich Humacher, Sica MK, Coley JOURNEL OF THOR. 15	MEDLINE:25656284 Sertraline-induced potentiation of the CYP3A4-deperGhosh, Chaitali; Hossain, Mohamr EPILEPSIA 56	3	439-449	2015
MEDLINE:25779/54 EVALUATION OF RHBMP-2/COLLAGEN/TCP-HA BONI Luangphakdy, V.; Shinohara, Bir, Fie LUROPEAN ICELLS 82 n/a 57-69 2015 MEDLINE:25779/54 EVALUATION OF RHBMP-2/COLLAGEN/TCP-HA BONI Luangphakdy, V.; Shinohara, Bir, Fie LUROPEAN ICELLS 82 n/a 1037-103 2015 MEDLINE:25779/54 EVALUATION OF RHEMP-2/COLLAGEN/TCP-HA BONI Luangphakdy, V.; Shinohara, Bir, Fie LUROSAMINOCIVI 1229 n/a 543-548 2015 n/a Improving Quality of Life and Depression After Strok Linder, Suan M.; Rosenfeld I, Ans: AMERICAN JOURN-69 2 n/a 663-40 2015 MEDLINE:2540300C Sustained Epigenetic Drug Delivery Depletes Choles Raghavan, Vijay, Vijayaraghavalu, LANGMUIR 404-409 2015 MEDLINE:2540320C Reproducibility of intravascular ultrasound radiofreq Muramatsu, Takashi; Muramatsu, JOURNAL OF CARDI 65 2.1an 134-142 2015 MEDLINE:25423216 Ex vivo aligation of 4 Shterinoplastic rubbe Yang, Jun; Charf, Andrea C.; Pusk. JOURNAL OF THEM 45 n/a 36-41 2015 MEDLINE:2525257 CAdantsiz Deletion results in bronchial fibrillin microf Hubmacher, Dirk, Wang, Lauren Y DISEASE MODELS 8 47-499 2015 MEDLINE:25202314 Sh vivo albadian of 4 Sh Mit intravascular ultrasounc Cange, Samath A; Campos, Carlic UNRAL OF THEM 45 n/a 36-41 2015 MEDLINE:25231237 Ex vivo albadianed 4 Sh MIT int	MEDLINE:25520437 Comparing brain structural MRI and metabolic FDG-I Rajagopalan, Venkateswaran; Raja JOURNAL OF NEUR 86	9	952-958	2015
MEDLINE:2577905Weakening of Corticomuscular Signal Coupling Durin Bayram, Mehmed Bugrahan; Bayr JOURNALS OF CERK 7081037-10432015MEDLINE:2532575Analysis of the Heavy-Chain Modification and TSG-6 Lauer, Mark E.; Loftis, Jacqueline; GLYCOSAMINOGI 1229n/a543-5482015n/aImproving Quality of Life and Depression After Strok Linder, Susan M.; Rosenfeldt, Ans: AMERICAN JOURNAL 692n/a2015MEDLINE:2542980C Sustained Epigenetic Drug Delivery Depletes Cholest Raghavan, Vijay; Vijayaraghavalu, LANGMUR314211564-115732015MEDLINE:254230C Reproducibility of intravascular ultrasound radiofreg Muramatsu, Takashi; Muramatsu, JOURNAL OF CARDIGS2-Jan134-1422015MEDLINE:252635C Adamtsi2 deletion results in bronchial fibrillin microf Hubmacher, Dirk; Wang, Lauren V DISEASE MODELS 85487-4992015MEDLINE:252625C Adamtsi2 deletion results in bronchial fibrillin microf Hubmacher, Dirk; Wang, Lauren V DISEASE MODELS 85487-4992015MEDLINE:2523236C Heapmin Interaction with a receptor on hyperglycemi Wang, Aimin; Stankaranarayanan, MATRIX BIOLOGY 48n/a36-412015MEDLINE:2523236C Heapmin Interaction with a receptor on hyperglycemi Wang, Aimin; Stankaranarayanan, MATRIX BIOLORY 48n/a36-422015MEDLINE:25234234C Rene Choice Excise Enhances Motor Recovery A Linder, Susan M.; Rosenfeldt, Ansi AMERICAN JOURNAE 9n/a6-412015MEDLINE:252343515CORRELATES OF PARTICIPATION IN MEANINGFULA CPIGN, MATHEW SUGAWAICO F THOR, 150234-3482015MEDLINE:25242347C En-year follow-up of the iminimal MIN lesion' subgrismon, J. H.; Kinkel, R.MULI	MEDLINE:25579754EVALUATION OF RHBMP-2/COLLAGEN/TCP-HA BONI Luangphakdy, V.; Shinohara, K.; PaEUROPEAN CELLS & 29	n/a	57-69	2015
MEDLINE:25325976 Analysis of the Heavy-Chain Modification and TSG-6 Lauer, Mark E, Loftis Jacquelline; GLYCOSAMINOGLY122n/a543-5482015n/aImproving Quality of Life and Depression After Strok Linder, Susan M.; Rosenfeldt, Ans:AMERICAN JOURN/692n/a2015MEDLINE:2643980C Sustained Epigenetic Drug Delivery Depletes Cholest Raghavan, Vijay; Vijayaraghavalu, LANGMUIR314211564-115732015MEDLINE:25012202 Effect of subthalamic nucleus deep brain stimulation MIIls, Kelly A; Mills, Kelly A; Mark JOURNAL OF NEURIS64404-4092015MEDLINE:256803C Bicoompatibility of intravascular ultrasound radiofreq Muramatsu, Takashi; Muramatsu, JOURNAL OF CARDIES2-Jan134-1422015MEDLINE:256803C Bicoompatibility valuation of a thermoplastic rubbe Yang, Jun; Charff, Andrea C; Pusk:JOURNAL OF THE M 45n/a38-892015MEDLINE:25732321C Ex vivo validation of 45 MHz intravascular ultrasounc Campos, Carlos M; Campos, Carle LUROPEAN HEART. 16101112-11192015MEDLINE:2582563Heparin interaction with a receptor on hyperglycemi Wang, Animir, Sankaranarayanan, MATRIX BIOLOGY 48n/a36-412015MEDLINE:25204861h vitor hemodynamic characterization of HeartMats Sunagawa, Gengo; Byram, Nicole; JOURNAL OF THOR, 1502343-3482015n/aForced Aerobic Exercise Enhances Motor Recovery A Linder, Susan M.; Rosenfeldt, Ans:AMERICAN JOURNA 64n/a2015MEDLINE:2593315CORRLATES OF PARTICIPATION IN MEANINGFUL ACPIOw, Matthew A; Plow, MatthewJOURNAL OF RHAI476538-5452015MEDLINE:2593315CORRLATES OF PARTICIPATION IN MEANINGFUL ACPIOw, Matthew A; Plow, MatthewJOURNAL OF	MEDLINE:25779095 Weakening of Corticomuscular Signal Coupling Durin Bayram, Mehmed Bugrahan; Bayr JOURNALS OF GERC 70	8	1037-1043	2015
n/a Improving Quality of Life and Depression After Strok Linder, Susan M, Rosenfeldt, Ans: AMERICAN JOURNA 69 2 n/a 2015 MEDLINE:2643980C Sustained Epigenetic Drug Delivery Depletes Cholest Raghavan, Vijay; Vijayaraghavalu, LANGMUIR 3 4 40-409 2015 MEDLINE:25012202E Effect of subthalamic nucleus deep brain stimulation Mills, Kelly A; Mills, Kelly A; Mart JOURNAL OF CARD65 2-Jan 134-42 2015 MEDLINE:2524230C Reproducibility of intravascular ultrasound radiofreq Muramatsu, DANG and CARDA OF THE N45 n/a 83-80 2015 MEDLINE:2526357C Adamts12 deletion results in bronchial fibrillin microf Hubmacher, Dirk; Wang, Lauren V DISEASE MODELS & 8 5 487-499 2015 MEDLINE:25253255GH eparin interaction with a receptor on hyperglycemi Wang, Aiming, Sankaranarayanan, MATRIX BIOLOGY 8 1469-1472 2015 MEDLINE:2525325GH eparin interaction with a receptor on hyperglycemi Wang, Aiming, Sankaranarayanan, MATRIX BIOLOGY 8 1649-1472 2015 MEDLINE:2526375CA admets12 deletion results in bronchial fibrillin microf Hubmacher, Dirk, Wang, Lauren V DISEASE MODELS & 8 1640-1472 2015 MEDLINE:2526375CA damets12 deletion results in bronchial fibrillin microf Hubmacher, Sankartha, Konsenfeld, Ans: AMERICAN JOURNA OF THOCN15 2 343-348 2015 MEDLIN	MEDLINE:25325979 Analysis of the Heavy-Chain Modification and TSG-6 Lauer, Mark E.; Loftis, Jacqueline; GLYCOSAMINOGLY 1229	n/a	543-548	2015
MEDLINE:2643980C Sustained Epigenetic Drug Delivery Depites Cholest Raghvan, Vijay: Vijayraghavalu, LANGMUIR114211564-115732015MEDLINE:2501202 Effect of subthalamic nucleus deep brain stimulation Mills, Kelly A.; Mari JOURNAL OF KEUN864404-4092015MEDLINE:2524230C Reproducibility of intravascular ultrasound radiofreq Muramatsu, Takashi; Muramatsu, JOURNAL OF CARDI652-Jan134-1422015MEDLINE:2576257 Chadmatiz J deletion of a thermoplastic rubb Yang, Jun; Charif, Andrea C.; Puski: JOURNAL OF CARDI655487-4992015MEDLINE:2576257 Chadmatiz J deletion of a thermoplastic rubb Yang, Jun; Charif, Andrea C.; Puski: JOURNAL OF CARDI655487-4992015MEDLINE:2576257 Chadmatiz J deletion of 45 MHz intravascular ultrasounc Campos, Carlos M.; Campos, Carlc EUROPEAN HEART. 16101112-11192015MEDLINE:252321341S oninvasive Optical Imaging of UV-Induced Squamoi Rollakanti, Kishore R.; Rollakanti, IPHOTOCHEMISTRY 9161469-14782015MEDLINE:25739272EAdvancements in the delivery of epigenetic drugs Cramer, Samantha A.; Cramer, Sai EXPERT DRININO 1291501-15122015MEDLINE:2573972EAdvancements in the delivery of epigenetic drugs Cramer, Samantha A.; Chaudhu JOURNAL OF REHAt476538-5452015MEDLINE:257372EAdvances Section Report PARTICIPATION IN MEANINGEUL AC Plow, Matthew A.; Plow, Matthew JOURNAL OF REHAt476538-5452015MEDLINE:2561734Havy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Cheng, Georgiana; JOURNAL OF NACCLO24140-4+215MEDLINE:256173	n/a Improving Quality of Life and Depression After Strok Linder, Susan M.; Rosenfeldt, Ans AMERICAN JOURN 69	2	n/a	2015
MEDLINE:25012202 Effect of subthalamic nucleus deep brain stimulation Nills, Kelly A; Mills, Kelly A; Marl JOURNAL OF NEURI864404-4092015MEDLINE:2584230C Reproducibility of intravascular ultrasound radiofreq Muramatsu, Takashi; Muramatsu, JOURNAL OF CARDIS2.Jan134-1422015MEDLINE:2564230C Adamts12 deletion results in bronchial fibrillin microf Hubmacher, Dirk; Wang, Lauren V DISEASE MODELS 85487-4992015MEDLINE:2576257C Adamts12 deletion results in bronchial fibrillin microf Hubmacher, Dirk; Wang, Lauren V DISEASE MODELS 86447-4902015MEDLINE:2573321C K vivo validation of 45 MHz intravacular ultrasounc Camops, Carlos M; Campos, Carle EUROPEAN HEART. 16101112-11192015MEDLINE:2573321C K vivo validation of 45 MHz intravacular ultrasounc Camops, Carlos M; Campos, Carle EUROPEAN HEART. 16101112-11192015MEDLINE:252314S Noninvasive Optical Imaging of UV-Induced Squamor Rollakanti, Kishore R, Rollakanti, IPHOTOCHEMISTRY 9161469-14782015MEDLINE:25739728 Advancements in the delivery of epigenetic drugs Cramer, Samantha A; Cramer, Sat EXPERT OPINION 0 1291501-15122015MEDLINE:25739728 Advancements in the delivery of epigenetic drugs Cramer, Samantha A; Cramer, Sat EXPERT OPINION 0 1291501-15122015MEDLINE:2563315 CORRELATES OF PARTICIPATION IN MEANINGFUL AC Plow, Matthew A; PloW, Matthew JOURNAL OF REAL ⁴⁷ 6538-542015MEDLINE:25635173H eaver Chain Transfer By Turor Necrosis Factor-situ Lankin, Ellicit, Cheng, Georgian; JOURNAL OF MUCH 64176-42015MEDLINE:25635173H eaver Chain Transfer By Turor Necrosis Factor-situ Lankin, Ellic	MEDLINE:2643980C Sustained Epigenetic Drug Delivery Depletes Cholest Raghavan, Vijay; Vijayaraghavalu, LANGMUIR 31	42	11564-11573	2015
MEDLINE:25840345 Deletion of ADAMTS5 does not affect aggrecan or ve Gorski, Daniel J.; Xiao, Wenfeng; XMATRIX BIOLOGYn/a66-842015MEDLINE:2524230C Reproducibility of intravascular ultrasound radiofred Muramatsu, Takashi, Muramatsu, JOURNAL OF THE M45n/a83-802015MEDLINE:256803C Biocompatibility evaluation of a thermoplastic rubbe Yang, Jun; Charif, Andrea C.; Puski: OURNAL OF THE M45n/a83-802015MEDLINE:2576257C AdamtsI2 deletion results in bronchial fibrilin microf Hubmacher, Dirk; Wang, Lauren VDISEASE MODELS &101112-11192015MEDLINE:2578257C AdamtsI2 deletion results in bronchial fibrilin microf Hubmacher, Dirk; Wang, Lauren VDISEASE MODELS &161469-14782015MEDLINE:2578257C AdamtsI2 deletion results in bronchial fibrilin microf Hubmacher, Dirk; Wang, Kantanarayanan, MATRIX BIOLOGYn/a36-412015MEDLINE:25282145 Noninvasive Optical Imaging of UV-Induced Squamo Rollakanti, Kishore R.; Rollakanti, IPHOTOCHEMISTRY 9161469-14782015MEDLINE:2529372E Advancements in the delivery of epigenetic drugs Cramer, Samantha A; Cramer, Sar EXPERT OPINION O1291501-15122015MEDLINE:25537321E CORRELATES OF PARTICIPATION IN MEANINGFUL AC Plow, Matthew A.; Plow, Matthew NAI, PloW, Matthew NAI, OPINAL OF FIRAL476538-5452015MEDLINE:2563731E CORRELATES OF PARTICIPATION IN MEANINGFUL AC Plow, Matthew A.; Plow, Matthew ALOR PARLICS 32222-37362015MEDLINE:256430247 Enveer olise treeme and the lision' subgr Simon, J. H.; Simon, J. H.; Kinkel, RMULTIPLE SCLEROS 214415-4222015MEDLINE:2564374 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin	MEDLINE:25012202 Effect of subthalamic nucleus deep brain stimulation Mills, Kelly A.; Mills, Kelly A.; Mark JOURNAL OF NEUR(86	4	404-409	2015
MEDLINE:2524230C Reproducibility of intravascular ultrasound radiofreq Muramatsu, Takashi; Muramatsu, JOURNAL OF CARDIGS2-lan134-1422015MEDLINE:2568803C Biocompatibility evaluation of a thermoplastic rubbe Yang, Jun; Charif, Andrea C.; Puski JOURNAL OF THE V45n/a83-892015MEDLINE:2576257C4 Admts12 deletion results in bronchial fibrillin microf Hubmacher, Dirk; Wang, Lauren V DISEASE MODELS &101112-11192015MEDLINE:2573321C Ex vivo validation of 45 MHz intravascular ultrasounc Campos, Carlos M.; Campos, Carlc EUROPEAN HEART.16101112-11192015MEDLINE:25623314 Noninvasive Optical Imaging of UV-Induced Squamor Rollakanti, Kishore R.; Rollakanti, IPHOTOCHEMISTRY 9161469-14782015MEDLINE:250204865 In vitro hemodynamic characterization of HeartMate Sungawa, Gengo; Byram, Nicole; JOURNAL OF THOR 1502343-3482015n/aForced Aerobic Exercise Enhances Motor Recovery A Linder, Susan M.; Rosenfeldt, Ans: AMERICAN JOURNE 694n/a2015MEDLINE:2553315CORRELITES OF PARTICIPATION IN MEANINGFUL AC Plow, Matthew JoURNAL OF REHA1476538-5422015MEDLINE:25563721 Building a Bridge to Save a Failing Ventricle: Radiolg Mohamed, Inas; Lau, Charles T.; B RADIOGRAPHICS 352327-3562015MEDLINE:25501734Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Chang, Georgiana; JOURNAL OF VASCL 6241040-42015MEDLINE:25501734Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Chang, Borgian; JOURNAL OF ARCH 63348-9422015MEDLINE:25501277A MAGNETOCENCEPHALOGRAPHY STUDU OF MULTI-h Gopalakrishnan, R; Burgess, R. C.; NEUROSCIE	MEDLINE:25840345 Deletion of ADAMTS5 does not affect aggrecan or ve Gorski, Daniel J.; Xiao, Wenfeng; XMATRIX BIOLOGY 47	n/a	66-84	2015
MEDLINE:2568803C Biocompatibility evaluation of a thermoplastic rubbe Yang, Jun; Charif, Andrea C.; Pusk; JOURNAL OF THE N 45n/a83-892015MEDLINE:2576257C Adamtsl2 deletion results in bronchial fibrillin microf Hubmacher, Dirk; Wang, Lauren V DISEASE MODELS & 85487-4992015MEDLINE:25737321C Ex vivo validation of 45 MHz intravascular ultrasounc Campos, Carlos M.; Campos, Carle EUROPEAN HEART. 16101112-11192015MEDLINE:2523324C Nonirvasive Optical Imaging of UV-Induced Squamor Rollakanti, Kishore R.; Rollakanti, IPHOTOCHEMISTRY 9161469-14782015MEDLINE:2520314E Nonirvasive Optical Imaging of UV-Induced Squamor Rollakanti, Kishore R.; Rollakanti, IPHOTOCHEMISTRY 9161469-14782015MEDLINE:2520315E Northe hemodynamic characterization of HeartMate Sunagawa, Gengo; Byram, Nicole; JOURNAL OF THOR, 1502343-3482015MEDLINE:2573972E Advancements in the delivery of epigenetic drugsCramer, Samatha A.; Cramer, Sar EXPERT OPINION 01291501-15122015MEDLINE:2573972E Ndvancements in the delivery of epigenetic drugsCramer, Samatha A.; Cramer, Sar EXPERT OPINION 01291501-15122015MEDLINE:257372E Ndvancements in the delivery of exilosing Simon, J. H.; Sinkel, RMULTIPLE SCLEROS 214415-4222015MEDLINE:257372E Ndvancements in the Sell regulating Netricic Radiolog Mohamed, Inas; Lau, Charles T.; B RADIOGRAPHICS 3522273-662015MEDLINE:2567372E Building a Bridge to Save a Failing Ventricic Radiolog Mohamed, Inas; Lau, Charles T., BRADIOGRAPHICS 3522273-622015MEDLINE:2561734 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamki	MEDLINE:2524230C Reproducibility of intravascular ultrasound radiofreq Muramatsu, Takashi; Muramatsu, JOURNAL OF CARDI 65	2-Jan	134-142	2015
MEDLINE:2576257C Adamtsl2 deletion results in bronchial fibrillin microf Hubmacher, Dirk; Wang, Lauren V DISEASE MODELS & 85487-4992015MEDLINE:2573321C Ex vivo validation of 45 MHz intravascular ultrasounc Campos, Carlos M.; Campos, Carle EUROPEAN HEART. 16101112-11192015MEDLINE:258925631Heparin interaction with a receptor on hyperglycemi Wang, Aimin; Sankaranarayanan, MATRIX BIOLOGY 48n/a36-412015MEDLINE:252023145 Noninvasive Optical Imaging of UV-Induced Squamo Rollakanti, Kishore R.; Rollakanti, IPHOTOCHEMISTRY 9161469-14782015MEDLINE:25204865 In vitro hemodynamic characterization of HeartMate Sunagawa, Gengo; Byram, Nicole; JOURNAL OF THOR, 1502343-3482015n/aForced Aerobic Exercise Enhances Motor Recovery A Linder, Susan M.; Rosenfeldt, Ans: AMERICAN JOURNAL OF REHA{ 476538-5452015MEDLINE:25593315 CORRELATES OF PARTICIPATION IN MEANINGFUL AC Plaw, Matthew A.; Plow, Matthew JOURNAL OF REHA{ 476538-5452015MEDLINE:25563212 Building a Bridge to Save a Failing Ventricle: Radiolog Mohamed, Inas; Lau, Charles T.; B RADIOGRAPHICS 352327-3562015MEDLINE:2561734 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Cheng, Georgian; JOURNAL OF VASCL6241040-+2015MEDLINE:25806513 Human Fitting Studies of Cleveland Clinic Continuous: Karimov, Jamshid ASAIO JOURNAL 614726-7282015MEDLINE:25806513 Human Fitting Studies of Cleveland Clinic Continuous: Karimov, Jamshid H.; Steffen, Rob ASAIO JOURNAL 614726-7282015MEDLINE:255031162 CINFAMGORRAPHY STUDY OF MULTI-Nogalakrishnan, R.; Burgess, R. C.	MEDLINE:2568803C Biocompatibility evaluation of a thermoplastic rubbe Yang, Jun; Charif, Andrea C.; Pusk; JOURNAL OF THE N 45	n/a	83-89	2015
MEDLINE:2573321C Ex vivo validation of 45 MHz intravascular ultrasounc Campos, Carlos M.; Campos, Carlos ZUROPEAN HEART. 16101112-11192015MEDLINE:25892563Heparin interaction with a receptor on hyperglycemi Wang, Aimin; Sankaranarayanan, MATRIX BIOLOGY 48n/a36-412015MEDLINE:26223149 Noninvasive Optical Imaging of UV-Induced Squamor Rollakanti, Kishore R.; Rollakanti, IPHOTOCHEMISTRY 9161469-14782015n/aForced Aerobic Exercise Enhances Motor Recovery A Linder, Susan M.; Rosenfeldt, Ansr AMERICAN JOURNA OF THOR. 1502343-3482015MEDLINE:257397282Advancements in the delivery of epigenetic drugsCramer, Samantha A.; Cramer, Sai EXPERT OPINION 0 1291501-15122015MEDLINE:2593315 CORRELATES OF PARTICIPATION IN MEANINGFUL AC Plow, Matthew A.; Plow, Matthew JOURNAL OF REHA(475538-5422015MEDLINE:25763721Building a Bridge to Save a Failing Ventricle: Radiolog Mohamed, Inas; Lau, Charles T.; B RADIOGRAPHICS3327-3562015MEDLINE:2561734Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliot; Cheng, Georgiana; JOURNAL OF VASCL 6241040-+2015MEDLINE:2561734Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliot; Cheng, Georgiana; JOURNAL OF IMORAL6726-7282015MEDLINE:25806613Human Fitting Studies of Cleveland Clinic Continuous Karimov, Jamshid H.; Steffen, Rob ASAIO JOURNAL614424-4282015MEDLINE:2543258Virus integration and genome influence in approacht II, Longkun; Zhang, Deving; Shang ADVANCED DRUG C 82-83n/a116-1892015MEDLINE:25433258Virus integration and genome influence in approacht I	MEDLINE:2576257C Adamtsl2 deletion results in bronchial fibrillin microf Hubmacher, Dirk; Wang, Lauren V DISEASE MODELS & 8	5	487-499	2015
MEDLINE:25892563 Heparin interaction with a receptor on hyperglycemi Wang, Aimin; Sankaranarayanan, MATRIX BIOLOGYn/a36-412015MEDLINE:26223146 Noninvasive Optical Imaging of UV-Induced Squamon Rollakanti, Kishore R.; Rollakanti, IPHOTOCHEMISTRY61469-14782015MEDLINE:26204865 In vitro hemodynamic characterization of HeartMate Sunagawa, Gengo; Byram, Nicole; JOURNAL OF THOR, JOS2343-3482015NaForced Aerobic Exercise Enhances Motor Recovery A Linder, Susan M.; Rosenfeldt, Ans: AMERICAN JOURNA 694Na2015MEDLINE:25739728 Advancements in the delivery of epigenetic drugsCramer, Samantha A.; Cramer, Sar EXPERT OPINION 0 1291501-15122015MEDLINE:2534437CTen-year follow-up of the 'minimal MRI lesion' subgr Simon, J. H.; Simon, J. H.; Kinkel, RMULTIPLE SCLEROS 214415-4222015MEDLINE:25824327 Ten-year follow-up of the 'minimal MRI lesion' subgr Simon, J. H.; Simon, J. H.; Kinkel, RMULTIPLE SCLEROS 214415-4222015MEDLINE:2582437 Ten-year follow-up of the 'minimal MRI lesion' subgr Simon, J. H.; Simon, J. H.; Kinkel, RMULTIPLE SCLEROS 214415-4222015MEDLINE:24820897 Hypercholesterolemia inhibits re-endothelialization (Rosenbaum, Michael A; Chaudhu JOURNAL OF VASCL 6241040-42015MEDLINE:25606173 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Cheng, Georgiana; JOURNAL OF BUCL 205156-51662015MEDLINE:25206175 A MAGNETOENCEPHALOGRAPHY STUDY OF MULTI-MOPalaKirshnan, R.; Burgess, R. C.; NEUROSCIENCE3041/6-1892015MEDLINE:2520511ailoring Brain Stimulation to the Nature of Rehabilit Cunningham, David, A.; Cunnin	MEDLINE:2573321C Ex vivo validation of 45 MHz intravascular ultrasounc Campos, Carlos M.; Campos, Carlc EUROPEAN HEART. 16	10	1112-1119	2015
MEDLINE:2622314\$ Noninvasive Optical Imaging of UV-Induced Squamot Rollakanti, Kishore R.; Rollakanti, IPHOTOCHEMISTRY 9161469-14782015MEDLINE:26204865 In vitro hemodynamic characterization of HeartMate Sunagawa, Gengo; Byram, Nicole; JOURNAL OF THOR. 1502343-3482015n/aForced Aerobic Exercise Enhances Motor Recovery A Linder, Susan M.; Rosenfeldt, Ans: AMERICAN JOURN/E4n/a2015MEDLINE:25739728 Advancements in the delivery of epigenetic drugsCramer, Samantha A.; Cramer, Sai EXPERT OPINION 0.1291501-15122015MEDLINE:2593315 CORRELATES OF PARTICIPATION IN MEANINGFUL AC Plow, Matthew A.; Plow, Matthew JOURNAL OF REHA1476538-5452015MEDLINE:25963721 Building a Bridge to Save a Failing Ventricle: Radiolog Mohamed, Inas; Lau, Charles T.; B RADIOGRAPHICS352327-3562015MEDLINE:25601237 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Cheng, Georgiana; JOURNAL OF BIOLO 29085156-51662015MEDLINE:25060137 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Bulliott; Cheng, Georgiana; JOURNAL OF BIOLO 29085156-51662015MEDLINE:26010576 A MAGNETOENCEPHALOGRAPHY STUDY OF MULTI-NGopalakrishnan, R.; Burgess, R. C.; NEUROSCIENCE304176-1892015MEDLINE:2566131 Human Fitting Studies of Cleveland Clinic Continuous Karimov, Jamshid H.; Steffen, Rob ASAIO JOURNAL 614424-4282015MEDLINE:25661267 6M MGNETOENCEPHALOGRAPHY STUDY OF MULTI-NGopalakrishnan, R.; Burgess, R. C.; NEUROSCIENCE30489-4942015MEDLINE:2580513162 Unplication of Acetabular Width on the Anteroposter Nie, Yong; Pei, Fuxing; S	MEDLINE:25892563 Heparin interaction with a receptor on hyperglycemi Wang, Aimin; Sankaranarayanan, MATRIX BIOLOGY 48	n/a	36-41	2015
MEDLINE:26204865 In vitro hemodynamic characterization of HeartMate Sunagawa, Gengo; Byram, Nicole; JOURNAL OF THOR, 1502343-3482015n/aForced Aerobic Exercise Enhances Motor Recovery A Linder, Susan M.; Rosenfeldt, Ansr. AMERICAN JOURNA 694n/a2015MEDLINE:25739728 Advancements in the delivery of epigenetic drugsCramer, Samantha A.; Cramer, Sar EXPERT OPINION 01291501-15122015MEDLINE:2593315 CORRELATES OF PARTICIPATION IN MEANINGFUL ACPlow, Matthew A.; Plow, Matthew JOURNAL OF REHAI 476538-5422015MEDLINE:2534437C Ten-year follow-up of the 'minimal MRI lesion' subgr Simon, J. H.; Simon, J. H.; Kinkel, RMULTIPLE SCLEROS 214415-4222015MEDLINE:25361734 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Cheng, Georgian; JOURNAL OF BIOLO 29085156-51662015MEDLINE:26102177 sensorless Suction Recognition in the Self-Regulating Horvath, David; Karimov, Jamshid ASJOURNAL OF BIOLO 29085166-51662015MEDLINE:26200576 A MAGNETOENCEPHALOGRAPHY STUDY OF MULTI-Neopalakrishnan, R.; Burgess, R.C.; NEUROSCIENCE 304n/a176-1892015MEDLINE:2630613 Human Fitting Studies of Cleveland Clinic Continuous Karimov, Jamshid H.; Steffen, Rob ASAIO JOURNAL4424-4282015MEDLINE:254325E Virus integration and genome influence in approach (Li, Longkun; Zhang, Deying; Zhang ADVANCED DRUG F&2-83n/a21-Dec2015MEDLINE:25611434 Reproducibility of transcranial magnetic stimulation Sakarasubramanian, Vishwanath JOURNAL OF ARTHF303489-4942015MEDLINE:254325E Virus integration and genome influence in approach (Li, Longkun; Zhang,	MEDLINE:26223149 Noninvasive Optical Imaging of UV-Induced Squamor Rollakanti, Kishore R.; Rollakanti, IPHOTOCHEMISTRY 91	6	1469-1478	2015
n/aForced Aerobic Exercise Enhances Motor Recovery A Linder, Susan M.; Rosenfeldt, Ans/AMERICAN JOURN/694n/a2015MEDLINE:25739728 Advancements in the delivery of epigenetic drugsCramer, Samantha A.; Cramer, Sar EXPERT OPINION O 1291501-15122015MEDLINE:2593315 CORRELATES OF PARTICIPATION IN MEANINGFUL AC Plow, Matthew A.; Plow, Matthew JOURNAL OF RELAT476538-5452015MEDLINE:2554347 Cren-year follow-up of the 'minimal MRI lesion' subgr Simon, J. H.; Simon, J. H.; Kinkel, R MULTIPLE SCLEROS 214415-4222015MEDLINE:2561734 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Cheng, Georgian; JOURNAL OF RIOL 29085156-51662015MEDLINE:2561734 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Cheng, Georgian; JOURNAL OF BIOL 29085156-51662015MEDLINE:2560134 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Cheng, Georgian; JOURNAL OF BIOL 2908762-7282015MEDLINE:2560134 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Cheng, Georgian; JOURNAL OF BIOL 2908762-7282015MEDLINE:2506131 Human Fitting Studies of Cleveland Clinic Continuous Karimov, Jamshid H.; Steffen, Rob ASAIO JOURNAL 614424-4282015MEDLINE:25501734 For Stimulation to the Nature of Rehabilit Cunningham, David A.; Cunningha PHYSICAL MEDICIN 264759-+2015MEDLINE:25501261CF Morphological and positional changes of the carpal Marquardt, Tamara L.; Gabra, Josc CLINICAL METHODS 508n/a248-2532015MEDLINE:25501261CF Morphological and positional changes of the carpal Marquardt, Tamara L.	MEDLINE:26204865 In vitro hemodynamic characterization of HeartMate Sunagawa, Gengo; Byram, Nicole; JOURNAL OF THOR/ 150	2	343-348	2015
MEDLINE:25739728 Advancements in the delivery of epigenetic drugsCramer, Samantha A.; Cramer, Sai EXPERT OPINION O 1291501-15122015MEDLINE:2593315 CORRELATES OF PARTICIPATION IN MEANINGFUL AC Plow, Matthew A.; Plow, Matthew JOURNAL OF REHAL 476538-5452015MEDLINE:2534437 Chen-year follow-up of the 'minimal MRI lesion' subgr Simon, J. H.; Simon, J. H.; Kinkel, R MULTIPLE SCLEROS 214415-4222015MEDLINE:25763721 Building a Bridge to Save a Failing Ventricle: Radiolog Mohamed, Inas; Lau, Charles T.; B RADIOGRAPHICS352327-3562015MEDLINE:25561734 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Cheng, Georgiana; JOURNAL OF VASCL 6241040-+2015MEDLINE:26102177 Sensorless Suction Recognition in the Self-Regulating Horvath, David; Karimov, Jamshid ASAIO JOURNAL6726-7282015MEDLINE:26522911Tailoring Brain Stimulation to the Nature of Rehabilit Cunningham, David A.; Cunningha PHYSICAL MEDICINI 264424-4282015MEDLINE:2561734 Meavy Chain and genome influence in approach(Li, Longkur; Zhang, Deying; Zhang ADVANCED DRUG E82-83n/a176-1892015MEDLINE:26522911Tailoring Brain Stimulation to the Nature of Rehabilit Cunningham, David A.; Cunningha PHYSICAL MEDICINI 264424-4282015MEDLINE:2563258 Virus integration and genome influence in approach(Li, Longkur; Zhang, Deying; Zhang ADVANCED DRUG E82-83n/a21-Dec2015MEDLINE:2563257 Cropical calcitriol prior to photodynamic therapy enh: Rollakanti, Kishore; Rollakanti, Kis OPTICAL METHODS 938n/a248-2532015MEDLINE:259337C Topical calcitriol prior to photodyna	n/a Forced Aerobic Exercise Enhances Motor Recovery A Linder, Susan M.; Rosenfeldt, Anst AMERICAN JOURNA69	4	n/a	2015
MEDLINE:25953315 CORRELATES OF PARTICIPATION IN MEANINGFUL AC Plow, Matthew A.; Plow, Matthew JOURNAL OF REHAF 476538-5452015MEDLINE:2534437C Ten-year follow-up of the 'minimal MRI lesion' subgr Simon, J. H.; Simon, J. H.; Kinkel, R MULTIPLE SCLEROS 214415-4222015MEDLINE:25763721 Building a Bridge to Save a Failing Ventricle: Radiolog Mohamed, Inas; Lau, Charles T.; B RADIOGRAPHICS 352327-3562015MEDLINE:24820897 Hypercholesterolemia inhibits re-endothelialization (Rosenbaum, Michael A.; Chaudhu JOURNAL OF VASCL 6241040-+2015MEDLINE:25501734 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Cheng, Georgiana; JOURNAL OF BIOLO 29085156-51662015MEDLINE:26102177 Sensorless Suction Recognition in the Self-Regulating Horvath, David; Karimov, Jamshid ASAIO JOURNAL6726-7282015MEDLINE:26201057 CA MAGNETOENCEPHALOGRAPHY STUDY OF MULTI-M Gopalakrishnan, R.; Burgess, R. C.; NEUROSCIENCE304176-1892015MEDLINE:25806613 Human Fitting Studies of Cleveland Clinic Continuou: Karimov, Jamshid H.; Steffen, Rob ASAIO JOURNAL61424-4282015MEDLINE:25311162 Implication of Acetabular Width on the Anteroposter Nie, Yong; Pei, Fuxing; Shen, Bin; I JOURNAL OF ARTHF 303489-4942015MEDLINE:25453252 Virus integration and genome influence in approach Li, Longkun; Zhang, Deying; Zhang ADVANCED DRUG E 82-83n/a21-Dec2015MEDLINE:2561267 Morphological and positional changes of the carpal Marquardt, Tamara L.; Gabra, Jos CLINICAL BIOMECH 303248-2532015MEDLINE:2598337C Topical calcitriol prio to photodynamic therapy enh: Rollakanti, K	MEDLINE:25739728 Advancements in the delivery of epigenetic drugs Cramer, Samantha A.; Cramer, Sar EXPERT OPINION O 12	9	1501-1512	2015
MEDLINE:2534437C Ten-year follow-up of the 'minimal MRI lesion' subgr Simon, J. H.; Kinkel, R MULTIPLE SCLEROS 214415-4222015MEDLINE:25763721 Building a Bridge to Save a Failing Ventricle: Radiolog Mohamed, Inas; Lau, Charles T.; B RADIOGRAPHICS352327-3562015MEDLINE:24820897 Hypercholesterolemia inhibits re-endothelialization (Rosenbaum, Michael A.; Chaudhu JOURNAL OF VASCL 6241040-+2015MEDLINE:25561734 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Cheng, Georgiana; JOURNAL OF BIOLO 29085156-51662015MEDLINE:26102177 Sensorless Suction Recognition in the Self-Regulating Horvath, David; Karimov, Jamshid ASAIO JOURNAL616726-7282015MEDLINE:26210576 A MAGNETOENCEPHALOGRAPHY STUDY OF MULTI-N Gopalakrishnan, R.; Burgess, R. C.; NEUROSCIENCE304n/a176-1892015MEDLINE:25806613 Human Fitting Studies of Cleveland Clinic Continuous Karimov, Jamshid H.; Steffen, Rob ASAIO JOURNAL614424-4282015MEDLINE:2531162 Implication of Acetabular Width on the Anteroposten Nie, Yong; Pei, Fuxing; Shen, Bin; HJOURNAL OF ARTHI 30489-4942015MEDLINE:25661267 Morphological and positional changes of the carpal Marquardt, Tamara L.; Gabra, Joss CLINICAL BIOMECH 303248-2532015MEDLINE:2569837C Topical calcitriol prior to photodynamic therapy enh: Rollakanti, Kishore; Rollakanti, Kis OPTICAL METHODS 9308n/an/a2015MEDLINE:25643084 Ultrasound Field Measurement Using a Binary Lens Clement, Gregory T.; Nomura, Hid IEEE TRANSACTION 5112n/a2015MEDLINE:25643084 Ultrasound Field Measurement Using a Binary Le	MEDLINE:25953315 CORRELATES OF PARTICIPATION IN MEANINGFUL AC Plow, Matthew A.; Plow, Matthew JOURNAL OF REHAL47	6	538-545	2015
MEDLINE:25763721 Building a Bridge to Save a Failing Ventricle: Radiolog Mohamed, Inas; Lau, Charles T.; B RADIOGRAPHICS352327-3562015MEDLINE:24820897 Hypercholesterolemia inhibits re-endothelialization (Rosenbaum, Michael A.; Chaudhu JOURNAL OF VASCL 6241040-+2015MEDLINE:25561734 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Cheng, Georgiana; JOURNAL OF BIOLO 29085156-51662015MEDLINE:26102177 Sensorless Suction Recognition in the Self-Regulating Horvath, David; Karimov, Jamshid ASAIO JOURNAL616726-7282015MEDLINE:26210576 A MAGNETOENCEPHALOGRAPHY STUDY OF MULTI-N Gopalakrishnan, R.; Burgess, R. C.; NEUROSCIENCE304n/a176-1892015MEDLINE:25806613 Human Fitting Studies of Cleveland Clinic Continuous Karimov, Jamshid H.; Steffen, Rob ASAIO JOURNAL614424-4282015MEDLINE:25311162 Implication of Acetabular Width on the Anteroposter Nie, Yong; Pei, Fuxing; Shen, Bin; FJOURNAL OF ARTHF 303489-4942015MEDLINE:25661267 6Morphological and positional changes of the carpal Marquardt, Tamara L.; Gabra, Jost CLINICAL BIOMECH 303248-2532015MEDLINE:2598337C Topical calcitriol prior to photodynamic therapy enh: Rollakanti, Kishore; Rollakanti, Kis OPTICAL METHODS 9308n/an/a2015MEDLINE:26611434 Reproducibility of transcranial magnetic stimulation Wi Zborowski, Maciej; Androjna, Chai IEEE TRANSACTION 5112n/a2015MEDLINE:25643084 Ultrasound Field Measurement Using a Binary Lens Clement, Gregory T.; Nomura, Hid IEEE TRANSACTION 622350-3592015	MEDLINE:2534437C Ten-year follow-up of the 'minimal MRI lesion' subgr Simon, J. H.; Simon, J. H.; Kinkel, R MULTIPLE SCLEROS 21	4	415-422	2015
MEDLINE:24820897 Hypercholesterolemia inhibits re-endothelialization (Rosenbaum, Michael A.; Chaudhu JOURNAL OF VASCL 6241040-+2015MEDLINE:25561734 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Cheng, Georgiana; JOURNAL OF BIOL 29085156-51662015MEDLINE:26102177 Sensorless Suction Recognition in the Self-Regulating Horvath, David; Karimov, Jamshid ASAIO JOURNAL616726-7282015MEDLINE:26210576 A MAGNETOENCEPHALOGRAPHY STUDY OF MULTI-N Gopalakrishnan, R.; Burgess, R. C.; NEUROSCIENCE304n/a176-1892015MEDLINE:25806613 Human Fitting Studies of Cleveland Clinic Continuous Karimov, Jamshid H.; Steffen, Rob ASAIO JOURNAL614424-4282015MEDLINE:2511162 Implication of Acetabular Width on the Anteropostel Nie, Yong; Pei, Fuxing; Shen, Bin; HJOURNAL OF ARTHF 303489-4942015MEDLINE:25661267 6Morphological and positional changes of the carpal Marquardt, Tamara L.; Gabra, Jos CLINICAL BIOMECH 303248-2532015MEDLINE:2598337C Topical calcitriol prior to photodynamic therapy enh: Rollakanti, Kishore; Rollakanti, Kis OPTICAL METHODS 9308n/an/a2015MEDLINE:25643084 Ultrasound Field Measurement Using a Binary Lens Clement, Gregory T.; Nomura, Hid IEEE TRANSACTION 622350-3592015	MEDLINE:25763721 Building a Bridge to Save a Failing Ventricle: Radiolog Mohamed, Inas; Lau, Charles T.; B RADIOGRAPHICS 35	2	327-356	2015
MEDLINE:25561734 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Cheng, Georgiana; JOURNAL OF BIOLO 29085156-51662015MEDLINE:26102177 Sensorless Suction Recognition in the Self-Regulating Horvath, David; Karimov, Jamshid ASAIO JOURNAL616726-7282015MEDLINE:26210576 A MAGNETOENCEPHALOGRAPHY STUDY OF MULTI-N Gopalakrishnan, R.; Burgess, R. C.; NEUROSCIENCE304n/a176-1892015MEDLINE:25806613 Human Fitting Studies of Cleveland Clinic Continuou: Karimov, Jamshid H.; Steffen, Rob ASAIO JOURNAL614424-4282015MEDLINE:26522911 Tailoring Brain Stimulation to the Nature of Rehabilit Cunningham, David A.; Cunningha PHYSICAL MEDICINI 264759-+42015MEDLINE:25311162 Implication of Acetabular Width on the Anteroposter Nie, Yong; Pei, Fuxing; Shen, Bin; HJOURNAL OF ARTHF 303489-4942015MEDLINE:256612676 Morphological and positional changes of the carpal Marquardt, Tamara L.; Gabra, Jose CLINICAL BIOMECH 303248-2532015MEDLINE:2598337C Topical calcitriol prior to photodynamic therapy enh: Rollakanti, Kishore; Rollakanti, Kis OPTICAL METHODS 9308n/an/a2015MEDLINE:26111434 Reproducibility of transcranial magnetic stimulation Sankarasubramanian, Vishwanath JOURNAL OF ELECT 255754-7642015n/aComparison of Therapeutic Magnetic Stimulation Wi Zborowski, Maciej; Androjna, Chal IEEE TRANSACTION 5112n/a2015MEDLINE:25643084 Ultrasound Field Measurement Using a Binary LensClement, Gregory T.; Nomura, Hid IEEE TRANSACTION 622350-3592015	MEDLINE:24820897 Hypercholesterolemia inhibits re-endothelialization (Rosenbaum, Michael A.; Chaudhu JOURNAL OF VASCL 62	4	1040-+	2015
MEDLINE:26102177 Sensorless Suction Recognition in the Self-Regulating Horvath, David; Karimov, Jamshid ASAIO JOURNAL616726-7282015MEDLINE:26210576 A MAGNETOENCEPHALOGRAPHY STUDY OF MULTI-N Gopalakrishnan, R.; Burgess, R. C.; NEUROSCIENCE304n/a176-1892015MEDLINE:25806613 Human Fitting Studies of Cleveland Clinic Continuous Karimov, Jamshid H.; Steffen, Rob ASAIO JOURNAL614424-4282015MEDLINE:26522911Tailoring Brain Stimulation to the Nature of Rehabilit Cunningham, David A.; Cunningha PHYSICAL MEDICINI 264759-+2015MEDLINE:25311162 Implication of Acetabular Width on the Anteroposter Nie, Yong; Pei, Fuxing; Shen, Bin; HOURNAL OF ARTH 303489-4942015MEDLINE:25463267 GMorphological and positional changes of the carpal Marquardt, Tamara L.; Gabra, Josc CLINICAL BIOMECH 303248-2532015MEDLINE:2598337C Topical calcitriol prior to photodynamic therapy enh: Rollakanti, Kishore; Rollakanti, Kis OPTICAL METHODS 9308n/an/a2015MEDLINE:26111434 Reproducibility of transcranial magnetic stimulation WiZborowski, Maciej; Androjna, Cha IEEE TRANSACTION 5112n/a2015N/aComparison of Therapeutic Magnetic Stimulation WiZborowski, Maciej; Androjna, Cha IEEE TRANSACTION 622350-3592015	MEDLINE:25561734 Heavy Chain Transfer by Tumor Necrosis Factor-stim Lamkin, Elliott; Cheng, Georgiana; JOURNAL OF BIOLO 290	8	5156-5166	2015
MEDLINE:2621057€ A MAGNETOENCEPHALOGRAPHY STUDY OF MULTI-N Gopalakrishnan, R.; Burgess, R. C.; NEUROSCIENCE304n/a176-1892015MEDLINE:25806613 Human Fitting Studies of Cleveland Clinic Continuous Karimov, Jamshid H.; Steffen, Rob ASAIO JOURNAL614424-4282015MEDLINE:26522911 Tailoring Brain Stimulation to the Nature of Rehabilit Cunningham, David A.; Cunningha PHYSICAL MEDICINI264759-+2015MEDLINE:25311162 Implication of Acetabular Width on the Anteroposter Nie, Yong; Pei, Fuxing; Shen, Bin; FJOURNAL OF ARTHF 303489-4942015MEDLINE:25453258 Virus integration and genome influence in approach Li, Longkun; Zhang, Deying; Zhang ADVANCED DRUG E82-83n/a21-Dec2015MEDLINE:25661267 6Morphological and positional changes of the carpal Marquardt, Tamara L.; Gabra, José CLINICAL BIOMECH 303248-2532015MEDLINE:2598337C Topical calcitriol prior to photodynamic therapy enh Rollakanti, Kishore; Rollakanti, Kis OPTICAL METHODS 9308n/an/a2015MEDLINE:26111434 Reproducibility of transcranial magnetic stimulation Sankarasubramanian, Vishwanath JOURNAL OF ELECT 255754-7642015n/aComparison of Therapeutic Magnetic Stimulation Wi Zborowski, Maciej; Androjna, Cha IEEE TRANSACTION 5112n/a2015MEDLINE:25643084 Ultrasound Field Measurement Using a Binary LensClement, Gregory T.; Nomura, Hid IEEE TRANSACTION 622350-3592015	MEDLINE:26102177 Sensorless Suction Recognition in the Self-Regulating Horvath, David; Karimov, Jamshid ASAIO JOURNAL 61	6	726-728	2015
MEDLINE:25806613 Human Fitting Studies of Cleveland Clinic Continuous Karimov, Jamshid H.; Steffen, Rob ASAIO JOURNAL614424-4282015MEDLINE:26522911 Tailoring Brain Stimulation to the Nature of Rehabilit Cunningham, David A.; Cunningha PHYSICAL MEDICINI 264759-+2015MEDLINE:25311162 Implication of Acetabular Width on the Anteroposter Nie, Yong; Pei, Fuxing; Shen, Bin; FJOURNAL OF ARTHF 303489-4942015MEDLINE:25453258 Virus integration and genome influence in approach (Li, Longkun; Zhang, Deying; Zhang ADVANCED DRUG [82-83n/a21-Dec2015MEDLINE:25661267 6Morphological and positional changes of the carpal Marquardt, Tamara L.; Gabra, Jose CLINICAL BIOMECH 303248-2532015MEDLINE:2598337C Topical calcitriol prior to photodynamic therapy enh: Rollakanti, Kishore; Rollakanti, Kis OPTICAL METHODS 9308n/an/a2015MEDLINE:26111434 Reproducibility of transcranial magnetic stimulation Sankarasubramanian, Vishwanath JOURNAL OF ELECT 255754-7642015n/aComparison of Therapeutic Magnetic Stimulation Wi Zborowski, Maciej; Androjna, Cha IEEE TRANSACTION 5112n/a2015MEDLINE:25643084 Ultrasound Field Measurement Using a Binary LensClement, Gregory T.; Nomura, Hid IEEE TRANSACTION 622350-3592015	MEDLINE:26210576 A MAGNETOENCEPHALOGRAPHY STUDY OF MULTI-N Gopalakrishnan, R.; Burgess, R. C.; NEUROSCIENCE 304	n/a	176-189	2015
MEDLINE:26522911 Tailoring Brain Stimulation to the Nature of Rehabilit Cunningham, David A.; Cunningha PHYSICAL MEDICINI 264759-+2015MEDLINE:25311162 Implication of Acetabular Width on the Anteroposter Nie, Yong; Pei, Fuxing; Shen, Bin; FJOURNAL OF ARTHF 303489-4942015MEDLINE:2543258 Virus integration and genome influence in approach Li, Longkun; Zhang, Deying; Zhang ADVANCED DRUG E 82-83n/a21-Dec2015MEDLINE:25661267 6Morphological and positional changes of the carpal Marquardt, Tamara L.; Gabra, Jos CLINICAL BIOMECH 303248-2532015MEDLINE:2598337C Topical calcitriol prior to photodynamic therapy enh Rollakanti, Kishore; Rollakanti, Kis OPTICAL METHODS 9308n/an/a2015MEDLINE:26111434 Reproducibility of transcranial magnetic stimulation Sankarasubramanian, Vishwanath JOURNAL OF ELECT 255754-7642015n/aComparison of Therapeutic Magnetic Stimulation Wi Zborowski, Maciej; Androjna, Chai IEEE TRANSACTION 5112n/a2015MEDLINE:25643084 Ultrasound Field Measurement Using a Binary LensClement, Gregory T.; Nomura, Hid IEEE TRANSACTION 622350-3592015	MEDLINE:25806613 Human Fitting Studies of Cleveland Clinic Continuous Karimov, Jamshid H.; Steffen, Rob ASAIO JOURNAL 61	4	424-428	2015
MEDLINE:25311162 Implication of Acetabular Width on the Anteropostel Nie, Yong; Pei, Fuxing; Shen, Bin; I JOURNAL OF ARTHI 303489-4942015MEDLINE:25453258 Virus integration and genome influence in approach Li, Longkun; Zhang, Deying; Zhang ADVANCED DRUG E82-83n/a21-Dec2015MEDLINE:25661267 6Morphological and positional changes of the carpal Marquardt, Tamara L.; Gabra, Jos: CLINICAL BIOMECH 303248-2532015MEDLINE:2598337C Topical calcitriol prior to photodynamic therapy enh: Rollakanti, Kishore; Rollakanti, Kis OPTICAL METHODS 9308n/an/a2015MEDLINE:26111434 Reproducibility of transcranial magnetic stimulationSankarasubramanian, Vishwanath JOURNAL OF ELECT 255754-7642015n/aComparison of Therapeutic Magnetic Stimulation Wi Zborowski, Maciej; Androjna, Cha IEEE TRANSACTION 5112n/a2015MEDLINE:25643084 Ultrasound Field Measurement Using a Binary LensClement, Gregory T.; Nomura, Hid IEEE TRANSACTION 622350-3592015	MEDLINE:26522911 Tailoring Brain Stimulation to the Nature of Rehabilit Cunningham, David A.; Cunningha PHYSICAL MEDICIN 26	4	759-+	2015
MEDLINE:25453258 Virus integration and genome influence in approach Li, Longkun; Zhang, Deying; Zhang ADVANCED DRUG E82-83n/a21-Dec2015MEDLINE:25661267 6Morphological and positional changes of the carpal Marquardt, Tamara L.; Gabra, Jos CLINICAL BIOMECH 303248-2532015MEDLINE:2598337C Topical calcitriol prior to photodynamic therapy enh: Rollakanti, Kishore; Rollakanti, Kis OPTICAL METHODS 9308n/an/a2015MEDLINE:26111434 Reproducibility of transcranial magnetic stimulation Sankarasubramanian, Vishwanath JOURNAL OF ELECT 255754-7642015n/aComparison of Therapeutic Magnetic Stimulation Wi Zborowski, Maciej; Androjna, Cha LEEE TRANSACTION 5112n/a2015MEDLINE:25643084 Ultrasound Field Measurement Using a Binary LensClement, Gregory T.; Nomura, Hid LEE TRANSACTION 622350-3592015	MEDLINE:25311162 Implication of Acetabular Width on the Anteroposter Nie, Yong; Pei, Fuxing; Shen, Bin; HOURNAL OF ARTHF 30	3	489-494	2015
MEDLINE:25661267 6Morphological and positional changes of the carpal Marquardt, Tamara L.; Gabra, Jose CLINICAL BIOMECH 303248-2532015MEDLINE:2598337C Topical calcitriol prior to photodynamic therapy enh: Rollakanti, Kishore; Rollakanti, Kis OPTICAL METHODS 9308n/an/a2015MEDLINE:26111434 Reproducibility of transcranial magnetic stimulationSankarasubramanian, Vishwanath JOURNAL OF ELECT 255754-7642015n/aComparison of Therapeutic Magnetic Stimulation Wi Zborowski, Maciej; Androjna, ChallEEE TRANSACTION 5112n/a2015MEDLINE:25643084 Ultrasound Field Measurement Using a Binary LensClement, Gregory T.; Nomura, Hid IEEE TRANSACTION 622350-3592015	MEDLINE:25453258 Virus integration and genome influence in approach(Li, Longkun; Zhang, Deying; Zhang ADVANCED DRUG [82-83	n/a	21-Dec	2015
MEDLINE:2598337C Topical calcitriol prior to photodynamic therapy enh: Rollakanti, Kishore; Rollakanti, Kis OPTICAL METHODS 9308n/an/a2015MEDLINE:26111434 Reproducibility of transcranial magnetic stimulationSankarasubramanian, Vishwanath JOURNAL OF ELECT 255754-7642015n/aComparison of Therapeutic Magnetic Stimulation Wi Zborowski, Maciej; Androjna, Challeee TRANSACTION 5112n/a2015MEDLINE:25643084 Ultrasound Field Measurement Using a Binary LensClement, Gregory T.; Nomura, Hid IEEE TRANSACTION 622350-3592015	MEDLINE:256612676Morphological and positional changes of the carpal Marquardt, Tamara L.; Gabra, Jose CLINICAL BIOMECH 30	3	248-253	2015
MEDLINE:26111434 Reproducibility of transcranial magnetic stimulationSankarasubramanian, Vishwanath JOURNAL OF ELECT 255754-7642015n/aComparison of Therapeutic Magnetic Stimulation Wi Zborowski, Maciej; Androjna, ChallEEE TRANSACTION 5112n/a2015MEDLINE:25643084 Ultrasound Field Measurement Using a Binary LensClement, Gregory T.; Nomura, Hid IEEE TRANSACTION 622350-3592015	MEDLINE:2598337C Topical calcitriol prior to photodynamic therapy enh: Rollakanti, Kishore; Rollakanti, Kis OPTICAL METHODS 9308	n/a	n/a	2015
n/aComparison of Therapeutic Magnetic Stimulation Wi Zborowski, Maciej; Androjna, ChallEEE TRANSACTION 5112n/a2015MEDLINE:25643084 Ultrasound Field Measurement Using a Binary LensClement, Gregory T.; Nomura, Hid IEEE TRANSACTION 622350-3592015	MEDLINE:26111434 Reproducibility of transcranial magnetic stimulation Sankarasubramanian, Vishwanath JOURNAL OF ELECT 25	5	754-764	2015
MEDLINE:25643084 Ultrasound Field Measurement Using a Binary Lens Clement, Gregory T.; Nomura, Hid IEEE TRANSACTION 62 2 350-359 2015	n/a Comparison of Therapeutic Magnetic Stimulation Wi Zborowski, Maciej; Androjna, ChallEEE TRANSACTION 51	12	n/a	2015
	MEDLINE:25643084 Ultrasound Field Measurement Using a Binary Lens Clement, Gregory T.; Nomura, Hid IEEE TRANSACTION 62	2	350-359	2015

MEDLINE:25623935 Tissue engineering and regenerative medicine: bencl Damaser, Margot S.; Damaser, Margot ADVANCED DRUG E82-83	n/a	V-VII	2015
MEDLINE:26320611A game of hide and seek: Is it possible to recruit mor Potter-Baker, Kelsey A.; Bonnett, (JOURNAL OF THE N 358	2-Jan	472-474	2015
MEDLINE:26381404A Comprehensive Specimen-Specific Multiscale Data Chokhandre, Snehal; Colbrunn, Rc PLOS ONE 10	9	n/a	2015
MEDLINE:26696815 Non-Local Means Inpainting of MS Lesions in Longitu Guizard, Nicolas; Nakamura, Kunic FRONTIERS IN NEUI 9	n/a	n/a	2015
MEDLINE:25325983 Isolation and Purification of Versican and Analysis of Foulcer, Simon J.; Day, Anthony J.; GLYCOSAMINOGLY 1229	n/a	587-604	2015
MEDLINE:25796115 Anatomical Targeting Improves Delivery of Unconjug Snow-Lisy, Devon C.; Sabanegh, EcJOURNAL OF UROL(194	4	1155-1161	2015
MEDLINE:25830308 Detrusor Myocyte Autophagy Protects the Bladder F Zhao, Jiang; Song, Qixiang; Wang, PLOS ONE 10	4	n/a	2015
MEDLINE:25250974 Conversion of urodynamic pressures measured simu Awada, Hassan K.; Awada, Hassan NEUROUROLOGY A 34	6	507-512	2015
MEDLINE:2470834C Automated generation of tissue-specific three-dimer Bennetts, Craig J.; Sibole, Scott; Er COMPUTER METHC 18	12	1293-1304	2015
MEDLINE:25759977The Contribution of the Acetabular Labrum to Hip Jo Bonner, Tara F.; Colbrunn, Robb V JOURNAL OF BIOMI 137	6	n/a	2015
MEDLINE:25708038 Finite Element Modelling for Assessing Effect of Acet Nie, Yong; Pei, Fu-xing; Li, Zong-m ORTHOPAEDIC SUR 7	1	66-73	2015
MEDLINE:29353957 Magnetic separation of algae genetically modified fo Buck, Amy; Buck, Amy; Moore, Le JOURNAL OF MAGN 380	n/a	201-204	2015
MEDLINE:26368657 Circular Halbach Array for Fast Magnetic Separation Joshi, Powrnima; Williams, P. Step ANALYTICAL CHEMI 87	19	9908-9915	2015
MEDLINE:25939428 Post-explant visualization of thrombi in outflow graft Karimov, Jamshid H.; Horvath, Day JOURNAL OF ARTIFI 18	4	354-357	2015
n/a Multiscale modelling in biomechanics Introduction Viceconti, Marco; Humphrey, Jay INTERFACE FOCUS 5	2	n/a	2015
MEDLINE:23947659 Integration of marker and force data to compute thr Nataraj, Raviraj; Li, Zong-ming COMPUTER METHC 18	6	592-606	2015
MEDLINE:25596633 Digit mechanics in relation to endpoint compliance d Nataraj, Raviraj; Audu, Musa L.; Li JOURNAL OF BIOMI 48	4	672-680	2015
n/a Umbilical cord mesenchymal stem cells suppress hos Coulson-Thomas, V. J.; Gesteira, T INTERNATIONAL JO 96	2	A18-A18	2015
MEDLINE:26349531 Double-wire sternal closure technique in bovine anir Karimov, Jamshid H.; Sunagawa, CINTERNATIONAL JO 38	8	465-467	2015
MEDLINE:25787334The impact of 'negative data' Labhasetwar, Vinod DRUG DELIVERY AN 5	1	2-Jan	2015
n/a The self-administered, iPad (R)-based processing spe Rao, S.; Schindler, D.; Mourany, L. MULTIPLE SCLEROS 21	n/a	229-229	2015
MEDLINE:2651747C Milestones Contributing to the Evolution of Craniofa Tadisina, Kashyap Komarraju; Orra JOURNAL OF CRANI 26	8	2400-2408	2015
MEDLINE:25477141 Validation of a culturally compliant voiding platform Borazjani, Ali; Borazjani, Ali; Boraz INTERNATIONAL UF 26	5	749-755	2015
n/a Stem Cell Secretions Rescue the Pelvic Organ Prolaps Couri, B. M.; Wilson-Harris, B.; Wi TISSUE ENGINEERIN 21	n/a	S25-S26	2015
MEDLINE:25902768 The cyclical lower extremity exercise for Parkinson's Rosenfeldt, Anson B.; Rasanow, MBMC NEUROLOGY 15	n/a	n/a	2015
n/a The Contribution Of Sugar Nucleotides In The Pathog Tian, L.; Barnes, J. W.; Loftis, J.; Hi: AMERICAN JOURNA 191	n/a	n/a	2015
MEDLINE:26186322 Bone Graft Substitute Provides Metaphyseal Fixation Kim, Myung-Sun; Kovacevic, Davic ORTHOPEDICS 38	7	E597-E603	2015
n/a Cathepsin-K Targeted Nanoparticles for Regenerative Jennewine, B.; Ramamurthi, A. TISSUE ENGINEERIN 21	n/a	S186-S186	2015
n/a LOCAL ELECTRICAL STIMULATION WITH MESENCHYN Zutshi, M.; Sun, L.; Xie, Z.; Kuang, INEUROUROLOGY A 34	n/a	S283-S284	2015
MEDLINE:26378235 The Responses of Hyperglycemic Dividing Mesangial Wang, Christina P.; Hascall, Vincer JOURNAL OF BIOLO 290	48	29045-29050	2015
n/a Differential Regulation of CCN1 During Valve RemodeGhatak, Shibnath; Misra, Suniti; ReFASEB JOURNAL 29	n/a	n/a	2015
n/a Magnetically-responsive Stem Cell-derivatives Maint Swaminathan, G.; Sivaraman, B.; MISSUE ENGINEERIN 21	n/a	S24-S25	2015
n/a Wireless Implantable Pressure Monitor for Conditior Majerus, Steve; Makovey, Iryna; Z 2015 IEEE BIOMEDI n/a	n/a	204-207	2015
n/a Processing speed test vs. symbol digit modalities test Rao, S.; Schindler, D.; Mourany, L. MULTIPLE SCLEROS 21	n/a	228-229	2015
MEDLINE:25400204 Human fascia lata ECM scaffold augmented with imn Leigh, Diane R.; Kim, Myung-Sun; JOURNAL OF BIOM, 26	1	15-Jan	2015
n/a STEM-CELL BASED THERAPY PREVENTS PELVIC ORGA Couri, Bruna M.; Wilson-Harris, Br NEUROUROLOGY A 34	n/a	S3-S3	2015
n/a Diffusion tensor imaging effects of mesenchymal ste Ontaneda, D.; Offerman, E.; Karaf: MULTIPLE SCLEROS 21	n/a	277-277	2015
MEDLINE:26105105 Anatomy of the bovine ascending aorta and brachioc Karimov, Jamshid H.; Sunagawa, CJOURNAL OF ARTIFI 18	4	358-360	2015
n/a Validation of the MS performance test walking and b Bethoux, F.; Mourany, L.; Schindle MULTIPLE SCLEROS 21	n/a	665-665	2015
n/a POST-PARTUM INTRAPERITONEAL (IP) INJECTION OF Pizarro-Berdichevsky, J.; Walker, MINTERNATIONAL UF 26	n/a	S59-S59	2015

n/a	Pathological Hyaluronan Matrices In Cystic Fibrosis A Matuska, B.; Chmiel, J.; Chmiel, J.; AMERICAN JOURNA	⁴ 191	n/a	n/a	2015
n/a	FREQUENT ELECTRICAL STIMULATION IMPROVES PU Balog, B. M.; Balog, B. M.; Balog, EJOURNAL OF THE P	20	2	101-101	2015
n/a	Circulating Tumor Cells (CTC) Enrichment as Liquid-B Ma, Patrick C.; Yin, Lihong; Joshi, JOURNAL OF THOR	10	9	S357-S357	2015
n/a	Paracrine Effects of Human Urine-derived Stem Cells Tran, C. N.; Tangada, A.; Balog, B.; TISSUE ENGINEERIN	21	n/a	S385-S385	2015
n/a	Biomarkers of Blood Brain Barrier Disruption Brennan, Chanda; Song, Anne; Gh BIOLOGICAL PSYCH	77	9	302S-302S	2015
n/a	THE EFFECTS OF VAGINAL DELIVERY ON SERUM CYT(Moore, Courtenay; Kuang, Mei; R; NEUROUROLOGY A	34	n/a	S17-S17	2015
MEDLINE:26461854	Presurgical Psychological and Neuroendocrine PredicKing, Anthony P.; King, Anthony P. PSYCHOSOMATIC N	77	9	993-1005	2015
n/a	Clinical Potential for Vitamin D as a Neoadjuvant for Maytin, Edward V.; Maytin, Edwar OPTICAL METHODS	59308	n/a	n/a	2015
n/a	Hyaluronan In Asthma Severity And Experimental As Lauer, M. E.; Majors, A. K.; Comha AMERICAN JOURNA	⁴ 191	n/a	n/a	2015
n/a	Multiple sclerosis performance test: longitudinal vali Rao, S.; Mamone, B.; Mourany, L.; MULTIPLE SCLEROS	521	n/a	125-126	2015
n/a	Phenotypic Coordinates of Mesenchymal Stem Cell-c Swaminathan, G.; Stoilov, I.; Bratz TISSUE ENGINEERIN	21	n/a	S25-S25	2015
n/a	Anti-NR2 Antibody and Blood-Brain Barrier Disruptio Gulati, Gaurav; Iffland, Philip; Iffla ARTHRITIS & RHEU	167	n/a	n/a	2015
n/a	Pediatric Bronchial Epithelial Cells Synthesize Leukoc Lamkin, E.; Harford, T. J.; Brown, FAMERICAN JOURNA	⁴ 191	n/a	n/a	2015
MEDLINE:26783524	Brain Parenchymal Fraction: A Relatively Simple MRI Rajagopalan, Venkateswaran; Raj، BIOMED RESEARCH ا	In/a	n/a	n/a	2015
n/a	Preface Hafeli, Urs; Schneider, Thomas; O(JOURNAL OF MAG	380	n/a	1-Jan	2015
n/a	COMBINING PHOSPHODIESTERASE-4 AND PHOSPHO Balog, B. M.; Balog, B. M.; Balog, ENEUROUROLOGY A	34	n/a	S97-S98	2015
n/a	POST-PARTUM INTRAPERITONEAL (IP) INJECTION OF Pizarro-Berdichevsky, Javier; Pizar NEUROUROLOGY A	34	n/a	S16-S17	2015
n/a	Automatic Drift Cancellation of Implanted Bladder Pr Majerus, Steve; Damaser, Margot 2015 IEEE BIOMED	I n/a	n/a	580-583	2015
MEDLINE:26564433	Revised Recommendations of the Consortium of MS Traboulsee, A.; Simon, J. H.; Simor AMERICAN JOURN	£37	3	394-401	2016
MEDLINE:27371730	Long Noncoding RNA MALAT1 Promotes Aggressive Li, LE; Chen, Hua; Gao, Yue; Wang MOLECULAR CANC	15	9	2232-2243	2016
MEDLINE:26556772	Is phosphorylated tau unique to chronic traumatic er Puvenna, Vikram; Puvenna, Vikrar BRAIN RESEARCH	1630	n/a	225-240	2016
MEDLINE:26446156	ADAMTS3 activity is mandatory for embryonic lympl Janssen, Lauriane; Dupont, Laura; ANGIOGENESIS	19	1	53-65	2016
MEDLINE:26444849	Open Knee: Open Source Modeling and Simulation ir Erdemir, Ahmet JOURNAL OF KNEE	29	2	107-116	2016
MEDLINE:26789548	Deficiency of circadian clock protein BMAL1 in mice I Samsa, William E.; Vasanji, Amit; I BONE	84	n/a	194-203	2016
MEDLINE:27259980	Immunoregulatory roles of versican proteolysis in th Hope, Chelsea; Foulcer, Simon; Ja _l BLOOD	128	5	680-685	2016
MEDLINE:26553870	Molecular Mechanism Responsible for Fibronectin-c، Iwasaki, Ayumi; Sakai, Keiko; Saka JOURNAL OF BIOLC المحافظ	291	1	72-88	2016
MEDLINE:26538088	Assessment of Methods for Rapid Intraoperative Cor Luangphakdy, Viviane; Boehm, Cy TISSUE ENGINEERIN	22	2-Jan	17-30	2016
MEDLINE:26903413	The effect of biomechanical variables on force sensit Schofield, Jonathon S.; Evans, Katl JOURNAL OF BIOM	149	5	786-792	2016
MEDLINE:26858457	Membrane translocation of TRPC6 channels and end Chaudhuri, Pinaki; Rosenbaum, M PROCEEDINGS OF T	113	8	2110-2115	2016
MEDLINE:26740262	Determination of the substrate repertoire of ADAMT Bekhouche, Mourad; Leduc, Cedri FASEB JOURNAL	30	5	1741-1756	2016
MEDLINE:26829621	Training the next generation of biomedical investigal Agre, Peter; Agre, Peter; Bertozzi, JOURNAL OF CLINIC	126	2	405-408	2016
MEDLINE:26238463	Effect of intramuscular interferon beta-1a on gray m Fisher, E.; Fisher, E.; Nakamura, K. MULTIPLE SCLEROS	522	5	668-676	2016
MEDLINE:27869206	Endotoxin free hyaluronan and hyaluronan fragment Dong, YiFei; Arif, Arif; Olsson, Mia SCIENTIFIC REPORT	6	n/a	n/a	2016
MEDLINE:27638769	Adamts18 deletion results in distinct developmental Ataca, Dalya; Caikovski, Marian; P BIOLOGY OPEN	5	11	1585-1594	2016
MEDLINE:26949875	A Web-Based Mindfulness Stress Management ProgrAllexandre, Didier; Allexandre, Dic JOURNAL OF OCCU	58	3	254-264	2016
MEDLINE:26735970	Tissue plasminogen activator followed by antioxidan Petro, Marianne; Jaffer, Hayder; Y BIOMATERIALS	81	n/a	169-180	2016
MEDLINE:27090164	Inhibition of bone loss with surface-modulated, drug Adjei, Isaac M.; Adjei, Isaac M.; Sh JOURNAL OF CONT	1232	n/a	83-92	2016
MEDLINE:26829347	Vaginal Expression of LOXL1 in Premenopausal and PKow, Nathan; Ridgeway, Beri; Kua FEMALE PELVIC ME	22	4	229-235	2016
MEDLINE:26292331	Real-Time Classification of Bladder Events for Effecti، Karam, Robert; Bourbeau, Dennis; IEEE TRANSACTION المحا	63	4	721-729	2016
MEDLINE:27297885	Genetic and biochemical evidence that gastrulation (Benz, Brian A.; Benz, Brian A.; Nan DEVELOPMENTAL E	416	1	111-122	2016

MEDLINE:27131609 A general framework for application of prestrain to c Maas, Steve A.; Erdemir, Ahmet; HOURNAL OF THE N 61	n/a	499-510	2016
MEDLINE:27590291 Superior MRI outcomes with alemtuzumab compare Arnold, Douglas L.; Fisher, Elizabe NEUROLOGY 87	14	1464-1472	2016
MEDLINE:26857399 Cortical and motor responses to acute forced exercis Alberts, Jay L.; Alberts, Jay L.; Phill PARKINSONISM & F 24	n/a	56-62	2016
MEDLINE:26761515 Applying to Integrated Plastic Surgery Residency Prol Tadisina, Kashyap Komarraju; Orra PLASTIC AND RECO 137	4	1344-1353	2016
MEDLINE:27872808 Delineation of cortical pathology in multiple sclerosis Rudko, David A.; Derakhshan, Mis NEUROIMAGE-CLIN 12	n/a	858-868	2016
n/a Models to Tailor Brain Stimulation Therapies in Strok Plow, E. B.; Sankarasubramanian, NEURAL PLASTICITY n/a	n/a	n/a	2016
MEDLINE:27435674Tumor Necrosis Factor-stimulated Gene-6 (TSG-6) Is Coulson-Thomas, Vivien J.; Lauer, JOURNAL OF BIOLO 291	38	19939-19952	2016
MEDLINE:27050606 Electrical Stimulation Followed by Mesenchymal SterSun, Li; Yeh, Judy; Xie, Zhuojun; Ki DISEASES OF THE C 59	5	434-442	2016
MEDLINE:26760967 Detection of Coupling in Short Physiological Series by Li, Peng; Li, KE; Liu, Chengyu; Zher IEEE TRANSACTION 63	11	2231-2242	2016
MEDLINE:28072567 Commentary on the Integration of Model Sharing an Erdemir, Ahmet; Guess, Trent M.; IEEE TRANSACTION 63	10	2080-2085	2016
Dong, Xingyou; Song, Qixiang; Zhu SCIENTIFIC REPORT 6 و DONG, Xingyou; Song, Qixiang; Zhu SCIENTIFIC REPORT 6	n/a	n/a	2016
MEDLINE:27058145 POST-EXERCISE DEPRESSION FOLLOWING SUBMAXIN Cunningham, David A.; Cunningha NEUROSCIENCE 326	n/a	95-104	2016
MEDLINE:26791217 Hyaluronidase and Hyaluronan Oligosaccharides Pro Vinukonda, Govindaiah; Vinukond JOURNAL OF NEUR 36	3	872-889	2016
MEDLINE:27565163 Expression of natural killer cell regulatory microRNA Joshi, Powrnima; Kooshki, Mitra; / CLINICAL & EXPERI 33	8	829-838	2016
MEDLINE:26708965 Simplified versus geometrically accurate models of fcTelfer, Scott; Telfer, Scott; Erdemi JOURNAL OF BIOMI 49	2	289-294	2016
MEDLINE:27285829 Expert Panel Recommendations on Lower Urinary Tr Losada, Liliana; Amundsen, Cindy JOURNAL OF WOM 25	11	1086-1096	2016
MEDLINE:26936873 Neuroanatomic and behavioral correlates of urinary Palacios, J. L.; Juarez, M.; Moran, (AMERICAN JOURN/310	10	F1065-F1073	2016
MEDLINE:26733321 Early event related fields during visually evoked pain Gopalakrishnan, Raghavan; Burge CLINICAL NEUROPH 127	3	1855-1863	2016
MEDLINE:26657033 Anti-ADAMTS5 monoclonal antibodies: implications Apte, Suneel S. BIOCHEMICAL JOUF 473	n/a	E1-E4	2016
MEDLINE:27312874 Pathophysiological implications of neurovascular P4! Ghosh, Chaitali; Hossain, Mohamr DRUG DISCOVERY T 21	10	1609-1619	2016
MEDLINE:27084769 Longitudinal Metabolite Profiling of Cerebrospinal FI Huang, HE; Yang, Jun; Luciano, MaNEUROCHEMICAL F41	7	1713-1722	2016
MEDLINE:27496286 Quality of life outcomes following cervical decompre Xiao, Roy; Xiao, Roy; Miller, Jacob SPINE JOURNAL 16	11	1358-1366	2016
MEDLINE:2614721C The impact of vaginal delivery on pelvic floor functio Callewaert, G.; Albersen, M.; Jans: BJOG-AN INTERNAT 123	5	678-681	2016
MEDLINE:27013773 Monitoring and Surveillance of Hemodialysis Access Koirala, Nischal; Koirala, Nischal; ASEMINARS IN INTEF 33	1	25-30	2016
MEDLINE:27280845 Differential contribution of complement receptor C5 McCullough, Rebecca L.; McMulle MOLECULAR IMMU 75	n/a	122-132	2016
MEDLINE:26684685 Median Sternotomy or Right Thoracotomy Techniqu Karimov, Jamshid H.; Moazami, Na ARTIFICIAL ORGANS 40	10	1022-1027	2016
MEDLINE:26601955 Hyaluronan Rafts on Airway Epithelial Cells Abbadi, Amina; Abbadi, Amina; La JOURNAL OF BIOLO 291	3	1448-1455	2016
MEDLINE:26830683 Magnetically Responsive Bone Marrow Mesenchyma Swaminathan, Ganesh; Swaminatl TISSUE ENGINEERIN 22	4	301-311	2016
MEDLINE:27013942 Influence of Corticospinal Tracts from Higher Order I Potter-Baker, Kelsey A.; Varnerin, FRONTIERS IN NEUI 10	n/a	n/a	2016
MEDLINE:27240521 Lack of CAR impacts neuronal function and cerebrov Boussadia, Baddreddine; Gangaro EXPERIMENTAL NEI 283	n/a	39-48	2016
MEDLINE:2692638C Correlates of the timed 25 foot walk in a multiple scl Bethoux, Francois A.; Palfy, Dylan INTERNATIONAL JO 39	2	134-139	2016
MEDLINE:2826871C Inductive Passive Sensor for Intraparenchymal and Ir Behfar, Mohammad H.; Abada, En 2016 38TH ANNUAI n/a	n/a	1950-1954	2016
MEDLINE:26953892 Adaptation of the Transverse Carpal Ligament Associ Mhanna, Christiane; Marquardt, T PLOS ONE 11	3	n/a	2016
MEDLINE:27086577 Variability in Subjective Review of Umbilical Cord Blo Powell, K.; Kwee, E.; Kwee, E.; Nut CYTOMETRY PART I 90	6	517-524	2016
MEDLINE:26617368 Three-dimensional stiffness of the carpal arch Gabra, Joseph N.; Gabra, Joseph N JOURNAL OF BIOMI 49	1	53-59	2016
MEDLINE:27650121 Comparison of preoperative quality of life in breast r Duraes, Eliana F. R.; Duraes, Eliana JOURNAL OF PLAST 69	11	1478-1485	2016
MEDLINE:26498093 Exercise-induced changes of cerebrospinal fluid vasc Yang, Jun; Shanahan, Kaitlyn J.; Sh JOURNAL OF CLINIC 24	n/a	52-56	2016
MEDLINE:24737693 Nanoparticulate delivery of agents for induced elast Venkataraman, Lavanya; Venkata JOURNAL OF TISSUI 10	12	1041-1056	2016
MEDLINE:26994394 Who is Publishing in Facial Cosmetic Surgery? A Citat Waltzman, Joshua T.; Waltzman, J AESTHETIC SURGER 36	7	743-755	2016
MEDLINE:24383709 Evaluation of a post-processing approach for multisc Sibole, Scott C.; Maas, Steve; Hall COMPUTER METHC 19	1	n/a	2016

MEDLIN	E:27301359 Suppression of Ischemia-Induced Hippocampal Pyrar Sunabori, Takehiko; Koike, Masatc AMERICAN JOURNA 186	8	2143-2151	2016
n/a	Ultralow-power Data Compression for Implantable B Karam, Robert; Karam, Robert; M، PROCEEDINGS OF 2 n/a	n/a	500-503	2016
MEDLIN	E:27741209 Pterygopalatine Fossa Anatomy for a Surgical Approa Frautschi, Russell S.; Halasa, Brian JOURNAL OF CRANI 27	7	1866-1869	2016
MEDLIN	E:2691230C The Contribution to Hemodynamics Even at Very Lov Sunagawa, Gengo; Byram, Nicole; ANNALS OF THORA 101	6	2260-2264	2016
MEDLIN	E:26851211Challenges in Recruitment for the Study of Noninvas Potter-Baker, Kelsey A.; Bonnett, (JOURNAL OF STROk 25	4	927-937	2016
MEDLIN	E:26911917 Application of magnetic cytosmear for the estimatio Sumari, Deborah; Sumari, Deboral MALARIA JOURNAL 15	n/a	n/a	2016
MEDLIN	E:26886467The Role of Virtual Histology Intravascular Ultrasoun Sinclair, Hannah; Veerasamy, Mur CARDIOLOGY IN RE'24	6	303-309	2016
MEDLIN	E:26895598The effects of prosthetic humeral head shape on glei Jun, Bong Jae; Lee, Thay Q.; McGa JOURNAL OF SHOU 25	7	1084-1093	2016
MEDLIN	E:2826957C Real-time, Autonomous Bladder Event Classification Karam, Robert; Karam, Robert; Bh 2016 38TH ANNUAI n/a	n/a	5789-5792	2016
n/a	Alemtuzumab durably slows brain volume loss over (Traboulsee, A.; Barnett, M.; Comi, MULTIPLE SCLEROS 22	n/a	616-617	2016
MEDLIN	E:27243106 Pathological Hyaluronan Matrices in Cystic Fibrosis A Matuska, Brittany; Comhair, Suzy; AMERICAN JOURNA55	4	576-585	2016
MEDLIN	E:27460854Smooth Muscle Progenitor Cells Derived From Huma Li, Yanhui; Li, Yanhui; Wen, Yan; WSTEM CELLS TRANS 5	12	1719-1729	2016
MEDLIN	E:27045553 Reliability of TMS metrics in patients with chronic in Potter-Baker, K. A.; Janini, D. P.; FI SPINAL CORD 54	11	980-990	2016
MEDLIN	E:27687499 Impaired ADAMTS9 secretion: A potential mechanisr Dubail, Johanne; Dubail, Johanne; SCIENTIFIC REPORT 6	n/a	n/a	2016
MEDLIN	E:2710662C Limitations to Chronic Right Ventricular Assist Device Karimov, Jamshid H.; Sunagawa, CANNALS OF THORA 102	2	651-658	2016
MEDLIN	E:26662276 Carpal arch and median nerve changes during radiou Marquardt, Tamara L.; Evans, Pete JOURNAL OF ORTH 34	7	1234-1240	2016
n/a	Alemtuzumab reduces the rate of brain volume Loss Traboulsee, A.; Pelletier, D.; Comi, MULTIPLE SCLEROS 22	n/a	613-614	2016
MEDLIN	E:26652359 Fibrinolytic PLGA nanoparticles for slow clot lysis wit Sivaraman, Balakrishnan; Sylveste MATERIALS SCIENC 59	n/a	145-156	2016
MEDLIN	E:26895354 Evaluating latrogenic Complications of the Total-Con Owings, Tammy M.; Nicolosi, Nico JOURNAL OF THE A 106	1	6-Jan	2016
MEDLIN	E:26088829 Combination histamine and serotonin treatment aft Song, Qi-Xiang; Song, Qi-Xiang; So NEUROUROLOGY A 35	6	703-710	2016
n/a	Optic cup-specific ablation of Adamts9, encoding a scEarp, Sarah; Dubail, Johanne; ApteINVESTIGATIVE OPF 57	12	n/a	2016
n/a	Doxycycline Inhibition of C-Jun Kinase Contributes to Camardo, A.; Ramamurthi, A. TISSUE ENGINEERIN 22	n/a	S135-S135	2016
MEDLIN	E:26808837 Development of an Arthroscopic Joint Capsule Injury Kovacevic, David; Kovacevic, Davic PLOS ONE 11	1	n/a	2016
n/a	Cognitive and Balance Correlates of Exposure and Br Banks, Sarah; Alberts, Jay; Bernick NEUROLOGY 86	n/a	n/a	2016
MEDLIN	E:27722366 Differential regulation of NSC phenotype and genoty Farrell, Kurt; Borazjani, Ali; Borazja INTEGRATIVE BIOLC 8	11	1145-1157	2016
MEDLIN	E:26779995A flow cytometry assay that measures cellular sensit Mathew, Sherin T.; Johansson, Pe _l CLINICAL BIOCHEM 49	8-Jul	566-572	2016
n/a	Imaging cortical demyelination using T1/T2-weighter Nakamura, K.; Chen, J. T.; Fox, R. J MULTIPLE SCLEROS 22	n/a	526-526	2016
n/a	Combination photodynamic therapy using 5-fluorou၊ Maytin, Edward V.; Anand, Sanjay OPTICAL METHODS 9694	n/a	n/a	2016
MEDLIN	E:26968608 Functional Magnetic Stimulation of Inspiratory and E Zhang, Xiaoming; Zhang, Xiaoming PM&R 8	7	651-659	2016
n/a	Oral vitamin D3 supplementation for combination pl Anand, S.; Thomas, E.; Hasan, T.; MJOURNAL OF INVES 136	5	S105-S105	2016
n/a	Cellular modelling in functional tissue engineering: reFerreira, Joao; Parente, Marco; M PROCEEDINGS OF T 230	1	17-May	2016
n/a	ADAMTS9 regulates cell-cell interactions and myelin; Ackerman, S. D.; Ackerman, S. D.; MOLECULAR BIOLO 27	n/a	n/a	2016
n/a	IMPACT OF DEVICE TYPE ON RESIDUAL SHUNT FOLLC Krasuski, Richard A.; Zdradzinski, I JOURNAL OF THE A 67	13	933-933	2016
n/a	Maternal sleep position, sleep disordered breathing Dorrian, J.; Morrison, J.; O'Brien, LJOURNAL OF SLEEP 25	n/a	171-172	2016
MEDLIN	E:26686343 Relapse May Serve as a Mediator Variable in Longitu Stone, Lael Anne; Cutter, Gary Ray JOURNAL OF NEUR 26	3	296-302	2016
n/a	IN VIVO INTEGRATION AND MECHANISM OF ACTION Li, Yan Hui; Wen, Yan; Wang, Zhe; NEUROUROLOGY A 35	n/a	S18-S19	2016
n/a	Cognitive and Balance Correlates of Exposure and Br Banks, Sarah; Alberts, Jay; Bernick NEUROLOGY 86	n/a	n/a	2016
MEDLIN	E:2741898C Interventions to Enhance Adaptive Plasticity after Sti Conforto, Adriana; Conforto, Adria NEURAL PLASTICITY n/a	n/a	n/a	2016
n/a	Early Patient Morbidity after Open Ventral Hernia ReSahoo, Sambit; Haskins, Ivy N.; O'I JOURNAL OF THE A 223	4	E19-E19	2016
n/a	Cognitive and Balance Correlates of Exposure and Br Banks, Sarah; Alberts, Jay; Bernick NEUROLOGY 86	n/a	n/a	2016

n/a	A Novel Method for Quantification of Normal Appea Nakamura, Kunio; Deshmane, Ana NEUROLOGY 86	n/a	n/a	2016
n/a	QUANTITATIVE ASSAY OF CHONDROGENIC CONNEC Mantripragada, V. R.; Boehm, C.; I OSTEOARTHRITIS A 24	n/a	S225-S225	2016
MEDLINE:270	74707 Changes in carpal tunnel compliance with increment Ratnaparkhi, Rubina; Xiu, Kaihua; JOURNAL OF ORTH 11	n/a	n/a	2016
MEDLINE:269	50799 Mechanical circulatory support in pediatrics Steffen, Robert J.; Miletic, Kyle G.; EXPERT REVIEW OF 13	5	507-514	2016
n/a	Altered dermal fibroblast function contributes to enł Wang, Y.; Mack, J.; Maytin, E. V. JOURNAL OF INVES 136	5	S129-S129	2016
n/a	Altered Sugar Nucleotide Levels Facilitate Changes Ir Tian, L.; Barnes, J. W.; Loftis, J.; Hi AMERICAN JOURN/ 193	n/a	n/a	2016
n/a	A Novel Method for Quantification of Normal Appea Nakamura, Kunio; Deshmane, Ana NEUROLOGY 86	n/a	n/a	2016
MEDLINE:264	69561Importance of maintaining the basic stress pathway Nie, Yong; Pei, Fuxing; Shen, Bin; I COMPUTER METHC 19	9	977-984	2016
MEDLINE:275	74737 Advanced ventricular assist device with pulse augme Fukamachi, Kiyotaka; Horvath, Da JOURNAL OF HEAR135	12	1519-1521	2016
n/a	Vitamin D for combination photodynamic therapy of Anand, Sanjay; Thomas, Erik; Hasa OPTICAL METHODS 9694	n/a	n/a	2016
MEDLINE:272	97856 Contributors to and impact of residual shunting after Zdradzinski, Michael J.; Zdradzinsk AMERICAN HEART J 177	n/a	112-119	2016
n/a	Non-invasive Ultrasonic Differentiation of Carotid Pla Fedewa, Russell J.; Gornik, Heathe VASCULAR MEDICI 21	3	302-302	2016
n/a	Generating Pulsatility by Pump Speed Modulation wi Fukamachi, K.; Karimov, J. H.; Sun، JOURNAL OF HEAR	4	S129-S129	2016
n/a	An intrapatient, bilaterally-controlled clinical trial co Maytin, E. V.; Riha, M.; Anand, S.; JOURNAL OF INVES 136	5	S50-S50	2016
MEDLINE:273	57716 Anti-NR2 antibodies, blood-brain barrier, and cogniti Gulati, Gaurav; Iffland, Philip H., II CLINICAL RHEUMA135	12	2989-2997	2016
n/a	The Role Of Hyaluronan On Chronic Asthma: Expand Goldstein, B. D.; Goldstein, B. D.; (AMERICAN JOURN/ 193	n/a	n/a	2016
MEDLINE:274	01044In vivo tissue interaction between the transverse car Gabra, Joseph N.; Gordon, Joshua MEDICAL ENGINEEF 38	10	1055-1062	2016
n/a	Elastic Matrix-Regenerative Nanoparticles for Target Fox, J.; Ramamurthi, A. TISSUE ENGINEERIN 22	n/a	S9-S9	2016
n/a	Wireless Bladder Pressure Monitor for Closed-Loop I Majerus, Steve; Basu, Anisha S.; B 2016 IEEE SENSORS n/a	n/a	n/a	2016
n/a	Spectral Analysis of Ultrasonic Backscatter from Hun Fedewa, Russell; Gornik, Heather; 2016 IEEE INTERNA n/a	n/a	n/a	2016
n/a	Optimizing Soft Tissue Management And Spacer Des Luangphakdy, V.; Boehm, C.; Zach TISSUE ENGINEERIN 22	n/a	S37-S37	2016
n/a	Evaluation of Changes in Flow Associated with Heart Karimov, J. H.; Tong, M.; Byram, NJOURNAL OF HEAR135	4	S325-S326	2016
MEDLINE:287	56833Biocompatibility evaluation of a thermoplastic rubbe Yang, Jun; Charif, Andrea C.; Pusk; JOURNAL OF THE N 53	n/a	463-463	2016
n/a	Long-term change in magnetisation transfer ratio de Zheng, Y.; Nakamura, K.; Rudick, RMULTIPLE SCLEROS 22	n/a	235-236	2016
n/a	DRUG METABOLIZING ENZYMES P450S AND NUCLEA Ghosh, C.; Hossain, M.; Marchi, N. JOURNAL OF CEREB 36	n/a	147-147	2016
n/a	Reproducibility of Computational Models Erdemir, A.; Sauro, H. M. IEEE TRANSACTION 63	10	1995-1996	2016
n/a	Aerobic Exercise Preserves Olfaction Function in Indi Rosenfeldt, Anson B.; Dey, Tanujit PARKINSONS DISEA n/a	n/a	n/a	2016
n/a	Membrane Lipids and Drug Transport Labhasetwar, Vinod DRUG DELIVERY AC n/a	n/a	271-290	2016
n/a	Improving Dispersion of Bacterial Endospores for En၊ Krishna, Vijay B.; Krishna, Vijay B.; KONA POWDER AN n/a	33	304-309	2016
MEDLINE:268	14884 Translational approaches to the treatment of benign Lee, Calvin; Chermansky, Christop CURRENT OPINION 26	2	184-192	2016
n/a	Brain hypometabolism coincides with or precedes cc Rajagopalan, V.; Rajagopalan, V.; I JOURNAL OF CEREB 36	n/a	685-685	2016
MEDLINE:274	48751 Women's Urological Health as a Priority to the Wom Mueller, Elizabeth R.; Damaser, M WOMENS HEALTH I 26	4	476-477	2016
n/a	Advanced Ventricular Assist Device with Pulse Augm Fukamachi, K.; Horvath, D. J.; Byra JOURNAL OF HEAR135	4	S329-S330	2016
n/a	Quantitative analysis of normal-appearing brain tissı Nakamura, K.; Deshmane, A.; Shal MULTIPLE SCLEROS 22	n/a	526-527	2016
n/a	Mechanical Stress on Suspended Cortical Bone Samp Schwab, Samuel M.; Androjna, Ch IEEE TRANSACTION 52	7	n/a	2016
MEDLINE:267	32059 Future Prospects for the Total Artificial Heart Sunagawa, Gengo; Horvath, David EXPERT REVIEW OF 13	2	191-201	2016
n/a	Optimization of Orthogonal-Coil RF Probe for Miniat، Behfar, Mohammad H.; Sydanheir 2016 IEEE ANTENN، n/a	n/a	1047-1048	2016
MEDLINE:266	49472 Early growth and development impairments in patie Wang, H.; Wang, H.; Wang, H.; W& CLINICAL GENETICS 89	5	625-629	2016
MEDLINE:281	60121 Destination Brain: the Past, Present, and Future of Tl Joshi, Chaitanya R.; Labhasetwar, JOURNAL OF NEUR 12	1	51-83	2017
MEDLINE:280	26755 Passive Acoustic Mapping with the Angular Spectrun Arvanitis, Costas D.; Crake, Calum, IEEE TRANSACTION 36	4	983-993	2017

MEDLINE:28060842 Suburothelial Bladder Contraction Detection with Im Majerus, Steve J. A.; Majerus, Stev PLOS ONE 12	1	n/a	2017
MEDLINE:28402865 Inhibition versus facilitation of contralesional motor Sankarasubramanian, Vishwanath CLINICAL NEUROPH 128	6	892-902	2017
MEDLINE:27720413 Neer Award 2015: Analysis of cytokine profiles in the Frangiamore, Salvatore J.; Saleh, & JOURNAL OF SHOU 26	2	186-196	2017
MEDLINE:28380672 Randomized Clinical Trial of Deep Brain Stimulation f Lempka, Scott F.; Lempka, Scott F. ANNALS OF NEURO 81	5	653-663	2017
MEDLINE:25376929 Pro-elastogenic effects of bonemarrowmesenchyma Swaminathan, Ganesh; Swaminatl JOURNAL OF TISSUI 11	3	679-693	2017
MEDLINE:28709984 Micrometer scale guidance of mesenchymal stem ce Chou, Chih-Ling; Rivera, Alexande ACTA BIOMATERIAI 60	n/a	210-219	2017
MEDLINE:28095177 Integrated Colony Imaging, Analysis, and Selection D Kwee, Edward; Kwee, Edward; He SLAS TECHNOLOGY 22	2	217-223	2017
MEDLINE:27884774 Magnetically-responsive, multifunctional drug delive Sivaraman, Balakrishnan; Swamin: ACTA BIOMATERIAI 52	n/a	171-186	2017
MEDLINE:27705061 Errors in Shoulder Joint Position Sense Mainly Come Lin, Yin-Liang; Lin, Yin-Liang; Kardi JOURNAL OF APPLII 33	1	32-38	2017
MEDLINE:28299721 Pro-NP (TM) protect against TiO2 nanoparticle-induc Kim, Min-Sik; Kim, Min-Sik; Stees, DRUG DELIVERY AN 7	3	372-382	2017
MEDLINE:27401215 Mechanism of Self-Regulation and In Vivo Performar Horvath, David; Byram, Nicole; Ka ARTIFICIAL ORGAN: 41	5	411-417	2017
MEDLINE:28416267 Molecular Mechanisms and Targets of Therapy for H Klungboonkrong, Vivian; Klungboc JOURNAL OF VASCL 28	7	949-955	2017
MEDLINE:28426701 Exploratory study on the effect of osteoactivin on mi Ma, Jinjin; Baker, Andrew R.; Calal PLOS ONE 12	4	n/a	2017
MEDLINE:27815598 In vitro chondrocyte toxicity following long-term, hig Midura, Sharon; Schneider, Erika; SKELETAL RADIOLO 46	1	23-33	2017
MEDLINE:28872528 Quantitative Measurement of Osseous Pathology in Jannotti, Joseph P.; Jun, Bong-Jae; JOURNAL OF BONE 99	17	1460-1468	2017
MEDLINE:28389561 Transforming growth factor 1 (TGF1)-induced CD44V Ghatak, Shibnath; Hascall, Vincent JOURNAL OF BIOLO 292	25	10490-10519	2017
MEDLINE:27856308 Dysregulation of hyaluronan homeostasis during aor Krishnamurthy, Varun K.; Stout, A MATRIX BIOLOGY 62	n/a	40-57	2017
MEDLINE:27580083 Air filled, including "air-charged," catheters in urody: Abrams, Paul; Damaser, Margot S. NEUROUROLOGY A 36	5	1234-1242	2017
MEDLINE:28389562 Transforming growth factor 1 (TGF1) regulates CD44 Ghatak, Shibnath; Markwald, Rog JOURNAL OF BIOLO 292	25	10465-10489	2017
MEDLINE:27654489 Deairing Techniques for Double-Ended Centrifugal TcKarimov, Jamshid H.; Horvath, Dav ARTIFICIAL ORGANS 41	6	568-572	2017
MEDLINE:2826701C Regenerating the Anal Sphincter: Cytokines, Stem Ce Sun, Li; Xie, Zhuojun; Kuang, Mei; DISEASES OF THE C 60	4	416-425	2017
MEDLINE:2479939C Spatiotemporal mapping of matrix remodelling and (Deb, Partha Pratim; Ramamurthi, JOURNAL OF TISSUI 11	1	231-245	2017
MEDLINE:28835433 Integration of TRPC6 and NADPH oxidase activation i Chaudhuri, Pinaki; Rosenbaum, M AMERICAN JOURNA313	5	C541-C555	2017
n/a SPRINT-MS/NN 102 phase II trial of ibudilast in progr Fox, R. J.; Coffey, C. S.; Cudkowicz, MULTIPLE SCLEROS 23	n/a	979-980	2017
MEDLINE:28833377T1-/T2-weighted ratio differs in demyelinated cortex Nakamura, Kunio; Chen, Jacquelin ANNALS OF NEURO 82	4	635-639	2017
MEDLINE:29182648 The neural response properties and cortical organiza Marasco, Paul D.; Marasco, Paul DPLOS ONE 12	11	n/a	2017
MEDLINE:28230974 Femtogram Resolution of Iron Content on a Per Cell Chalmers, J. J.; Jin, X.; Jin, X.; Palm ANALYTICAL CHEMI 89	6	3702-3709	2017
MEDLINE:28285399 Surgeons' views on sling tensioning during surgery fc Borazjani, Ali; Pizarro-Berdichevsk INTERNATIONAL UF 28	10	1489-1495	2017
MEDLINE:28117211Assessment of Vascular Stent Heating with Repetitiv Varnerin, Nicole; Mirando, David; JOURNAL OF STROK 26	5	1121-1127	2017
MEDLINE:28176809 Unusual life cycle and impact on microfibril assembly Hubmacher, Dirk; Schneider, Mich SCIENTIFIC REPORT 7	n/a	n/a	2017
n/a Volumetric analysis of MR images for glioma classific Gupta, Manu; Rajagopalan, Venka SIGNAL IMAGE ANE 11	7	1337-1345	2017
n/a Blood Flow Measurement using Digital Subtraction A Koirala, Nischal; Koirala, Nischal; S MEDICAL IMAGING 10137	n/a	n/a	2017
MEDLINE:27838275 Local Immediate versus Long-Range Delayed Change Battelli, Lorella; Battelli, Lorella; G BRAIN STIMULATIO 10	2	263-269	2017
MEDLINE:2823485C Relevant Surgical Anatomy of Pterygomaxillary Dysju Orra, Susan; Tierney, William S.; C PLASTIC AND RECO 139	3	701-709	2017
MEDLINE:28824352 Effects of Carpal Tunnel Syndrome on Force Coordin: Lu, Szu-Ching; Xiu, Kaihua; Li, KE; I JOURNAL OF MEDIC 37	3	328-335	2017
MEDLINE:28634897The Effect of Surgical Technique and Spacer Texture Luangphakdy, Viviane; Pluhar, G. I CLINICAL ORTHOPA 475	10	2575-2585	2017
MEDLINE:28333178 Age as a Risk Factor in Abdominoplasty Couto, Rafael A.; Lamaris, Gregory AESTHETIC SURGER 37	5	550-556	2017
MEDLINE:27419825 Novel method for dynamic control of intracranial pre Luciano, Mark G.; Luciano, Mark & JOURNAL OF NEUR 126	5	1629-1640	2017
MEDLINE:28724581MRI evidence of acute inflammation in leukocortical Maranzano, Josefina; Rudko, Davi NEUROLOGY 89	7	714-721	2017
n/a Histopathological assessment of primary osteoarthri Mantripragada, V. P.; Piuzzi, N. S.; CURRENT RESEARCI 65	4	133-139	2017

MEDLINE:2808	7488 Cathepsin K-targeted sub-micron particles for regene Jennewine, Brenton; Jennewine, EACTA BIOMATERIAI 52	n/a	60-73	2017
MEDLINE:2693	314C Characterizing Information Processing With a Mobile Burke, Daniel; Linder, Susan; Hirsc ASSESSMENT 24	7	885-895	2017
MEDLINE:2808	0262 Processing speed test: Validation of a self-administer Rao, Stephen M.; Losinski, Genna; MULTIPLE SCLEROS 23	14	1929-1937	2017
MEDLINE:2863	3397 Impact of a refined advanced design for left atrial ap Sunagawa, Gengo; Karimov, Jamsl EUROPEAN JOURN/52	6	1098-1103	2017
MEDLINE:2833	5806 Fluorouracil Enhances Photodynamic Therapy of Squ Anand, Sanjay; Rollakanti, Kishore MOLECULAR CANCI 16	6	1092-1101	2017
MEDLINE:2773	9941 Biomechanical evaluation of the craniovertebral junc Kshettry, Varun R.; Healy, Andrew JOURNAL OF NEUR 127	4	829-836	2017
MEDLINE:2832	3982 Versican Proteolysis by ADAMTS Proteases and Its In Gueye, Ndeye-Aicha; Mead, Timol JOURNAL OF CLINIC 102	5	1631-1641	2017
MEDLINE:2845	7317 Development of a critical-sized ventral hernia model Sahoo, Sambit; Baker, Andrew R.; JOURNAL OF SURGI 210	n/a	115-123	2017
MEDLINE:2897	5432 The Efficiency of Bone Marrow Aspiration for the Ha Patterson, Thomas E.; Boehm, Cyr JOURNAL OF BONE 99	19	n/a	2017
MEDLINE:2886	3216 Hyaluronan Rich Microenvironment in the Limbal Ste Gesteira, Tarsis F.; Sun, Mingxia; CINVESTIGATIVE OPI 58	11	4407-4421	2017
MEDLINE:2807	5436 Gait Kinematic Deviations in Patients With Developm Nie, Yong; Ning, Ning; Pei, Fuxing; ORTHOPEDICS 40	3	E425-E431	2017
MEDLINE:2767	0925 Use of Mobile Device Accelerometry to Enhance Eva Ozinga, Sarah J.; Linder, Susan M.; ARCHIVES OF PHYSI 98	4	649-658	2017
n/a	Utilizing mobile technology in the assessment and m Alberts, J. L. MULTIPLE SCLEROS 23	n/a	18-19	2017
MEDLINE:2819	5352 Re: Industry response: Abrams P, Damaser MS, Nible Abrams, Paul; Gammie, Andrew; I NEUROUROLOGY A 36	7	1946-1946	2017
MEDLINE:2886	0944 Chronic asthma and Mesenchymal stem cells: Hyalur Goldstein, Benjamin D.; Goldstein JOURNAL OF INFLA 14	n/a	n/a	2017
n/a	State of activation of Hepatic Stellate Cells determin Das, Dola; Li, Xin; Fayazzadeh, Ehs HEPATOLOGY 66	n/a	720A-720A	2017
MEDLINE:2802	7272 Reply: Applying to Integrated Plastic Surgery Resider Tadisina, Kashyap Komarraju; Tad PLASTIC AND RECO 139	1	330E-331E	2017
MEDLINE:2882	5804 Early Wound Morbidity after Open Ventral Hernia Re Sahoo, Sambit; Haskins, Ivy N.; Hu JOURNAL OF THE A 225	4	472-+	2017
MEDLINE:2809	1708 The effect of motor overflow on bimanual asymmetr Cunningham, David A.; Cunningha EXPERIMENTAL BR/ 235	4	1097-1105	2017
MEDLINE:2862	5583 Bridging suture makes consistent and secure fixation Fukuhara, Tetsutaro; Fukuhara, TeJOURNAL OF ORTH 22	5	852-857	2017
MEDLINE:2902	3208 Tunable and Lightweight On-Chip Event Detection fo Karam, Robert; Karam, Robert; Malee TRANSACTION 11	6	1303-1312	2017
n/a	Superior Elastogenicity And Pro-elastogenic And Anti Dahal, S.; Ramamurthi, A. TISSUE ENGINEERIN 23	n/a	S142-S143	2017
n/a	Camp-Dependent Activation Of Protein Kinase A Atte Rezaee, F.; Harford, T. J.; Altawalle AMERICAN JOURNA 195	n/a	n/a	2017
n/a	Degradation Of Hyaluronan Matrices By Extracellula: Tseng, V.; Woods, C.; Maltzahn, J.; AMERICAN JOURNA 195	n/a	n/a	2017
n/a	IMPACT OF EPILEPTOGENESIS ON HEPATIC AND BRA Runtz, L.; Girard, B.; Boussadia, B. EPILEPSIA 58	n/a	S149-S149	2017
n/a	Thalamic MRI and histopathologic correlations in ad Mahajan, K.; Nakamura, K.; Chen, MULTIPLE SCLEROS 23	n/a	44-44	2017
MEDLINE:2857	5012 Characterization of interfacial socket pressure in trar Schofield, Jonathon S.; Schoepp, K PLOS ONE 12	6	n/a	2017
n/a	A large-scale forward genetic screen in zebrafish to ι Soung, A.; Ackerman, S. D.; Ackerr GLIA 65	n/a	E354-E354	2017
n/a	AUTOMATED IMAGING AND ANALYSIS OF COLONY F Mantripragada, V. R.; Luangphakd CYTOTHERAPY 19	5	S80-S81	2017
MEDLINE:2833	7412 Differential involvement of corticospinal tract (CST) f Rajagopalan, Venkateswaran; Raja NEUROIMAGE-CLIN 14	n/a	574-579	2017
n/a	Development and Delivery of Intranasal Cas9/gRNA ، Jayant, R. D.; Kaushik, A.; Yndart, ، JOURNAL OF NEUR (12	n/a	S58-S59	2017
n/a	Impaired cutaneous wound healing in tumor necrosi Shakya, S.; Shakya, S.; Mack, J.; M JOURNAL OF INVES 137	5	S158-S158	2017
MEDLINE:2850	0513 Surgeons' views on sling tensioning during surgery fc Borazjani, Ali; Pizarro-Berdichevsk INTERNATIONAL UF 28	10	1497-1498	2017
MEDLINE:2879	3966 Delivery of antioxidant enzymes for prevention of ull Hammiller, Brianna; Karuturi, Bala JOURNAL OF DERM 88	3	373-375	2017
n/a	Regenerative Nanotherapeutics to Modulate the Tur Seshadri, D.; Ramamurthi, A. TISSUE ENGINEERIN 23	n/a	S66-S66	2017
n/a	Alemtuzumab reduced MRI lesions and slowed brain Pelletier, D.; Barnett, M.; Boster, / MULTIPLE SCLEROS 23	n/a	355-356	2017
MEDLINE:2925	1846 Neurobiology of substance use in adolescents and pcNock, Nora L.; Minnes, Sonia; Albe BIRTH DEFECTS RES 109	20	1711-1729	2017
MEDLINE:2852	7232 Three-dimensional evaluation of postural stability in Ozinga, Sarah J.; Koop, Mandy Mil NEUROREHABILITA ⁻ 41	1	211-218	2017
n/a	Patients with active RRMS experience durable reduc Pelletier, D.; Traboulsee, A.; Barne MULTIPLE SCLEROS 23	n/a	369-370	2017
n/a	Alemtuzumab decreased MRI disease activity and slc Rovira, A.; Barnett, M.; Comi, G.; MULTIPLE SCLEROS 23	n/a	359-360	2017

n/a	Genetic insights on provisional extracellular matrix r(Apte, Suneel GENETICS RESEARC 99	n/a	n/a	2017
MEDLIN	E:2823815C Moderate hypothermia technique for chronic implar Karimov, Jamshid H.; Grady, Patric JOURNAL OF ARTIFI 20	2	182-185	2017
n/a	Initial In Vitro Testing of a Pediatric Continuous-Flow Fukamachi, K.; Horvath, D. J.; Kari JOURNAL OF HEAR136	4	S164-S164	2017
MEDLIN	E:28029574The axial continuous-flow blood pump: Bench evalua Karimov, Jamshid H.; Tong, Micha JOURNAL OF HEAR136	1	106-112	2017
MEDLIN	E:29149885 Setting the pace: insights and advancements gained McDaniel, John; McDaniel, John; LJOURNAL OF NEUR 14	n/a	n/a	2017
MEDLIN	E:28539399 Using theoretical models from adult stroke recovery Lin, Yin-Liang; Potter-Baker, Kelse JOURNAL OF NEUR 118	3	1435-1438	2017
n/a	Magnetic resonance fingerprinting indicates thalami Ontaneda, D.; Nakamura, K.; Saka MULTIPLE SCLEROS 23	n/a	815-815	2017
MEDLIN	E:28761992 Novel technique for airless connection of artificial he Karimov, Jamshid H.; Gao, Shengq JOURNAL OF ARTIFI 20	4	386-389	2017
n/a	Automated Quantitative Image Analysis and Precisio Mantripragada, V.; Luangphakdy, TISSUE ENGINEERIN 23	n/a	S65-S65	2017
MEDLIN	E:28607523Understanding cortical topographical changes in limi Potter-Baker, K. A.; Lin, Y-L; Plow, SPINAL CORD 55	9	882-884	2017
n/a	JNK-inhibitory Nanotherapeutics to Augment Vascul; Camardo, A.; Seshadri, D.; Broeke TISSUE ENGINEERIN 23	n/a	S66-S66	2017
n/a	Comparison of Therapeutic Magnetic Stimulation Wi Zborowski, Maciej; Androjna, ChallEEE TRANSACTION 53	2	n/a	2017
MEDLIN	E:28662931 Reply to "Need for updating safety recommendation Plow, Ela B.; Sankarasubramanian CLINICAL NEUROPH 128	8	1544-1545	2017
n/a	Nuclear hyaluronidase 2 drives alternative splicing of Midgley, Adam C.; Oltean, Sebasti SCIENCE SIGNALINC 10	506	n/a	2017
MEDLIN	E:28602151Assessment of Human Acellular Dermis Graft in Porc Sahoo, Sambit; Baker, Andrew R.; TISSUE ENGINEERIN 23	11	718-727	2017
n/a	Moderate Hypothermia Technique for Chronic Impla Karimov, J. H.; Grady, P.; Sinkewic JOURNAL OF HEAR136	4	S438-S439	2017
MEDLIN	E:28158899 Clinical Phenotype of Musladin-Lueke Syndrome in 2 Packer, R. A.; Logan, M. A.; Guo, L JOURNAL OF VETER 31	2	532-538	2017
n/a	Minimally toxic approach for treatment of cutaneou: Anand, Sanjay; Bullock, Taylor; Ma OPTICAL METHODS 10047	n/a	n/a	2017
MEDLIN	E:28391521Generating pulsatility by pump speed modulation wi Fukamachi, Kiyotaka; Karimov, Jar JOURNAL OF ARTIFI 20	4	381-385	2017
n/a	Convergent validity of acceleration-derived paramet Bethoux, F.; Li, H.; Schindler, D.; N MULTIPLE SCLEROS 23	n/a	146-146	2017
MEDLIN	E:28875964Vascular Graft Bridged En Bloc Resection for Biliopan Lai, Yun-Gang; Gao, Yue; Liu, Jun-(CHINESE MEDICAL J 130	18	2259-+	2017
MEDLIN	E:27892719Is a pulse absolutely necessary during cardiopulmon: Sunagawa, Gengo; Koprivanac, M: EXPERT REVIEW OF 14	1	27-35	2017
n/a	Alemtuzumab Durably Slows Brain Volume Loss Over Pelletier, Daniel; Traboulsee, Anth MULTIPLE SCLEROS 23	1	18-18	2017
MEDLIN	E:2875957C cAMP-dependent activation of protein kinase A atter Rezaee, Fariba; Harford, Terri J.; Li PLOS ONE 12	7	n/a	2017
n/a	Brain atrophy rates in multiple sclerosis changes alor Andorra, M.; Nakamura, K.; Lamp MULTIPLE SCLEROS 23	n/a	11-Oct	2017
n/a	Are we underestimating the severity of cognitive dys Weber, M.; Mourany, L.; Losinski, MULTIPLE SCLEROS 23	n/a	283-283	2017
n/a	LATERAL FEMORAL CONDYLE IN VARUS KNEES OF PA Mantripragada, V. R.; Piuzzi, N.; Za OSTEOARTHRITIS A 25 المحافظة المح	n/a	S303-S304	2017
MEDLIN	E:28746384 Detection of brain-directed autoantibodies in the ser Banjara, Manoj; Ghosh, Chaitali; C PLOS ONE 12	7	n/a	2017
n/a	C-Jun N-terminal Kinase Gene Silencing as an Effecti، Ortiz-Seranno, D.; Camardo, A.; RaTISSUE ENGINEERIN 23	n/a	S66-S66	2017
MEDLIN	E:28775338NIH Centers for Accelerated Innovations Program: pr Antman, Elliott M.; Di Corleto, Pat NATURE REVIEWS [16	10	663-664	2017
MEDLIN	E:2819900C Overexpression of pregnane X and glucocorticoid rec Ghosh, Chaitali; Hossain, Mohamr EPILEPSIA 58	4	576-585	2017
MEDLIN	E:29122888TNF-stimulated gene 6 promotes formation of hyalu Stober, Vandy P.; Johnson, Collin (JOURNAL OF BIOLO 292	51	20845-20858	2017
n/a	Polymeric Nanoparticles (NPs)-Mediated Gene Deliv، Joshi, C. R.; Labhasetwar, V; Ghor، JOURNAL OF NEUR	n/a	S30-S30	2017
n/a	Validation of fully automated machine-learning algo: Feng, J. J.; Nakamura, K.; Hersh, C. MULTIPLE SCLEROS 23	n/a	268-269	2017
n/a	Adult Stem and Progenitor Cell Heterogeneity in Hur Qadan, M. A.; Qadan, M. A.; Qada TISSUE ENGINEERIN 23	n/a	S78-S78	2017
MEDLIN	E:28589998 Magnetic field application or mechanical stimulation Dikina, A. D.; Lai, B. P.; Cao, M.; Zt BIOMATERIALS SCIE 5	7	1241-1245	2017
MEDLIN	E:2811259C "Go! to Sleep": A Web-Based Therapy for Insomnia Bernstein, Adam M.; Bernstein, AcTELEMEDICINE ANE 23	7	590-599	2017
n/a	Can MS patients accurately self-time the 25-foot wal Freiburger, J. L.; Mourany, L.; Wet MULTIPLE SCLEROS 23	n/a	738-739	2017
n/a	Pilot Clinical Study of a Novel Unobtrusive Carpal Tur Luong, Pauline; King, Frank; Li, Zor ARTHRITIS & RHEUI 69	n/a	n/a	2017
n/a	CHARACTERIZATION OF HUMAN BONE AND ADIPOSI Qadan, M.; Qadan, M.; Qadan, M. CYTOTHERAPY 19	5	S109-S111	2017

MEDLINE:28560091A mixed methods study of multiple health behaviors Plow, Matthew; Moore, Shirley M PEERJ 5	n/a	n/a	2017
n/a CD44 and p38 participate in regulating the pro-fibrot Wang, Y.; Mack, J.; Maytin, E. V. JOURNAL OF INVES 137	5	S158-S158	2017
MEDLINE:27636223 Transcriptional Regulation of Connective Tissue Met; Borazjani, Ali; Borazjani, Ali; Kow, FEMALE PELVIC ME 23	1	44-52	2017
MEDLINE:26439973 Authors' Response Re: Valentini P, Nelson P. Letter t Damaser, Margot S. NEUROUROLOGY A 36	1	209-210	2017
n/a Enhanced skin tumor development in CHOP knockou Anand, S.; Maytin, E. V. JOURNAL OF INVES 137	5	S128-S128	2017
n/a Quantitative Assessment of Cell and Progenitor Popu Mantripragada, V.; Boehm, C.; Bov TISSUE ENGINEERIN 23	n/a	S14-S14	2017
n/a Stromal Versican Regulates Tumor Growth by Promc Asano, Keiichi; Nelson, Courtney NSCIENTIFIC REPORT 7	n/a	n/a	2017
MEDLINE:29104346 Tessellated permanent magnet circuits for flow-thro Moore, Lee R.; Williams, P. Stephe JOURNAL OF MAGN 427	n/a	325-330	2017
n/a Visible Light Photocatalytic Bacterial Inactivation on Nandakumar, Vignesh; Han, Zhao; KONA POWDER AN n/a	34	234-240	2017
MEDLINE:28617542 Assessment of behavioral tasks performed by hemip Bashir, S.; Bashir, S.; Caipa, A.; Plo EUROPEAN REVIEW 21	10	2443-2451	2017
MEDLINE:28722276 Identification and functional analysis of an ADAMTSL Hendee, Kathryn; Wang, Lauren V HUMAN MUTATION 38	11	1485-1490	2017
MEDLINE:28395539 Unlocking the box: basic requirements for an ideal ve Medvedev, Alexander L.; Karimov, EXPERT REVIEW OF 14	5	393-400	2017
n/a Durable reduction in MRI disease activity and slowin Arnold, D. L.; Barnett, M.; Comi, G MULTIPLE SCLEROS 23	n/a	628-628	2017
MEDLINE:28248847 Effect of Pregnancy and Delivery on Cytokine Expres: Couri, Bruna M.; Lenis, Andrew T.; FEMALE PELVIC ME 23	6	449-456	2017
n/a How to Resolve Large Atelectasis in Ex Vivo Lung Per Okamoto, T.; Niikawa, H.; Wheele JOURNAL OF HEAR136	4	S313-S313	2017
MEDLINE:28073093 Subject-specific finite element analysis of the carpal Walia, Piyush; Erdemir, Ahmet; Li, CLINICAL BIOMECH 42	n/a	25-30	2017
MEDLINE:29111978 The eukaryotic translation initiation factor eIF4E harı Zahreddine, Hiba Ahmad; Culjkovi ELIFE 6	n/a	n/a	2017
n/a Hepatic Stellate Cell-Induced Cytotoxicity in Liver CarFayazzadeh, Ehsan; Das, Dola; Lan HEPATOLOGY 66	n/a	721A-721A	2017
MEDLINE:29170462 Structure of Rap1b bound to talin reveals a pathway Zhu, Liang; Zhu, Liang; Yang, Jun; I NATURE COMMUN 8	n/a	n/a	2017

Department of Biomedical Engineering ANNUAL REPORT January 1, 2015 to December 31, 2015

Staff Totals

44 total Staff Full 13, Associate 4, Assistant 3, Staff Scientists 3, Project Staff 13, Research Associates 8 Joint/Adjunct Appointments in BME 31 joint, 20 adjunct

Innovations

While still high, BME's total invention disclosures are down when compared to previous years: 2015 (27), 2014 (35), 2013

(34), 2012 (41), 2011 (46). However, the number of patents issued has increased perhaps indicating that better IDFs are being submitted: 2015 (50), 2014 (40), 2013 (27), 2012 (13), 2011 (16).

Frank Proch of CC Innovations accepted the BME Chair's invitation to be available every Tuesday in BME (ND2-107) for consultation with anyone in BME who may have a novel concept that could become a formal Invention Disclosure.

Innovations/Intellectual Property - Final for 2015

		I	BME	LRI (% from BME)	CC (% from BME)
Invention Disclosures	27	50%		14%	
Patent Applications		42	48%	24%	
Patents Issued	50	66%		35%	
Licenses		7	50%	29%	

Department of Biomedical Engineering ANNUAL REPORT January 1, 2016 to December 31, 2016

Staff Totals

43 total Staff Full 14, Associate 5, Assistant 2, Staff Scientists 2, Project Staff 11, Research Associates 9 Joint/Adjunct Appointments in BME 28 joint, 21 adjunct

Innovations

While still high, BME's total invention disclosures are flat when compared to previous years: 2016 (29), 2015 (27), 2014 (35), 2013 (34), 2012 (41), 2011 (46). However, the number of patents issued has increased, perhaps indicating that better

IDFs are being submitted: 2016 (75), 2015 (50), 2014 (40), 2013 (27), 2012 (13), 2011 (16). As shown in the table below, nearly half of the patents issued to Cleveland Clinic involve a BME inventor, and over 60% of the patents from the LRI come from BME. In 2016, BME generated \$590,000 in royalty revenue.

Innovations/Intellectual Property - Final for 2016						
]	BME	LRI (% from BME)	CC (% from BME)	
Invention Disclosures	29	45%		12%		
Patent Applications		43	48%	25%		
Patents Issued	75	62%		42%		
Licenses		6	40%	17%		

Department of Biomedical Engineering ANNUAL REPORT January 1, 2017 to December 31, 2017

Staff Totals 46 total Staff Full 16, Associate 4, Assistant 2, Staff Scientists 2, Project Staff 12, Research Associates 10 Joint/Adjunct Appointments in BME 28 joint, 22 adjunct

Innovations

While still high, BME's total invention disclosures are flat when compared to previous years: 2017 (25); 2016 (29), 2015 (27), 2014 (35), 2013 (34), 2012 (41), 2011 (46). However, the number of patents issued maintains an

upward trend, perhaps indicating that better IDFs are being submitted: 2017 (67); 2016 (75), 2015 (50), 2014 (40), 2013 (27), 2012 (13), 2011 (16). As shown in the table below, over a third of the patents issued to Cleveland Clinic involve a BME inventor, and over 65% of the patents from the LRI come from BME. In 2016, BME generated \$590,000 in royalty revenue.

Innovations/Intellectual Property - Final for 2017							
	B	ME LRI (% from BME)	CC (% from BME)				
Invention Disclosures	25	38%	10%				
Patent Applications	39	47%	25%				
Patents Issued	67	68%	38%				
Licenses	6	30%	14%				



1 2 3	TABLE OF CONTENTS	PAGE
4 5 6	ARTICLE 3 - THE FACULTY COUNCIL	8
7 8	3.1 Purpose and functions of the Faculty Council	8
9 10	3.2 Membership of the Faculty Council	9
11 12	3.3 Election of the members of the Faculty Council	9
13 14	3.4 Terms of office of Faculty Council representatives	10
15 16	3.5 Officers of the Faculty Council	11
17 18	3.6 Committees of the Faculty Council	11
19 20	3.7 Meetings of the Faculty Council	14
21 22 23	3.8 Annual report of the Faculty Council	14

Approved by the Faculty Senate 1/30/18

1 ARTICLE 3: THE FACULTY COUNCIL 2 3 3.1: Purpose and Functions of the Faculty Council 4 The Faculty of Medicine delegates all powers not reserved to the Faculty of Medicine 5 itself (see Article 2) to a Faculty Council. The Faculty Council shall serve as the Executive 6 Committee of the Faculty of Medicine, in accordance with Article X.1 of the Bylaws of the Faculty 7 Senate. The Faculty Council shall meet regularly to exercise its powers and obligations, which Commented [A1]: Approved by the Bylaws Committee on 23 January, 2018, 6:0. SUBSTANTIVE: Explicitly identifies the Executive 8 shall include but not be limited to the following: Committee of the Faculty of Medicine for the first time. 9 a. To act for the Faculty of Medicine regarding the planning and execution of Rationale: In response to a query from the Faculty 10 Senate, Faculty Council at its meeting on December educational programs and the formulation of policies concerning curricula, student 12, 2016 agreed that the full representative body and 11 admissions, and the conduct of research in consultation with the appropriate not its Steering Committee serves in this capacity. 12 standing committee of the Faculty of Medicine. It shall review the requirements for Deleted: the Deleted: of the Faculty Council 13 the M.D. degree and the recommendations of the Committee on Students regarding, Deleted: also have the responsibility to 14 student standings and student promotions; Commented [A2]: Approved 5-0 10 April 2018. 15 b. To hear reports of the Standing Committees of the Faculty of Medicine and of the Rationale: To make Article 3.1a compatible with Article 2.6a.6. 16 Faculty Council and recommend action on such reports; 17 c. To make recommendations to the Faculty of Medicine concerning the establishment, Deleted: to approve 18 discontinuance, and merging of departments; 19 d. To make recommendations to the Faculty of Medicine concerning the establishment, 20 discontinuance, and initial charge and representative composition of the membership 21 of all Faculty of Medicine standing committees (see Article 2.6c); 22 e. To elect a chair, a chair-elect, members of the Steering Committee, and the Faculty 23 Council members of the Nomination and Elections Committee; 24 f. To classify any issue requiring a vote of the faculty so as to determine the eligibility 25 of the adjunct/clinical and student members to vote on that issue (per 2.4biii and 26 2.4bv); and 27 g. To create ad hoc committees to make recommendations concerning its various 28 functions and duties (see Article 3:6d). 29 30 3.2: Membership of the Faculty Council 31 a. Voting Members. Voting members of the Faculty Council shall include one 32 representative of each academic department (all references hereafter to academic departments 33 include the Division of General Medical Sciences (DGMS), which has departmental status; see Commented [A3]: Approved by the Bylaws Committee 5-0 34 Article 4.7.). When more than one autonomous department exists within a single academic on April 10.2018. 35 discipline, as per section 4.3 below, a representative of each such department shall be elected to the words in its title are written out.

Faculty of Medicine Bylaws

3 Approved by the Faculty Senate 1/30/18

Rationale: This is now the first time DGMS is mentioned, so Deleted: DGMS

1	the Faculty Council. These representatives shall be referred to as departmental representatives.	G
2	Other voting members shall include two representatives from the special faculty whose titles are	G
3	modified by the adjective adjunct or clinical, one representative from each affiliated institution.	- IG
4	and 10 representatives of the regular faculty elected at large. All these representatives shall be	
5	members of the faculty.	
6	b. Non-voting Members. Non-voting members of the Faculty Council shall be the	
7	president of the university, a vice-president of the university responsible for medical school	F
8	activities, the dean of the School of Medicine, the associate dean for medical education of the	L L
9	School of Medicine, the chair of the Committee on Medical Education, and student members who	
10	shall include not more than two undergraduate medical students, one M.DPh.D. student, and	
11	one Ph.D. graduate student. The student members shall be chosen by their respective groups.	
12	To facilitate communication between Standing Committees and the Faculty Council, if no member	
13	of a Standing Committee of the Faculty of Medicine is a voting member of the Faculty Council,	
14	the Faculty Council Chair may appoint one of the Standing Committee's elected members to	//
15	serve as a non-voting, <i>ad hoc</i> member, in accordance with each committee's charge. If a	\sum
16	representative to the university Faculty Senate is not included in the Faculty Council as a voting	
17	member, the Faculty Council Chair shall appoint one of the School of Medicine senators to be an	
18	ad hoc member of the Faculty Council. The Faculty Council Chair may invite other persons to	
19	attend designated meetings. Faculty Council meetings shall be open to the faculty. Faculty	
20	members may at any time request hearings before Faculty Council, but a request by a faculty	
21	member for a hearing before the Faculty Council must be made to the chair prior to the meeting	
22	of the Faculty Council.	
23		
24	3.3: Election of the Members of the Faculty Council	
25	Faculty members have the power and obligation to elect Faculty Council representatives	// r
26	(see Article 2.3). Elections shall be held by democratic process. Complaints concerning the	F
27	occurrence of undemocratic selections of representatives shall be brought to the attention of the	
28	chair of the Faculty Council.	- A
29	a. Departmental representatives: When the term of a departmental representative is	/ [
30	coming to an end, the dean shall inform all full-time faculty members of that department. The	Â
31	department shall elect its new representative no later than April 30 of each year, with newly	
32	elected members beginning their terms of office on the following July 1. <u>To be eligible to serve</u>	C
33	as a department <u>al</u> representative to the Faculty Council <u>, a faculty member must be appointed</u>	
34	full-time and hold a primary appointment in that department. The election shall be held by	
35	democratic process. Complaints concerning the occurrence of undemocratic selections of	$\langle 0 \rangle$
36	representatives shall be brought to the attention of the chair of the Faculty Council.	- (i

Approved by the Faculty Senate 1/30/18

Δ

Deleted: I

Deleted: the Bylaws

Deleted: shall

Deleted: Bylaws

Commented [A4]: A narrower version relating only to the Bylaws Committee was approved by the Bylaws Committee on 13 November 2017 and by the Faculty Council on 22 January 2018. Rationale: To make the Bylaws compliant with the Bylaws Committee charge approved by Faculty Council on May 15, 2017.

Commented [A5]: Approved by the Bylaws Committee 5-0 on10 April 2018. SUBSTANTIVE: Generalizes the right of each Standing

SUBSTANTIVE: Generalizes the right of each Standing Committee of the Faculty to have a non-voting representative to the Faculty Council.

Deleted: In addition,

Deleted: i

Deleted: senator

Commented [A6]: Approved by the Bylaws Committee on 10April, 2018 5-0/ Rationale: Curatorial.

Deleted: chair of the

Deleted: chair of the

Commented [A7]: Approved by the Bylaws Committee on 12 March 2018, 5-0. SUBSTANTIVE: Preamble added and passage about process was moved from 3.3b Rationale: To improve clarity.

Commented [A8]: Moved from 3.3b.

Commented [A9]: Approved by the Bylaws Committee on 12 March 2018, 5-0. SUBSTANTIVE: Previous version of this passage did not specify the party to be informed by the dean, but in practice it was department chairs. Rationale: Faculty members should be informed directly about the opportunity to represent their colleagues on Faculty Council.

Deleted: (For more details concerning elections, see Article 3:6b, paragraph 3.) ¶ →a. Shall be held

Deleted:

 $\rightarrow b.$ Upon notification by the dean, the full-time faculty members of each academic department of the School of Medicine shall elect

Commented [A11]: Approved by the Bylaws Committee on 12 March 2018, 5-0. ... [1]

Deleted: one of their

Deleted: members who

Deleted: S

1	b. At-large representatives: The at-large representatives shall be nominated by the
2	Nomination and Elections committee (see Article 3:6b) and shall be elected by the full-time
3	members of the faculty. The dean shall be requested to supply the Nomination and Elections
4	committee with a list of the basic and clinical science departments and rosters of the full-time
5	faculty members with primary appointments in each department. Five at-large representatives
6	shall be elected from basic science departments and five shall be elected from clinical science
7	departments. There shall be at least two nominees for each of these positions. Those nominees
8	who are not elected shall serve as alternates in the order of votes received (see <u>Article 3</u> :4).
9	The terms of at-large Faculty Council members shall be staggered such that one or two
10	basic science and one or two clinical representatives are elected each year, No more than
11	one at-large representative shall be from a single department.
12	c. Institutional representatives: Upon notification by the dean, full-time faculty based at
13	each affiliated institution shall choose, by a method of their own design, one of their members
14	who has a primary base at that institution and who has not been elected a department
15	representative to be a representative to the Faculty Council.
16	d. Special Faculty representatives: The Nomination and Elections Committee (see Article
17	3:6b) shall nominate at least four members of the special faculty whose titles are modified by the
18	adjective adjunct or clinical as candidates for representative to the Faculty Council. Two of these
19	nominees shall be elected by the special faculty whose titles are modified by the adjective
20	adjunct or clinical. The remaining nominees will serve as alternates in the order of votes
21	received.
22	
23	3.4: Terms of Office of Faculty Council Representatives
24	Departmental and at-large representatives shall serve for a period of three years.
25	Representatives may not serve consecutive terms but may stand for election after an absence of
26	one year. A department representative who is unable for any reason to complete a term of office
27	shall be replaced by a full-time faculty member from the same academic department, elected by
28	democratic process within that department. The new member shall complete the term of the
29	former member and shall be eligible for reelection if the remaining term so completed has been
30	less than two years. A departmental member on leave of absence shall be replaced during that
31	leave by a faculty member from the same academic department, elected by democratic process
32	within that department. Upon return from leave, the returned faculty member shall complete the
33	original term of office. An at-large representative who is unable for any reason to complete a
34	term of office shall be replaced by an alternate (per 3:3d) who shall serve during the remainder
35	of the term or during the leave of the representative, as outlined for department representatives.
36	A representative of the special faculty who is unable for any reason to complete a term shall be

Approved by the Faculty Senate 1/30/18

5

Deleted: c. Upon notification by the dean, full-time faculty based at each affiliated institution shall choose, by a method of their own design, one of their members who has a primary base at that institution and who has not been elected a department representative to be a representative to the Faculty Council.

Deleted: d

Deleted: The a

Deleted: a nominating

Deleted:

Deleted: nominating

Deleted: preclinical

Deleted: preclinical

Commented [A12]: Approved by the Bylaws Committee on 12 March 2018, 5-0.

Rationale: Rearranged for clarity.

Commented [A13]: Approved by the Bylaws Committee 23 January, 2018, 6:0. Rationale: Simplifies and clarifies a passage held over from

the first version of the Bylaws.

Deleted: In each three-year cycle beginning with the adoption of these amendments, one preclinical and one clinical at-large representative shall be elected the first year, and two preclinical and two clinical at-large representatives shall be elected in each of the second and third years. Upon adoption of these amendments, the at-large representatives who are then serving may complete their terms of office

Deleted:

Commented [A15]: Approved 5-0 2018-04-10. Rationale: Ensures broader representation on FC.

Deleted: $\rightarrow e$. The Nominating

Commented [A16]: Approved by the Bylaws Committee on 12 March, 2018. Rationale: Moved so that the types of representatives are clearly distinguished.

Commented [A17]: Approved by the Bylaws Committee on 12 March, 2018.

Rationale: Phrase inserted for clarity.

Commented [A18]: Changes to 3.b and c (formerly d and e) were approved by the Bylaws Committee on 23 January, 2018.

Rationale: Correction (update of NEC name) and clarification.

Deleted: Representatives

Commented [A19]: Approved by the Bylaws Committee on 23 January, 2018. Rationale: Clarification.

Deleted: be reelected

replaced by an alternate (see Article 3:3e) who shall serve during the remaining term or during
the leave of the representative. A representative of an affiliated institution who is unable for any
reason to complete a term shall be replaced by a full-time faculty member with a primary base at
the same institution. That individual shall be chosen by the same mechanism as the original
representative, and shall serve for the remaining term or during the leave of the original
member, as outlined above for department representatives.
Members who have three absences from Faculty Council meetings in one year must

8 resign from the Faculty Council unless their absences were excused by the chair of the Faculty

9 \quad Council. A warning letter will be sent to the Faculty Council member after two absences, with a

 $10\,$ $\,$ copy to the department chair. Selection of replacements for members who resign is discussed in

11 the preceding paragraph.

13 <u>3.5: Officers of the Faculty Council</u>

Each year the Faculty Council shall elect a chair-elect from <u>among current members of</u>
the Faculty <u>Council</u>. There shall be at least two nominees for the position of chair-elect. The

16 chair-elect shall serve as vice-chair of the Faculty Council during the first year following election

17 and succeed to the chair the following year. The chair of the Faculty Council (or the vice-chair of

- 18 the Faculty Council in the absence of the chair) shall preside over the Faculty Council and shall be
- 19 vice-chair of the Faculty of Medicine. Following completion of this term of office, the immediate
- 20 past chair of the Faculty Council shall serve one additional year as a member of the Faculty
- 21 Council and as a member of its Steering Committee. For procedures to be followed in the

22 election of the officers and committees of the Faculty Council, see article 3:6b. The dean shall be

- 23 requested to provide administrative support to these officers.
- 24

12

25 <u>3.6: Committees of the Faculty Council</u>

26 a. Steering Committee. The Steering Committee shall consist of eight members: the

- 27 chair of the Faculty Council, the vice-chair of the Faculty Council, the immediate past chair of the
- 28 Faculty Council, and five other Faculty Council members who shall be elected by the Faculty
- 29 Council for one-year terms. These members may be reelected successively to the Steering
- 30 Committee for the duration of their terms as members of the Faculty Council. The chair of the
- 31 Faculty Council (or the vice-chair of the Faculty Council in the absence of the chair) shall serve as
- 32 chair of the Steering Committee. The Steering Committee shall set the agenda for meetings of
- 33 the Faculty Council. The Steering Committee shall be empowered to act for the Faculty Council
- 34 between meetings. The Steering Committee shall report all actions and recommendations to the
- 35 Faculty Council. <u>Steering Committee meetings shall be conducted according to Robert's Rules of</u>
- 36 Order, Newly Revised. The Steering Committee shall act for the Faculty Council and faculty in

6

Faculty of Medicine Bylaws

Approved by the Faculty Senate 1/30/18

Deleted: the

Deleted: who have at least two years of their terms remaining

Commented [A20]: Approved by the Bylaws Committee on 27 March, 2018, 4-0. SUBSTANTIVE.

Rationale: Aligns Article 3.5 with the revised Nomination and Elections Committee charge approved by Faculty Council on 21 May, 2018. Both changes remove the restriction that FC chair-elect candidates must have at least two years left in their term, thereby expanding the pool of candidates and allowing candidates who have more experience on FC to run for chair-elect.

Commented [A21]: Approved by the Bylaws Committee on 27 March, 2018, 4-0. Rationale: This change prevents a candidate from running unopposed for this important office.

Commented [A22]: Approved by the Bylaws Committee on 12 December, 2017. Article 3.7d stipulates that Faculty Council meetings are conducted according to Robert's Rules but this was never explicitly stated for the Steering Committee. Rationale: Clarification. 1 reviewing actions of the Committee on Appointments, Promotions and Tenure in order to ensure

2 equity, adherence to published guidelines, and proper procedure. The Steering Committee shall

3 consult with the dean on such matters as the dean brings before it. The Steering Committee

4 shall advise the president concerning the appointment of an interim or acting dean of the School 5 of Medicine.

6 b. Nomination and Elections Committee. This committee shall consist of eleven

7 members: the dean, the chair of the Faculty Council, the vice-chair of the Faculty Council, four

8 other Faculty Council members, two each from the basic and clinical sciences, and four full-time 9

faculty members who are not members of the Faculty Council, two each from the basic and

10 clinical sciences. The four Faculty Council members of the Nomination and Elections Committee

11 shall be elected at large by the Faculty Council and shall serve for the duration of their terms as

12 Faculty Council members. The four non-members of the Faculty Council shall be elected by 13

ballot by the Faculty of Medicine and shall serve three-year terms. The chair will be elected from

14 the members of the committee annually.

15 The Nomination and Elections Committee shall nominate (1) candidates for the chair-16 elect of the Faculty Council from the eligible pool (all current members, see Article 3.5), (2) 17 candidates for the Steering Committee, and (3) candidates for the standing committees of the

18 Faculty Council. Ballots listing the nominees and leaving space for write-in candidates shall be

19 sent to all members of the Faculty Council. The election of the chair-elect and the members of

20 the Steering Committee, the Faculty Council members of the Nomination and Elections

21 Committee and the members of other standing committees of the Faculty Council will be carried

22 out at the May meeting of the Faculty Council. Additional nominations for all these offices shall

23 be invited from the floor. The consent of the nominee must be obtained in order for a write-in or

24 floor nomination to be valid. Faculty Council members who cannot attend the May meeting may

25 vote by mail (noting that wherever mail voting or distribution is mentioned in these Bylaws,

26 voting or distribution by email or other method well-calculated to reach voters shall be

27 considered satisfactory). Candidates for chair-elect will also be candidates for the Steering

28 Committee and will be so listed on mail ballots. Faculty Council members shall vote for one

29 nominee for chair-elect and for six members of the Steering Committee. The five persons with

30 the highest number of votes, excluding the person elected to the office of chair-elect, shall be

31 elected to serve on the Steering Committee. Both mail ballots and ballots collected at the Faculty

32 Council meeting shall be counted, whether or not a quorum is present at the meeting. If the

33 total number of ballots received does not equal or exceed 50% of the members of Faculty

34 Council, ballots may be solicited from absentee members. If either the Steering Committee or

35 the Nomination and Elections Committee perceives a significant deficit in the representation of

36 faculty constituencies within its membership following the annual election, either committee may

7

Faculty of Medicine Bylaws

Approved by the Faculty Senate 1/30/18

Commented [A23]: Approved by the Bylaws Committee on 10 April. 2018. Rationale: Undates language to reflect the current structure

of the curriculum (students are in the clinic from their first vear onward).

Deleted: preclinical

Deleted: preclinical

Commented [A24]: Approved by the Bylaws Committee on 27 March, 2018, 4:0 and by Faculty Council on 21 May, 2018. Reiterates the provision in Article 3.5 that all current

members of Faculty Council are eligible to run for chairelect.

Rationale: As stated in Article 3.5.

1 ask the chair of Faculty Council to appoint a single ad hoc voting member to serve on the 2 respective committee for the remainder of the year. In the case of the Steering Committee, the 3 appointee should be a current member of the Faculty Council. In the case of the Nomination and 4 Elections Committee, the appointee should be a regular member of the Faculty of Medicine. 5 In addition, the Nomination and Elections Committee shall nominate (1) candidates for 6 the at-large representatives to the Faculty Council, (2) candidates for the representatives of the 7 special faculty whose titles are modified by the adjective adjunct or clinical to the Faculty Council, 8 (3) candidates for standing committees of the Faculty of Medicine, and (4) candidates for the 9 University Faculty Senate. In the case of at-large representatives, senators, or members of the 10 Committee on Appointments, Promotions, and Tenure, the number of candidates shall be at least 11 twice the number of positions to be filled. In recruiting faculty for the ballot, the NEC shall strive 12 to produce a diverse slate of nominees, considering gender, race, institutional affiliation and 13 representation of basic and clinical departments. A nominee may not be put on the ballot if in 14 winning the election they would serve on more than two standing committees of the Faculty of 15 Medicine or Faculty Council (ad hoc committees are not included in this count). Exceptions will be 16 made only if no other candidates come forward to fill a committee vacancy. Elections shall be 17 conducted by e-mail or other electronic means, using a preferential voting system. Ballots shall 18 include a clear explanation of the preferential voting system. Ballots listing candidates for the 19 representatives of the special faculty on the Faculty Council shall be <u>distributed</u> to all special 20 faculty whose titles are modified by the adjective adjunct or clinical. Ballots listing candidates for 21 committees dealing with the planning and approval of the curriculum, the execution of the 22 instructional program, and the formulation of policies with regard to student affairs shall be 23 distributed to all members of the faculty. Elections shall be conducted as far in advance of the 24 completion of the terms of sitting members as is practicable. Elections shall be conducted 25 through the campus and first class mail or by email or other electronic means. All electronic 26 ballots shall provide space for write-in candidates. At least two weeks shall be allowed between 27 the distribution of all ballots and the close of the election and determination of election results. 28 Distribution of the ballots and the determination and publication of the election results shall be 29 the responsibility of the Nomination and Elections Committee. After each election, the 30 Committee shall count the votes and publish all the vote totals. Any irregularities or issues in the 31 conduct of the elections shall be investigated and resolved by the Committee. The Nomination, 32 and Elections Committee shall report its investigation and resolution to the Faculty Council and 33 the Faculty of the School of Medicine. The dean shall be requested to supply administrative 34 support for the elections. 35 c. Special Committee to Nominate Candidates for the Search Advisory Committee to the

36 President on the Selection of the Dean of the School of Medicine. This special nominating

8

Faculty of Medicine Bylaws

Approved by the Faculty Senate 1/30/18

Deleted: senator to

Formatted: Strikethrough

Commented [A25]: Approved by the Bylaws Committee on 12 December, 2017, 6-0 and by Faculty Council on 21 May, 2018.

Rationale: Curatorial.

Deleted: nominees

Commented [A26]: The amendments in lines 34-36 and lines 1-18 on the following page were approved 4:0 at the BC's 27 March, 2018 meeting, subsequently accepted by the NEC and approved by Faculty Council on 21 May, 2018.

Deleted: ive

Commented [A27]: SUBSTANTIVE. Stipulates that a faculty member may serve on only two committees concurrently.

Rationale: Increases overall participation in faculty governance and broadens representation.

Commented [A28]: Approved 2018-04-10, 5-0. SUBSTANTIVE: Institutes a preferential voting system in place of run-off elections (which were never explicitly described but conducted when candidate(s) did not receive a majority of the votes cast, as required by Robert's Rules).

Deleted: . A

(Deleted: shall be used for multi-seat elections

Commented [A31]: Rationale: Removes archaic language. **Deleted:** Electees shall be chosen by mail ballot. Ballots listing candidates for Faculty Council, senators, and standing committees of the faculty shall be mailed to all full-time members of the faculty.

Deleted: mailed

Deleted: mailed

Deleted:

Deleted: may

Formatted: Strikethrough

Commented [A32]: Approved by the Bylaws Committee 28 February, 2018.

Rationale: Modernizes description to match current practice. Commented [A33]: Approved by the Bylaws Committee on

28 February, 2018. Rationale: Modernization.

Formatted: Strikethrough

Commented [A34]: Approved by the Bylaws Committee on 28 February, 2018.

Rationale: Replaces "will" with the more forceful "will."

Deleted: will

Deleted: S

Formatted: Strikethrough

1 committee shall be formed when needed and shall consist of the chair of Faculty Council, three 2 other members of the Steering Committee of the Faculty Council, three elected members of the 3 Nomination and Elections Committee, and four academic department chairs (two Basic Science, 4 two Clinical) of the School of Medicine. The chair of the Faculty Council shall serve as chair of this 5 special nominating committee, and the other ten members shall be elected by their respective 6 groups. The majority of the nominees for the Search Advisory Committee selected by this special 7 nominating committee shall be full-time members of the Faculty of Medicine. The president is 8 requested to consider these nominees when appointing members of the Search Advisory 9 Committee. 10 In the early stages of the search for the dean of the School of Medicine, the chair of the 11 Faculty Council shall solicit recommendations, opinions, and advice regarding selection of the 12 dean from members of the Faculty of Medicine by mail and submit these views directly to the 13 Search Advisory Committee. When a final list of candidates for the position of dean has been 14 assembled, the Search Advisory Committee is requested to solicit the views and advice of the 15 Steering Committee of the Faculty Council on the ranking of the candidates. 16 d. Other Committees of the Faculty Council. The Faculty Council may create other 17 standing and ad hoc committees of the Faculty Council to carry out specific functions and duties 18 assigned to it. These committees may include members who are not Faculty Council members. 19 20 3.7: Meetings of the Faculty Council 21 a. The Faculty Council shall meet at least once every two months from September 22 through June of each academic year. Special meetings may be called by a majority vote of the 23 Steering Committee, by a written petition of 10 members of the faculty addressed to the chair of 24 the Faculty Council, or by the dean. 25 b. The agenda for each meeting shall be prepared by the Steering Committee, posted 26 electronically, and sent electronically to all faculty members at least one week in advance of 27 regular meetings and at least two days in advance of special meetings 28 c. Minutes of the meetings shall be kept and shall be distributed in a timely fashion to 29 Faculty Council members, to the dean, to all department chairs, and to each member of the 30 Faculty of Medicine. Approved minutes shall be posted electronically and sent electronically to all 31 faculty members. The dean is requested to provide administrative support for this purpose. 32 d. The meetings shall be conducted according to Robert's Rules of Order, Newly Revised. 33 A parliamentarian may be appointed by the Faculty Council Chair in order to facilitate orderly 34 transaction of business. A quorum of the Faculty Council shall consist of 50% of the voting

35 members. Elected members may not designate alternates for council meetings or vote by proxy

9

Faculty of Medicine Bylaws

Approved by the Faculty Senate 1/30/18

Commented [A35]: Approved by the Bylaws Committee on 12 December, 2017. Rationale: Curatorial.

Deleted: ng

Commented [A36]: Approved by the Bylaws Committee on 12 December, 2017. Rationale: Curatorial

Deleted: selected

Commented [A37]: Approved by the Bylaws Committee on 12 December, 2017. Rationale: Echoes language in the Faculty Senate Bylaws.

- 1 in council meetings. Faculty Council members may vote *in absentia* by mail in the election of
- 2 officers and standing committees of the Faculty Council (see article 3.6b).
- 3
- 4 <u>3.8: Annual Report of the Faculty Council</u>
- 5 Each year the chair of the Faculty Council shall submit to the faculty a report on the
- 6 activities of the Faculty Council.

Page 4: [1] Commented [A11]

I

Author

Approved by the Bylaws Committee on 12 March 2018, 5-0. Rationale: Sentences combined and rearranged for clarity.

Formatted **BYLAWS** 1 2 THE FACULTY OF MEDICINE 3 4 **CASE WESTERN RESERVE** 5 **UNIVERSITY** 6 7 8 9 10 11 12 13 14 15 16 Deleted: ¶ 17 18 ADOPTED BY THE FACULTY OF MEDICINE, AUGUST 25, 1978 RATIFIED BY THE FACULTY SENATE, DECEMBER 13, 1978 AMENDED BY THE FACULTY OF MEDICINE, MARCH 25, 1998 RATIFIED BY THE FACULTY SENATE, APRIL 23, 1998 AMENDED BY THE FACULTY OF MEDICINE JUNE 25, 1999 AND JUNE 30, 2000 RATIFIED BY THE FACULTY SENATE, NOVEMBER 6, 2000 AMENDED BY THE FACULTY OF MEDICINE, JANUARY 31, 2003 RATIFIED BY THE FACULTY SENATE, APRIL 27, 2003 AMENDED BY THE FACULTY OF MEDICINE, APRIL 22, 2005 RATIFIED BY THE FACULTY SENATE, FEBRUARY 27, 2006 AMENDED BY THE FACULTY OF MEDICINE, JANUARY 11, 2010 RATIFIED BY THE FACULTY SENATE, APRIL 21, 2010 AMENDED BY THE FACULTY OF MEDICINE, AUGUST 26, 2011 RATIFIED BY THE FACULTY SENATE, FEBRUARY 22, 2012 AMENDED BY THE FACULTY OF MEDICINE, MAY 6, 2014 RATIFIED BY THE FACULTY SENATE, JANUARY 22, 2016 AMENDED BY THE FACULTY OF MEDICINE, FEBRUARY 15, 2017, JULY 13, 2017, & November 13, 2017 RATIFIED BY THE FACULTY SENATE, JANUARY 30, 2018 1 Faculty of Medicine Bylaws Approved by the Faculty Senate 1/30/18

TABLE OF CONTENTS

PAGE

ARTICLE 3 - THE FACULTY COUNCIL			
3.1 Purpose and functions of the Faculty Council	8		
3.2 Membership of the Faculty Council	9		
3.3 Election of the members of the Faculty Council	9		
3.4 Terms of office of Faculty Council representatives	10		
3.5 Officers of the Faculty Council	11		
3.6 Committees of the Faculty Council	11		
3.7 Meetings of the Faculty Council	14		
3.8 Annual report of the Faculty Council	14		

 $\begin{array}{c}1\\2\\3\\4\\5\\6\\7\\8\\9\\10\\11\\12\\13\\14\\15\\16\\17\\18\\19\\20\\21\\22\\23\end{array}$

Faculty of Medicine Bylaws

2 Approved by the Faculty Senate 1/30/18

1	ARTICLE 3: THE FACULTY COUNCIL		
2			
3	3.1: Purpose and Functions of the Faculty Council		
4	The Faculty of Medicine delegates all powers not reserved to the Faculty of Medicine		
5	itself (see Article 2) to a Faculty Council. <u>The Faculty Council shall serve as the Executive</u>		
6	Committee of the Faculty of Medicine, in accordance with Article X.1 of the Bylaws of the Faculty		
7	Senate. The Faculty Council shall meet regularly to exercise its powers and obligations, which		Commented [A1]: Approved by the Bylaws Committee
8	shall include but not be limited to the following:	0 93	SUBSTANTIVE: Explicitly identifies the Executive
9	a. To act for the Faculty of Medicine regarding the planning and execution of	(F	Committee of the Faculty of Medicine for the first time. Rationale: In response to a query from the Faculty
10	educational programs and the formulation of policies concerning curricula, student		Senate, Faculty Council at its meeting on December
11	admissions, and the conduct of research in consultation with the appropriate	\\ r	not its Steering Committee serves in this capacity.
12	standing committee of the Faculty of Medicine. It shall review the requirements for		Deleted: the
13	the M.D. degree and the recommendations of the Committee on Students regarding,		Deleted: of the Faculty Council
14	student standings and student promotions;		Deleted: also have the responsibility to
15	b. To hear reports of the Standing Committees of the Faculty of Medicine and of the		Commented [A2]: Approved 5-0 10 April 2018. Rationale: To make Article 3.1a compatible with Article
16	Faculty Council and recommend action on such reports;		2.6a.6.
17	c. To make recommendations to the Faculty of Medicine concerning the establishment,	Y	Deleted: to approve
18	discontinuance, and merging of departments;	_	
19	d. To make recommendations to the Faculty of Medicine concerning the establishment,		
20	discontinuance, and initial charge and representative composition of the membership		
21	of all Faculty of Medicine standing committees (see Article 2.6c);		
22	e. To elect a chair, a chair-elect, members of the Steering Committee, and the Faculty		
23	Council members of the Nomination and Elections Committee;		
24	f. To classify any issue requiring a vote of the faculty so as to determine the eligibility		
25	of the adjunct/clinical and student members to vote on that issue (per 2.4biii and		
26	2.4bv); and		
27	g. To create <i>ad ho</i> c committees to make recommendations concerning its various		
28	functions and duties (see Article 3:6d).		
29			
30	3.2: Membership of the Faculty Council		
31	a. Voting Members. Voting members of the Faculty Council shall include one		
32	representative of each academic department (all references hereafter to academic departments		
33	include the Division of General Medical Sciences (DGMS), which has departmental status; see		Commented [A3]: Approved by the Bylaws Committee 5-0
34	Article 4.7. When more than one autonomous department exists within a single academic		on April 10,2018.
35	discipline, as per section 4.3 below, a representative of each such department shall be elected to	t	he words in its title are written out.

Deleted: DGMS

Faculty of Medicine Bylaws

3 Approved by the Faculty Senate 1/30/18

1	the Faculty Council. These representatives shall be referred to as departmental representatives.		Deleted: I
2	Other voting members shall include two representatives from the special faculty whose titles are		Deleted: the Bylaws
3	modified by the adjective adjunct or clinical, one representative from each affiliated institution,		Deleted: shall
4	and 10 representatives of the regular faculty elected at large. All these representatives shall be		Deleted: Bylaws
5	members of the faculty.		Commented [A4]: A narrower version relating only to the Bylaws Committee was approved by the Bylaws
6	b. Non-voting Members. Non-voting members of the Faculty Council shall be the		Committee on 13 November 2017 and by the Faculty
7	president of the university, a vice-president of the university responsible for medical school		Rationale: To make the Bylaws compliant with the
8	activities, the dean of the School of Medicine, the associate dean for medical education of the		Bylaws Committee charge approved by Faculty Council on May 15, 2017.
9	School of Medicine, the chair of the Committee on Medical Education, and student members who		Commented [A5]: Approved by the Bylaws Committee 5-0
10	shall include not more than two undergraduate medical students, one M.DPh.D. student, and	/// .	on10 April 2018. SUBSTANTIVE: Generalizes the right of each Standing
11	one Ph.D. graduate student. The student members shall be chosen by their respective groups.		Committee of the Faculty to have a non-voting
12	To facilitate communication between Standing Committees and the Faculty Council, if no member		
13	of a Standing Committee of the Faculty of Medicine is a voting member of the Faculty Council,	$\parallel \! \mid$,	Deleted: In addition,
14	the Faculty Council Chair may appoint one of the Standing Committee's elected members to	$\parallel / /$	Deleted: i
15	serve as a non-voting, <i>ad hoc</i> member, in accordance with each committee's charge. If a	V/	Deleted: senator
16	representative to the university Faculty Senate is not included in the Faculty Council as a voting		10April, 2018 5-0/
17	member, the Faculty Council Chair shall appoint one of the School of Medicine senators to be an		Rationale: Curatorial.
18	ad hoc member of the Faculty Council. The Faculty Council Chair may invite other persons to		Deleted: Chair of the
19	attend designated meetings. Faculty Council meetings shall be open to the faculty. Faculty		Commented [A7]: Approved by the Bylaws Committee
20	members may at any time request hearings before Faculty Council, but a request by a faculty		on 12 March 2018, 5-0.
21	member for a hearing before the Faculty Council must be made to the chair prior to the meeting	1	process was moved from 3.3b
22	of the Faculty Council.		Rationale: To improve clarity.
23			Commented [A9]: Moved from 5.55.
24	3.3: Election of the Members of the Faculty Council		on 12 March 2018, 5-0.
25	Faculty members have the power and obligation to elect Faculty Council representatives		not specify the party to be informed by the dean, but in
26	(see Article 2.3). Elections shall be held by democratic process. Complaints concerning the		practice it was department chairs. Rationale: Faculty members should be informed
27	occurrence of undemocratic selections of representatives shall be brought to the attention of the		directly about the opportunity to represent their colleagues on Faculty Council
28	chair of the Faculty Council.		Deleted: (For more details concerning elections, see
29	The following section in green will not be discussed at the November Faculty Council Meeting.		Article 3:6b, paragraph 3.) ¶
30	a. Departmental representatives: When the term of a departmental representative is		Deleted: ¶
31	coming to an end, the dean shall inform all full-time faculty members of that department. The		b. Upon notification by the dean, the full-time faculty
32	department shall elect its new representative no later than April 30 of each year, with newly		of Medicine shall elect
33	elected members beginning their terms of office on the following July 1. To be eligible to serve		Commented [A11]: Approved by the Bylaws Committee
34	as a departmental representative to the Faculty Council, a faculty member must be appointed		Delated: one of their
35	full-time and hold, a primary appointment in that department. The election shall be held by	V	Deleted: members who
I			Deleted

4 Approved by the Faculty Senate 1/30/18 Deleted:

1	democratic process. Complaints concerning the occurrence of undemocratic selections of		
2	representatives shall be brought to the attention of the chair of the Faculty Council.		Deleted: c. Upon notification by the dean, full-time
3	,b, At-large representatives: The at-large representatives shall be nominated by the		faculty based at each affiliated institution shall choose,
4	Nomination and Elections committee (see Article 3:6b) and shall be elected by the full-time		who has a primary base at that institution and who has
5	members of the faculty. The dean shall be requested to supply the Nomination and Elections	$\langle N \rangle$	not been elected a department representative to be a representative to the Faculty Council.
6	committee with a list of the basic and clinical science departments and rosters of the full-time	$\langle \rangle \rangle$	Deleted:
7	faculty members with primary appointments in each department. Five at-large representatives	$\langle \rangle \rangle$	Deleted: The a
8	shall be elected from basic science departments and five shall be elected from clinical science	$\langle \rangle$	Deleted: a nominating
9	departments. There shall be at least two nominees for each of these positions. Those nominees	///	Deleted:
10	who are not elected shall serve as alternates in the order of votes received (see Article 3:4),	$\langle \rangle$	Deleted: nominating
11	The terms of at-large Faculty Council members shall be staggered such that one or two	/ /	Deleted: preclinica
12	basic science and one or two clinical representatives are elected each <mark>year</mark> . <u>No more than</u>		Deleted: preclinica
13	one at-large representative shall be from a single department	\setminus	on 12 March 2018, 5-0.
14	c. Institutional representatives: Upon notification by the dean, full-time faculty based at	$ \rangle /$	Rationale: Rearranged for clarity.
15	each affiliated institution shall choose, by a method of their own design, one of their members		Commented [A13]: Approved by the Bylaws Committee 23 January, 2018, 6:0.
16	who has a primary base at that institution and who has not been elected a department		Rationale: Simplifies and clarifies a passage held over from the first version of the Bylaws.
17	representative to be a representative to the Faculty Council.	\mathbb{N}	Deleted: In each three-year cycle beginning with the
18	d. Special Faculty representatives: The Nomination and Elections Committee (see Article	$\ $	adoption of these amendments, one preclinical and one
19	3:6b) shall nominate at least four members of the special faculty whose titles are modified by the	111	year, and two preclinical and two clinical at-large
20	adjective adjunct or clinical as candidates for representative to the Faculty Council. Two of these	111/1	representatives shall be elected in each of the second and third years. Upon adoption of these amendments,
21	nominees shall be elected by the special faculty whose titles are modified by the adjective		the at-large representatives who are then serving may
22	adjunct or clinical. The remaining nominees will serve as alternates in the order of votes	$\ \ $	Deleted:
23	received.	11	Commented [A15]: Approved 5-0 2018-04-10.
24			Rationale: Ensures broader representation on FC.
25	3.4: Terms of Office of Faculty Council Representatives		Deleted: . e. The Nominating
26	Departmental and at-large representatives shall serve for a period of three years.		Commented [A16]: Approved by the Bylaws Committee on 12 March, 2018.
27	Representatives may not serve consecutive terms but may stand for election after an absence of	- /'	Rationale: Moved so that the types of representatives are clearly distinguished.
28	one year. A department representative who is unable for any reason to complete a term of office		Commented [A17]: Approved by the Bylaws Committee
29	shall be replaced by a full-time faculty member from the same academic department, elected by	\mathbb{N}	on 12 March, 2018. Rationale: Phrase inserted for clarity.
30	democratic process within that department. The new member shall complete the term of the	$\ $	Commented [A18]: Changes to 3.b and c (formerly d
31	former member and shall be eligible for reelection if the remaining term so completed has been		and e) were approved by the Bylaws Committee on 23 January. 2018.
32	less than two years. A departmental member on leave of absence shall be replaced during that	- []]	Rationale: Correction (update of NEC name) and
33	leave by a faculty member from the same academic department, elected by democratic process		Deleted: Representatives
34	within that department. Upon return from leave, the returned faculty member shall complete the		Commented [A19]: Approved by the Bylaws Committee
35	original term of office. An at-large representative who is unable for any reason to complete a		on 23 January, 2018. Rationale: Clarification.
36	term of office shall be replaced by an alternate (per 3:3d) who shall serve during the remainder		Deleted: be reelected
	5		
	Faculty of Medicine Bylaws Approved by the Faculty Senate 1/30/18		
1 of the term or during the leave of the representative, as outlined for department representatives. 2 A representative of the special faculty who is unable for any reason to complete a term shall be 3 replaced by an alternate (see Article 3:3e) who shall serve during the remaining term or during 4 the leave of the representative. A representative of an affiliated institution who is unable for any 5 reason to complete a term shall be replaced by a full-time faculty member with a primary base at 6 the same institution. That individual shall be chosen by the same mechanism as the original 7 representative, and shall serve for the remaining term or during the leave of the original 8 member, as outlined above for department representatives. 9 Members who have three absences from Faculty Council meetings in one year must 10 resign from the Faculty Council unless their absences were excused by the chair of the Faculty 11 Council. A warning letter will be sent to the Faculty Council member after two absences, with a 12 copy to the department chair. Selection of replacements for members who resign is discussed in 13 the preceding paragraph. 14 15 3.5: Officers of the Faculty Council 16 Each year the Faculty Council shall elect a chair-elect from among current members of 17 the Faculty Council. There shall be at least two nominees for the position of chair-elect. The 18 chair-elect shall serve as vice-chair of the Faculty Council during the first year following election 19 and succeed to the chair the following year. The chair of the Faculty Council (or the vice-chair of

21 vice-chair of the Faculty of Medicine. Following completion of this term of office, the immediate 22 past chair of the Faculty Council shall serve one additional year as a member of the Faculty 23 Council and as a member of its Steering Committee. For procedures to be followed in the 24 election of the officers and committees of the Faculty Council, see article 3:6b. The dean shall be 25 requested to provide administrative support to these officers. 26 27 3.6: Committees of the Faculty Council 28 a. Steering Committee. The Steering Committee shall consist of eight members: the 29 chair of the Faculty Council, the vice-chair of the Faculty Council, the immediate past chair of the 30 Faculty Council, and five other Faculty Council members who shall be elected by the Faculty 31 Council for one-year terms. These members may be reelected successively to the Steering 32 Committee for the duration of their terms as members of the Faculty Council. The chair of the 33 Faculty Council (or the vice-chair of the Faculty Council in the absence of the chair) shall serve as 34 chair of the Steering Committee. The Steering Committee shall set the agenda for meetings of 35 the Faculty Council. The Steering Committee shall be empowered to act for the Faculty Council

the Faculty Council in the absence of the chair) shall preside over the Faculty Council and shall be

36 between meetings. The Steering Committee shall report all actions and recommendations to the

6

Faculty of Medicine Bylaws

20

Approved by the Faculty Senate 1/30/18

Deleted: the

Deleted: who have at least two years of their terms remaining

Commented [A20]: Approved by the Bylaws Committee on 27 March, 2018, 4-0.

SUBSTANTIVE.

Rationale: Aligns Article 3.5 with the revised Nomination and Elections Committee charge approved by Faculty Council on 21 May, 2018. Both changes remove the restriction that FC chair-elect candidates must have at least two years left in their term, thereby expanding the pool of candidates and allowing candidates who have more experience on FC to run for chair-elect.

Commented [A21]: Approved by the Bylaws Committee on 27 March, 2018, 4-0. Rationale: This change prevents a candidate from running unopposed for this important office. 1 Faculty Council. <u>Steering Committee meetings shall be conducted according to Robert's Rules of</u>

2 Order, Newly Revised. The Steering Committee shall act for the Faculty Council and faculty in

3 reviewing actions of the Committee on Appointments, Promotions and Tenure in order to ensure

4 equity, adherence to published guidelines, and proper procedure. The Steering Committee shall

5 consult with the dean on such matters as the dean brings before it. The Steering Committee

shall advise the president concerning the appointment of an interim or acting dean of the Schoolof Medicine.

8 b. Nomination and Elections Committee. This committee shall consist of eleven 9 members: the dean, the chair of the Faculty Council, the vice-chair of the Faculty Council, four 10 other Faculty Council members, two each from the basic and clinical sciences, and four full-time 11 faculty members who are not members of the Faculty Council, two each from the basic and 12 clinical sciences. The four Faculty Council members of the Nomination and Elections Committee 13 shall be elected at large by the Faculty Council and shall serve for the duration of their terms as 14 Faculty Council members. The four non-members of the Faculty Council shall be elected by 15 ballot by the Faculty of Medicine and shall serve three-year terms. The chair will be elected from 16 the members of the committee annually. 17 The Nomination and Elections Committee shall nominate (1) candidates for the chair-18 elect of the Faculty Council from the eligible pool (all current members, see Article 3.5), (2) 19 candidates for the Steering Committee, and (3) candidates for the standing committees of the 20 Faculty Council. Ballots listing the nominees and leaving space for write-in candidates shall be 21 sent to all members of the Faculty Council. The election of the chair-elect and the members of 22 the Steering Committee, the Faculty Council members of the Nomination and Elections 23 Committee and the members of other standing committees of the Faculty Council will be carried 24 out at the May meeting of the Faculty Council. Additional nominations for all these offices shall 25 be invited from the floor. The consent of the nominee must be obtained in order for a write-in or 26 floor nomination to be valid. Faculty Council members who cannot attend the May meeting may 27 vote by mail (noting that wherever mail voting or distribution is mentioned in these Bylaws, 28 voting or distribution by email or other method well-calculated to reach voters shall be 29 considered satisfactory). Candidates for chair-elect will also be candidates for the Steering 30 Committee and will be so listed on mail ballots. Faculty Council members shall vote for one 31 nominee for chair-elect and for six members of the Steering Committee. The five persons with 32 the highest number of votes, excluding the person elected to the office of chair-elect, shall be 33 elected to serve on the Steering Committee. Both mail ballots and ballots collected at the Faculty 34 Council meeting shall be counted, whether or not a quorum is present at the meeting. If the 35 total number of ballots received does not equal or exceed 50% of the members of Faculty

36 Council, ballots may be solicited from absentee members. If either the Steering Committee or

7

Faculty of Medicine Bylaws

Approved by the Faculty Senate 1/30/18

Commented [A22]: Approved by the Bylaws Committee on 12 December, 2017. Article 3.7d stipulates that Faculty Council meetings are conducted according to Robert's Rules but this was never explicitly stated for the Steering Committee. Rationale: Clarification.

Commented [A23]: Approved by the Bylaws Committee on 10 April, 2018.

Rationale: Updates language to reflect the current structure of the curriculum (students are in the clinic from their first year onward).

Deleted: preclinical

Deleted: preclinical

Commented [A24]: Approved by the Bylaws Committee on 27 March, 2018, 4:0 and by Faculty Council on 21 May, 2018. Reiterates the provision in Article 3.5 that all current

members of Faculty Council are eligible to run for chairelect.

Rationale: As stated in Article 3.5.

1 the Nomination and Elections Committee perceives a significant deficit in the representation of 2 faculty constituencies within its membership following the annual election, either committee may 3 ask the chair of Faculty Council to appoint a single ad hoc voting member to serve on the 4 respective committee for the remainder of the year. In the case of the Steering Committee, the appointee should be a current member of the Faculty Council. In the case of the Nomination and 5 6 Elections Committee, the appointee should be a regular member of the Faculty of Medicine. 7 In addition, the Nomination and Elections Committee shall nominate (1) candidates for 8 the at-large representatives to the Faculty Council, (2) candidates for the representatives of the 9 special faculty whose titles are modified by the adjective adjunct or clinical to the Faculty Council, 10 (3) candidates for standing committees of the Faculty of Medicine, and (4) candidates for the 11 University Faculty Senate. In the case of at-large representatives, senators, or members of the 12 Committee on Appointments, Promotions, and Tenure, the number of candidates shall be at least 13 twice the number of positions to be filled. In recruiting faculty for the ballot, the NEC shall strive 14 to produce a diverse slate of nominees, considering gender, race, institutional affiliation and 15 representation of basic and clinical departments. A nominee may not be put on the ballot if in 16 winning the election they would serve on more than two standing committees of the Faculty of 17 Medicine or Faculty Council (ad hoc committees are not included in this count). Exceptions will be 18 made only if no other candidates come forward to fill a committee vacancy. Elections shall be 19 conducted by e-mail or other electronic means, using a preferential voting system. Ballots shall 20 include a clear explanation of the preferential voting system. Ballots listing candidates for the 21 representatives of the special faculty on the Faculty Council shall be distributed to all special 22 faculty whose titles are modified by the adjective adjunct or clinical. Ballots listing candidates for 23 committees dealing with the planning and approval of the curriculum, the execution of the 24 instructional program, and the formulation of policies with regard to student affairs shall be 25 distributed to all members of the faculty. Elections shall be conducted as far in advance of the 26 completion of the terms of sitting members as is practicable. Elections shall be conducted 27 through the campus and first class mail or by email or other electronic means. All electronic 28 ballots shall provide space for write-in candidates. At least two weeks shall be allowed between 29 the distribution of all ballots and the close of the election and determination of election results. 30 Distribution of the ballots and the determination and publication of the election results shall be 31 the responsibility of the Nomination and Elections Committee. After each election, the 32 Committee shall count the votes and publish all the vote totals. Any irregularities or issues in the 33 conduct of the elections shall be investigated and resolved by the Committee. The Nomination, 34 and Elections Committee shall report its investigation and resolution to the Faculty Council and 35 the Faculty of the School of Medicine. The dean shall be requested to supply administrative 36 support for the elections.

Deleted: senator to

Formatted: Strikethrough

Commented [A25]: Approved by the Bylaws Committee on 12 December, 2017, 6-0 and by Faculty Council on 21 May, 2018.

Rationale: Curatorial.

Deleted: nominees

Commented [A26]: The amendments in lines 34-36 and lines 1-18 on the following page were approved 4:0 at the BC's 27 March, 2018 meeting, subsequently accepted by the NEC and approved by Faculty Council on 21 May, 2018.

Deleted: ive

Commented [A27]: SUBSTANTIVE. Stipulates that a faculty member may serve on only two committees concurrently. Rationale: Increases overall participation in faculty

governance and broadens representation.

Commented [A28]: Approved 2018-04-10, 5 -0. SUBSTANTIVE: Institutes a preferential voting system in place of run-off elections (which were never explicitly described but conducted when candidate(s) did not receive a majority of the votes cast, as required by Robert's Rules).

Deleted: . A

Deleted: shall be used for multi-seat elections

Commented [A31]: Rationale: Removes archaic language. **Deleted:** Electees shall be chosen by mail ballot. Ballots listing candidates for Faculty Council, senators, and standing committees of the faculty shall be mailed to all full-time members of the faculty.

Deleted: mailed

Deleted: mailed

Deleted:

Deleted: may

Formatted: Strikethrough

Commented [A32]: Approved by the Bylaws Committee 28 February, 2018.

Rationale: Modernizes description to match current practice.

Commented [A33]: Approved by the Bylaws Committee on 28 February, 2018.

Rationale: Modernization.

Formatted: Strikethrough

Commented [A34]: Approved by the Bylaws Committee on 28 February, 2018. Rationale: Replaces "will" with the more forceful "will."

Deleted: will

Deleted: S

Formatted: Strikethrough

Faculty of Medicine Bylaws

\$8\$ Approved by the Faculty Senate 1/30/18

1 c. Special Committee to Nominate Candidates for the Search Advisory Committee to the 2 President on the Selection of the Dean of the School of Medicine. This special nominating 3 committee shall be formed when needed and shall consist of the chair of Faculty Council, three 4 other members of the Steering Committee of the Faculty Council, three elected members of the 5 Nomination and Elections, Committee, and four academic department chairs (two Basic Science, 6 two Clinical) of the School of Medicine. The chair of the Faculty Council shall serve as chair of this 7 special nominating committee, and the other ten members shall be elected by their respective 8 groups. The majority of the nominees for the Search Advisory Committee selected by this special 9 nominating committee shall be full-time members of the Faculty of Medicine. The president is 10 requested to consider these nominees when appointing members of the Search Advisory 11 Committee. 12 In the early stages of the search for the dean of the School of Medicine, the chair of the 13 Faculty Council shall solicit recommendations, opinions, and advice regarding selection of the 14 dean from members of the Faculty of Medicine by mail and submit these views directly to the 15 Search Advisory Committee. When a final list of candidates for the position of dean has been 16 assembled, the Search Advisory Committee is requested to solicit the views and advice of the 17 Steering Committee of the Faculty Council on the ranking of the candidates. 18 d. Other Committees of the Faculty Council. The Faculty Council may create other 19 standing and ad hoc committees of the Faculty Council to carry out specific functions and duties 20 assigned to it. These committees may include members who are not Faculty Council members. 21 22 3.7: Meetings of the Faculty Council 23 a. The Faculty Council shall meet at least once every two months from September 24 through June of each academic year. Special meetings may be called by a majority vote of the 25 Steering Committee, by a written petition of 10 members of the faculty addressed to the chair of 26 the Faculty Council, or by the dean. 27 b. The agenda for each meeting shall be prepared by the Steering Committee, posted 28 electronically, and sent electronically to all faculty members at least one week in advance of 29 regular meetings and at least two days in advance of special meetings 30 c. Minutes of the meetings shall be kept and shall be distributed in a timely fashion to 31 Faculty Council members, to the dean, to all department chairs, and to each member of the 32 Faculty of Medicine. Approved minutes shall be posted electronically and sent electronically to all 33 faculty members. The dean is requested to provide administrative support for this purpose. 34 d. The meetings shall be conducted according to Robert's Rules of Order, Newly Revised. 35 A parliamentarian may be appointed by the Faculty Council Chair in order to facilitate orderly 36 transaction of business. A quorum of the Faculty Council shall consist of 50% of the voting

Commented [A35]: Approved by the Bylaws Committee on 12 December, 2017. Rationale: Curatorial.

Deleted: ng

Commented [A36]: Approved by the Bylaws Committee on 12 December, 2017. Rationale: Curatorial

Deleted: selected

Commented [A37]: Approved by the Bylaws Committee on 12 December, 2017. Rationale: Echoes language in the Faculty Senate Bylaws.

Faculty of Medicine Bylaws

Approved by the Faculty Senate 1/30/18

9

- 1 members. Elected members may not designate alternates for council meetings or vote by proxy
- 2 in council meetings. Faculty Council members may vote *in absentia* by mail in the election of
- 3 officers and standing committees of the Faculty Council (see article 3.6b).
- 4
- 5 <u>3.8: Annual Report of the Faculty Council</u>
- 6 Each year the chair of the Faculty Council shall submit to the faculty a report on the
- 7 activities of the Faculty Council.

Faculty of Medicine Bylaws

 $10\ \mbox{Approved by the Faculty Senate 1/30/18}$

The Department of Biochemistry offers a Plan B coursework MS degree designed for students who are headed for careers in the biomedical sciences. Many of our graduates go on to PhD programs. They also work as researchers in academia, government laboratories, and the biotechnology sector. Students in our Plan B program spend most of their time on coursework, with limited opportunities for lab work and for the acquisition of practical skills they can use in their future endeavors.

Biochemistry Department faculty members had a "listening tour", which involved discussions with our faculty colleagues and with scientists at local biotechnology companies. We spoke with scientists at Athersys, Sherwin-Williams, and BioEnterprise. From these meetings, we created a set of skills and knowledge about research that employers value and that would make our graduates more attractive as employees. These include: i) general lab skills, including planning and documenting experiments, safety, and record keeping, ii) knowledge of specific techniques in molecular biology and protein science, and iii) knowledge about how research is funded and carried out in the non-profit and private sectors.

To prepare our students for employment opportunities in biotech, we plan to add a biotechnology track to our MS program to educate students in these areas. The track requires four new courses: BIOC 500, 501, 502, and 511. BIOC 500-502 form a course sequence that will introduce students to common techniques used in biochemistry labs and give them hands-on experience and training.

These courses include:

- BIOC 500: a laboratory course to introduce students to basic lab techniques of molecular biology
- BIOC 501: a didactic class that presents experimental design and covers the principles behind common experimental techniques
- BIOC 502: an in-depth lab course covering experimental techniques used for the engineering, preparation, and study of proteins and nucleic acids
- BIOC 511: presents information about the organization and practices in biotechnology research, product development and the biotech and pharmaceutical industry

All four of these courses have been approved. BIOC 500, 501, and 511 are being offered for the first time in the Fall 2018 semester with enrollments of 9, 16, and 9, respectively. Detailed descriptions are provided in Appendices 1 and 2.

The lab courses (500 & 502) have enrollment limits of 12-20 because of concerns about space and staffing. This will limit the number of students who can pursue this track. Students in the Biotechnology Track and in our MS program will receive preferential access to these courses; all other students will need instructor's permission to register. In the last seven years, our MS program has matriculated an average of 7.5 students per year. Consequently, we do not expect space to be an issue.

We are using laboratory space in the Biochemistry Department on the fourth floor of the Wood Building to teach the lab courses. Because much of our research space is open labs, it was easy to find enough space for the teaching lab. The Biochemistry Department anticipates significant

changes in the coming years as we recruit a new chair who will add new faculty members. Our open labs give us the flexibility to move the teaching lab to other space or adjust the lab size if that proves necessary. In addition we have been able to equip these teaching labs for a relatively modest investment (see below).

The Experimental Biotechnology Track

Students in the track will take the 4 new courses in their first year, providing them with a solid foundation in lab skills and techniques. They will also take our other required courses, BIOC 407, 408, EXAM 600.

Students will also carry out research in an academic or biotech laboratory in their second year. This will provide students with an opportunity to participate in a research project and to improve the skills they acquired in the first-year laboratory courses. The students will take BIOC 601 to get credit for this work. A minimum of 3 credit hours is required, although students are encouraged to take additional research credits.

Differences from the existing MS in Biochemistry program

Our existing program requires 36 credit hours. The required courses are BIOC 407, 408, as well as the MS comprehensive exam (EXAM 600). The remaining courses are electives, taken in Biochemistry and a wide range of departments. In the Biotechnology track, the electives in the first year will be replaced by the four new courses (10 credit hours).

Students in our existing MS program can pursue research projects in faculty labs while earning credit as BIOC 601, and most of our students pursue this option. This research will be required in the Biotechnology track.

Overlap with other programs and courses.

The Science and Technology Entrepreneurship Program offers a MS degree in Entrepreneurial Biotechnology in collaboration with the Law School and the Department of Biology. The coursework in the existing program is focused on the entrepreneurship, business and legal aspects of biotechnology, so there is little overlap between the existing program and our proposed Biochemistry track. Moreover, this program does not have a laboratory component, in contrast to this proposed track, which seeks to help students acquire specific skills and competencies that will allow them to work as bench researchers.

There are laboratory courses offered by other departments that have some similarity to BIOC 500 and 502. However they have limited overlap with our new offerings. BIOL 401, Biotechnology Laboratory: Genes and Genetic Engineering is a 3-credit course that focuses on molecular biology. BIOL 401 does not include the study of proteins, mammalian cell culture, and other analytical techniques that are frequently used in the biotechnology industry. These topics are covered in BIOC 502. The Chemistry Department offers a 3-credit Biochemistry Laboratory (CHEM 306). However, this course doesn't include molecular biology techniques. Moreover, it is an undergraduate course and is not being offered in the 2018-19 academic year. Based on these comparisons, BIOC 500 and 502 are courses that offer experience in research areas that are not represented well in other courses.

YEAR 1		
Introduction to Biochemistry: From Molecules To Medical Science		
Biotechnology Laboratory: Molecular Biology Basics		
Biochemical and Cellular Techniques for Biotechnology		
Practice and Professionalism in Biotechnology		
Molecular Biology		
Biotechnology Laboratory: Biochemical and Cellular Techniques for		
Biotechnology		
Proteins and Enzymes		
Biochemical Research		
Structural Biology		
Biochemical Research		
Master's Comprehensive Exam		

Suggested Schedule for Students in the Biotechnology Track

* New courses

9 credit hours in each semester. 36 credit hours total.

Financial Analysis of Proposed Experimental Biotechnology Track

The new track has costs for personnel and materials. These costs will be offset if the new track allows us to recruit more students. The increased size will result in additional tuition income. This analysis is based on costs of the track and income from adding new students.

Costs-The track has both startup and ongoing costs.

<u>Startup costs</u>—The startup costs involve outlays for equipment and supplies. We have spent ~\$100,000 to equip the teaching laboratory. These costs have been held to a minimum by repurposing existing equipment and by gifts of equipment from outside the university.

<u>Ongoing costs</u>—These include:

- Faculty effort required to teach the new courses (10 credits), estimated as 0.5 FTE. These are being taught by the current faculty.
- Salary for the teaching lab assistant
- Instrument repair
- Supplies the for teaching lab courses

The first 3 costs are fixed, whereas supply costs vary with the number of students.

<u>Income</u>—This estimate assumes new tuition income. It is adjusted for the fact that some tuition income goes to other departments when our students take elective courses outside of Biochemistry. We have discussed the possibility of adding lab fees for BIOC 500 and 502. However, Provost Vinson has put a hold on new lab fees while a university-wide policy is formulated. We will make a decision after the Provost's review is completed.

<u>Net Income</u>—The program will produce net income with 5 additional new students per year. In this case we will be able to recoup the startup costs in 7 years. If, as we expect, we can increase our class size by more than 5 students per year, we will recoup our startup costs more rapidly and produce income for the Department.

Ongoing Costs	Additional students per year	
	5	10
Faculty effort	75,000	75,000
Lab assistant	50,700	50,700
Instrument repair	5,000	5,000
Supplies @ \$2300/student	11,500	23,000
Total	142,200	153,700
Income		
Tuition @ \$31,000/student	155,000	310,000
Total	155,000	310,000
Net Income	12,800	156,300

Pamela B. Davis, MD, PhD Dean Senior Vice President for Medical Affairs

Office of the Dean

10900 Euclid Avenue Cleveland, Ohio 44106-4915

Visitors and Deliveries Biomedical Research Bldg., Rm. 113

> phone 216.368.2825 fax 216.368.2820

> > casemed.case.edu

October 10, 2018

Dr. Vivien Yee Interim Chair, Biochemistry Case Western Reserve University School of Medicine 10900 Euclid Avenue Cleveland, OH 44106

Dear Vivien,

I am writing to confirm my enthusiastic endorsement of the creation of an Experimental Biotechnology Track in the Biochemistry MS program. I agree with your assessment that adding this track will strengthen your MS program. This program will address the needs of the burgeoning biotechnology community in Cleveland and strengthen our ties with the regional firms, advancing the citywide agenda of revitalization of Cleveland through "meds and eds". Your careful preparation for this Track with consultations with local biotechnology firms to understand their needs as well as your engagement with these companies bodes well for the future of this Track. It is important to strengthen our partnerships with these companies, not only because we wish to keep positive touch with the entire Cleveland biomedical community (not just the academic) but also because of the need to expose our PhD students to such career opportunities, both for their own sake and to meet the expectations of the NIH for PhD training in T32s. This new Track will provide students with essential laboratory skills and understanding of the research process, and prepare them to contribute productively in both academic and industrial research settings. The added dimensions in your new Experimental Biotechnology Track not only will be a meaningful addition to the Biochemistry MS program but also will fill a training gap in the offerings of MS programs in the School of Medicine.

I understand that you have worked with Matthew Lester, Senior Associate Dean for Finance in the Medical School, to assess the startup and ongoing costs of this initiative. He has endorsed the expenditure of startup costs, and confirms that this program will be self-supporting once it reaches steady state enrollment. These strictly financial calculations, however, do not assess the value of this Track for the entire training portfolio in the School.

Finally, I understand that you plan to expand this initiative with a dedicated new MS program, and in consultation with Matthew Lester, will also develop a 1-year certificate program in Experimental Biotechnology. The certificate program will meet the needs of those who already have positions in academic or industrial laboratories but need to expand their skills to keep up with new career opportunities, as well as other students. I am fully supportive of both of these plans, which will broaden the appeal of your graduate program to a larger pool of prospective students. Once approved, we will support the marketing and communications appropriate to attracting this broader pool.

Sincerely,

Pamela B. Davis, MD, PhD



SCHOOL OF MEDICINE

CASE WESTERN RESERVE UNIVERSITY

Appendix 1: Description of New Biochemistry Courses

These courses have all been approved. BIOC 500, 501, and 511 are being taught for the first time in the Fall 2018 semester with enrollments of 9, 16, and 9, respectively. BIOC 502 will be offered for the first time in Spring 2019.

BIOC 500 (1) Biotechnology Laboratory: Molecular Biology Basics

This course provides hands-on laboratory experience in basic molecular biology techniques used in biomedical research and the biotechnology industry. Students will perform bacterial transformation, plasmid miniprep for DNA isolation, polymerase chain reaction (PCR) techniques, DNA restriction digestion, agarose gel electrophoresis for DNA purification, DNA ligation, and analysis of sequencing results.

BIOC 501 (3) Biochemical and Cellular Techniques for Biotechnology

This lecture course covers the basics of common, essential laboratory and analytical techniques used in biomedical research and the biotechnology industry. The course will cover recombinant protein production and characterization, mammalian cell culture, molecular and cell biology, and mass spectrometry. Specific topics include: general laboratory safety, record keeping, preparation of research reports, manipulation of bacteria, protein overexpression and purification, enzyme assays, high-throughput techniques, high-performance liquid chromatography (HPLC) and mass spectrometry, mammalian cell culture, Western blotting, protein-protein interactions, reverse transcription-quantitative polymerase chain reaction (RT-qPCR), immunofluorescence microscopy and assays for gene expression.

BIOC 502 (5) Biotechnology Laboratory: Biochemical and Cellular Techniques for Biotechnology

This course provides hands-on, project-based laboratory experience in techniques used in biomedical research and the biotechnology industry. Students will perform laboratory projects in expression and characterization of recombinant proteins, mammalian cell culture, molecular and cell biology, and mass spectrometry. Specific topics include: general laboratory safety, good laboratory practices (GLP), standard operating procedures (SOPs), buffers, media, and other reagent preparation, sterile technique, manipulation of bacterial and mammalian cells, mammalian cell culture, work with DNA and RNA, polymerase chain reaction (PCR) techniques including reverse transcription-quantitative PCR (RT-qPCR) and molecular cloning, protein overexpression and purification, assays (enzyme, stability, and reporter), high-throughput techniques, transient transfection reporter assays, immunoprecipitation, immunofluorescence, DNA and protein gel electrophoresis, high performance liquid chromatography (HPLC), and mass spectrometry.

BIOC 511 (1) Practice and Professionalism in Biotechnology

This course will provide students with a practical introduction to the world of research bioscience and biotechnology. Topics include lab skills (record keeping, confidentiality, safety, and regulations), the business of science, intellectual property, and the process of turning ideas into products, and scientific communications. This course is a combination of lectures and student presentations.

Appendix 1: Description of New Biochemistry Courses

These courses have all been approved. BIOC 500, 501, and 511 are being taught for the first time in the Fall 2018 semester with enrollments of 9, 16, and 9, respectively. BIOC 502 will be offered for the first time in Spring 2019.

BIOC 500 (1) Biotechnology Laboratory: Molecular Biology Basics

This course provides hands-on laboratory experience in basic molecular biology techniques used in biomedical research and the biotechnology industry. Students will perform bacterial transformation, plasmid miniprep for DNA isolation, polymerase chain reaction (PCR) techniques, DNA restriction digestion, agarose gel electrophoresis for DNA purification, DNA ligation, and analysis of sequencing results.

BIOC 501 (3) Biochemical and Cellular Techniques for Biotechnology

This lecture course covers the basics of common, essential laboratory and analytical techniques used in biomedical research and the biotechnology industry. The course will cover recombinant protein production and characterization, mammalian cell culture, molecular and cell biology, and mass spectrometry. Specific topics include: general laboratory safety, record keeping, preparation of research reports, manipulation of bacteria, protein overexpression and purification, enzyme assays, high-throughput techniques, high-performance liquid chromatography (HPLC) and mass spectrometry, mammalian cell culture, Western blotting, protein-protein interactions, reverse transcription-quantitative polymerase chain reaction (RT-qPCR), immunofluorescence microscopy and assays for gene expression.

BIOC 502 (5) Biotechnology Laboratory: Biochemical and Cellular Techniques for Biotechnology

This course provides hands-on, project-based laboratory experience in techniques used in biomedical research and the biotechnology industry. Students will perform laboratory projects in expression and characterization of recombinant proteins, mammalian cell culture, molecular and cell biology, and mass spectrometry. Specific topics include: general laboratory safety, good laboratory practices (GLP), standard operating procedures (SOPs), buffers, media, and other reagent preparation, sterile technique, manipulation of bacterial and mammalian cells, mammalian cell culture, work with DNA and RNA, polymerase chain reaction (PCR) techniques including reverse transcription-quantitative PCR (RT-qPCR) and molecular cloning, protein overexpression and purification, assays (enzyme, stability, and reporter), high-throughput techniques, transient transfection reporter assays, immunoprecipitation, immunofluorescence, DNA and protein gel electrophoresis, high performance liquid chromatography (HPLC), and mass spectrometry.

BIOC 511 (1) Practice and Professionalism in Biotechnology

This course will provide students with a practical introduction to the world of research bioscience and biotechnology. Topics include lab skills (record keeping, confidentiality, safety, and regulations), the business of science, intellectual property, and the process of turning ideas into products, and scientific communications. This course is a combination of lectures and student presentations.

Appendix 2 Detailed Course Information for New Biochemistry Courses

This appendix has syllabus material for BIOC 500, 501, 502, and 511.

BIOC 500, 501, and 511 are being taught in the Fall 2018 semester. The material for these courses is the final versions. BIOC 502 will be taught in Spring 2019. It's syllabus is complete and nearly in the final form, although some changes may be made to the schedule.

Biochemistry (BIOC) 500 - Biotechnology Laboratory: Molecular Biology Basics Fall Semester 2018, 1 credit, Section 100-LAB(11162) Syllabus

- InstructorsDr. Susan Wang (Course Director), Wood W445, 216-368-3921, scw10@case.eduOffice hours by appointment; please access Dr. Wang's Google calendar for availabilityCaroline Gray (Laboratory Assistant), Wood W446, 216-368-4973, cdg16@case.eduOffice hours Tuesdays 1-3 pm by appointment; otherwise please e-mail for availability
- <u>Classrooms</u> Wood Building W428 (for pre-lab lectures) and W449 (laboratory classroom), W 1-4 PM

Course Prerequisites Biochemistry master's student standing and instructor permission

Learning Objectives

This course provides basic hands-on laboratory experience in molecular biology with a focus on handling and manipulating DNA in bacterial systems. The instructors want this course to prepare you for laboratory research and, ultimately, a potential career in biotechnology.

Specific objectives include:

Master basic laboratory techniques including pipetting, weighing out chemicals, making buffers and bacteriological media, autoclaving, and sterile technique

Become familiar with and use standard laboratory kits (*e.g.*, plasmid mini-prep kits, agarose gel purification kits, DNA ligation kits)

Gain experience in basic DNA molecular biology techniques, including purification of plasmids, electrophoretic analysis, and construction of new plasmids

Gain experience in transforming, handling, and culturing bacterial cells

Conduct DNA sequence analysis

Course Mechanics

- 1. Required Text: None. All materials will be provided on Canvas (<u>http://canvas.case.edu</u>). Please download, print, and read all appropriate materials **BEFORE** each class period.
- 2. Course Grades: You will earn points from exams, attendance, and successful completion of your laboratory notebook. Standard letter grades (A-F) will be issued. Grades will be assigned based on the following weights:

Laboratory notebook	25%
Successful completion of experiments and attendance	25%
Midterm exam (10/17)	20%
Final exam (lab practical 12/5, written 12/13)	30%

Final course letter grades will be assigned according to the performance criteria below.

- A: 90.0% and above
- B: 80.0% to 89.9%
- C: 70.0% to 79.9%
- D: 60.0% to 69.9%

Biochemistry (BIOC) 500 - Biotechnology Laboratory: Molecular Biology Basics Fall Semester 2018, 1 credit, Section 100-LAB(11162) Syllabus

- F: Below 60.0%
- 3. Exams: There will be 2 exams: a midterm and a final. The midterm exam will be administered October 17 and will last approximately 1.5 hours. The final exam will include a lab practical section and a written section. The lab practical will be held on the last day of class, December 5, in class. The final written exam will be administered during finals week on Thursday, December 13, from 12-3 pm.
- 4. Written assignments: All assignments and exams must be your own, individual work and submission. Though collaboration is encouraged, you must perform your own experiments and report and submit your own data and analyses for grading. Exceptions are permitted only upon instructor permission. More detailed instructions and examples will be provided during the first or second week of class.
- 5. Class attendance and participation: Weekly attendance and participation are required to succeed in this laboratory class and to fulfill the course objectives. You may miss up to two laboratory periods and still be able to pass the course. A third absence will result in automatic failure of the course with an F grade. In case of emergency and/or extenuating circumstances, please contact the instructors. Make-up time for experiments missed due to absence is available during weeks 8 and 13. For those students who miss class due to absence, missed experiments (up to a maximum of two) must be completed during one of these make-up class periods.
- 6. Logistics: You are expected to arrive ON TIME. You are expected to dress appropriately and wear appropriate personal protective equipment during each laboratory period. Shoes must have closed-toes; no sandals/flip-flops/open-toed shoes. Whenever you are in the laboratory (W449), you must wear a laboratory coat, disposable gloves, and safety glasses. The Department of Biochemistry will provide you laboratory coats; these coats cannot leave the Wood Building and must be laundered (cleaned) by the department. Students should not handle mobile phones, tablets, computers, and/or other handheld electronic devices in the laboratory due to the risk of biological and/or chemical contamination. Failure to follow these rules will result in the student being sent home, a zero for the day, and being required to attend a make-up laboratory period to complete the missed experiment.

Each class period will begin with a short lecture (~10-30 minutes) discussing the procedures for the day. Lectures may be held in Wood W428 or in Wood W449 depending on the length of the lecture and the number of students enrolled in this course. The remainder of the class period will be spent in Wood W449. Apart from restroom breaks, students are expected to spend the entire class period in the laboratory focused upon the day's experiment. You are not permitted to stay late or to arrive at alternative times to complete your work. If you are efficient, you may be able to leave class before the scheduled end of the class period.

Week	Date	Торіс
1	8/29	Chemical and laboratory safety training
2	9/5	Basic laboratory skills: pipetting, handling chemicals, autoclaving, sterile technique
3	9/12	Preparing solutions and media
4	9/19	Preparing solutions and media (continued); bacterial transformation of pGLO

Laboratory Schedule:

Biochemistry (BIOC) 500 - Biotechnology Laboratory: Molecular Biology Basics Fall Semester 2018, 1 credit, Section 100-LAB(11162) Syllabus

5	9/26	pGLO plasmid preparation (mini-prep) and DNA concentration determination
6	10/3	Restriction digest and agarose gel electrophoresis
7	10/10	Polymerase chain reaction (PCR) of green fluorescent protein (<i>gfp</i>) using Taq DNA polymerase
8	10/17	Midterm exam (1.5 hr); turn in laboratory notebooks for mid-term grading; time for make-up experiments
9	10/24	Agarose gel electrophoresis to verify gfp PCR product
10	10/31	gfp PCR product ligation into pMiniT 2.0 and transformation
11	11/7	<i>gfp</i> -pMiniT plasmid mini-prep, DNA concentration determination, and sequencing preparation
12	11/14	BLAST lecture ONLY (in W428); gfp-pMiniT sequence analysis outside of laboratory
13	11/21	No class; time for make-up experiments
14	11/28	Clean up laboratory materials and space; turn in laboratory notebooks for final grading
15	12/5	Lab practical (3 hr)
Finals	12/13	Final written exam, 12-3 pm, Wood W428

Important Dates:

Friday, 9/7: Drop/add ends

Monday, 10/22: Midterm grades due

Friday, 11/9: Withdrawal and pass-no pass deadline

Students with Disabilities:

In accordance with federal law, if you have a documented disability, you may be eligible to request accommodations from Disability Resources. In order to be considered for accommodations you must first register with the Disability Resources office. Please contact their office to register at 216.368.5230 get process or more information on how to begin the (https://students.case.edu/academic/disability/getstarted/). Please keep in mind that accommodations are not retroactive.

Academic Integrity Policy:

Academic integrity is the cornerstone of higher education. As such, all members of the university community share responsibility for maintaining and promoting the principles of integrity in all activities, including academic integrity and honest scholarship. Academic dishonesty includes cheating, plagiarism (submission of another's work as your own), and/or misrepresentation. If you have any questions about what is and is not allowed in this course, you should ask the course director before proceeding. Academic integrity will be strongly enforced in this course. If a violation occurs, and the violation is the student's first violation, the student will receive a zero for the assignment. A second violation will result in failure of the course without the option to withdraw with the possibility of expulsion from the university. For details. visit more http://students.case.edu/community/conduct/aiboard/violations.html.

BIOC 501: Biochemical and cellular Techniques for Biotechnology (Fall 2018)

Science is based on experiments and the interpretation of data. However, most science teachers focus on the conclusions, rather than the techniques and experiments that advance scientific discoveries. As a consequence, most grad students and upper level UG students are not well prepared to work in the lab. BIOC 501 aims to fill this gap by providing students with a strong theoretical and practical foundation for common techniques, protocols, and standards of reproducibility and rigor in biomedical research.

This lecture course covers the basics of common, essential laboratory and analytical techniques used in biomedical research and the biotechnology industry. The course will cover recombinant protein production and characterization, mammalian cell culture, molecular and cell biology, and mass spectrometry. Specific topics include: general laboratory safety, record keeping, preparation of research reports, manipulation of bacteria, protein overexpression and purification, enzyme assays, high-throughput techniques, high performance liquid chromatography (HPLC) and mass spectrometry, mammalian cell culture, Western blotting, protein-protein interactions, reverse transcription-quantitative polymerase chain reaction (RT-qPCR), immunofluorescence microscopy and assays for gene expression. This course is suitable for Biochemistry MS students interested in pursuing careers in academia or biotechnology. It is also recommended for undergraduate students to enhance their technical skills and position them for productive research experiences. Graduate students in other programs within or outside the School of Medicine are permitted to enroll.

Prereq: (BIOL 215L and CHEM 113) or Graduate standing. Coreq: CHEM 233 or Graduate standing.

Instructors: (all are members of the Biochemistry Department)

Dr. Focco van den Akker (course co-director)

Dr. Hung-Ying Kao (course co-director)

Dr. Susan Wang

Learning Objectives:

Acquire basic knowledge in protein biochemistry and bacterial molecular biology and experimentation with common equipment in a laboratory environment.

Gain basic knowledge in the use of mass spectrometry (MS), high performance liquid chromatography (HPLC), and automation in a laboratory environment.

Gain basic knowledge in mammalian cell culture and mammalian molecular and cell biology experimentation with necessary equipment in a laboratory environment.

Course details:

This course will be taught during the fall semester. Class will meet Tuesdays and Thursdays, 10:00-11:15 a.m. Class expectations will meet those anticipated for a 3-credit course. A representative schedule is illustrated below.

Schedule for Fall 2018:

Week	Dates	Topics
Week 1	Tue 8/28 Thu 8/30	Overview of modern biotechnology successes Basic experimental facets (basic instruments, buffers/solutions) I
Week 2	Tue 9/4 Thu 9/6	Basic experimental facets (basic instruments, buffers/solutions) II Basic of Mammalian Cell Culture (I): Principle and practice
Week 3	Tue 9/11 Thu 9/13	Basic of Mammalian Cell Culture (II): Principle and practice Molecular cloning: Isolation of genes for studies
Week 4	Tue 9/18 Thu 9/20	Detecting and quantifying nucleic acids: agarose gel electrophoresis, Southern/Northern blotting, PCR, qPCR, and PCR cloning Studying proteins (I): transient transfection, protein preparation, fractionation, SDS-PAGE/Western blotting
Week 5	Tue 9/25 Thu 9/27	Studying proteins (II): immunofluorescence microscopy (<i>Guest lecture by</i> <i>David Navratil, B&B Microscopes/Hunt Optics, and Min Lam, Assistant</i> <i>Professor Dept. of Medicine</i> Studying proteins (III): protein engineering - plasmids and epitope tags and site-directed mutagenesis
Week 6	Tue 10/2 Thu 10/4	Studying protein-protein and protein-chromatin interactions: co- immunoprecipitation, GST pulldown and ChIP assays Studying transcription factors: Reporter assays and qRT-PCR, and drug screening
Week 7	Tue 10/9 Thu 10/11	Knockdown, transgenic, and knockout/knockin technologies Case study: Studying nuclear hormone receptors
Week 8	Tue 10/16 Thu 10/18	In-class literature presentation (for ¹ / ₂ the group) Mid-term exam
Week 9	Tue 10/23 Thu 10/25	FALL BREAK Protein expression in <i>E. coli</i>

Week 10	Tue 10/30 Thu 11/1	Purification of proteins by affinity tags and standard methods Activity assay development
Week 11	Tue 11/6	Standard Operating Procedures (SOP), Quality Control, and record keeping in academia and industry (<i>Guest Lecture by Cathy Schenk, Sr. Director</i>
	Thu 11/8	Example of activity assay: β -lactamase (Guest Lecture by Dr. Krisztina Papp-Wallace)
Week 12	Tue 11/13	Protein quantification and purity analysis
	Thu 11/15	Fundamental aspects of mass spectrometry (Guest Lecture by Dr. Susan Wang)
Week 13	Tue 11/20	Examples of analysis of mass spectrometry (Guest Lecture by Dr. Susan Wang)
	Thu 11/22	THANKSGIVING HOLIDAY
Week 14	Tue 11/27 Thu 11/29	Biophysical characterization of protein-ligand interactions Statistical analysis of data
Week 15	Tue 12/4 Thu 12/6	How to prepare research reports? In-class literature presentation: for other ½ of the group
Exam	TBD Dec 11- 19	Final exam

Resources:

Textbook: Basic Laboratory Methods for Biotechnology (Seidman & Moore) and additional materials. Lecture notes and assignments will be posted on Canvas.

Grading policy:

Grades A-F will be given to students based on the following weights:

Exam (60%): There are two in-class exams: mid-term (30%) and final (30%). The mid-term exam will be on 10/18 (Thursday). The final exam will be held during the final exam period, Dec. 11-19.

Problem sets (20%): Two problem sets will be given on 10/9 and 11/29 and are due at midnight on 10/16 and 12/6, respectively. We expect that the answers to problem sets are written concisely and clearly.

Presentation (10%): Each student will give a 10-15 min. oral presentation based on published articles.

Attendance (10%): Attendance and participation is crucial to succeed in this class and to fulfill the objectives of this course. A student may miss up to 4 sessions, with each absence resulting in a deduction of 3% of the student's overall grade. In case of emergency and/or extenuating circumstances, please contact the instructor.

Academic Integrity Policy:

Academic integrity is the cornerstone of higher education. As such, all members of the university community share responsibility for maintaining and promoting the principles of integrity in all activities, including academic integrity and honest scholarship. Academic dishonesty includes cheating, plagiarism (submission of another's work as your own), and/or misrepresentation. Any answers you submit for evaluation must be your own. If you quote statements, sentences or information from books, literature or website, you need to accurately cite the sources. If you have any questions about what is and is not allowed in this course, you should ask the course director before proceeding. Academic integrity will be strongly enforced in this course. If a violation occurs, and the violation is the student's first violation, the student will receive a zero for the assignment. A second violation will result in failure of the course without the option to withdraw with the possibility of expulsion from the university. For more details, visit http://students.case.edu/community/conduct/aiboard/violations.html.

Important dates:

10/16 (Tuesday)	1 st problem set due
10/16 (Tuesday)	1 st presentation
10/18 (Thursday)	Mid-term exam
12/6 (Thursday)	2 nd problem set due
12/6 (Thursday)	2 nd Presentation
	Final exam

Course Description for BIOC 502

This spring course provides hands-on laboratory experience in the areas of bacterial recombinant protein biochemistry, mammalian cell culture, molecular and cell biology, and mass spectrometry.

Specific topics include: General laboratory safety, good laboratory practices (GLP), standard operating procedures (SOPs), buffers, media, and other reagent preparation, sterile technique, manipulation of bacterial and mammalian cells, mammalian cell culture, work with DNA and RNA, polymerase chain reaction (PCR) techniques including quantitative reverse transcription (RT-qPCR) and molecular cloning, protein overexpression and purification, assays (enzyme, stability, and reporter), high-throughput techniques, transfection, immunoprecipitation, immunofluorescence, DNA and protein gel electrophoresis, high performance liquid chromatography (HPLC), and mass spectrometry.

Prerequisites: BIOC 500 and BIOC 501. Suitable for biochemistry MS students interested in biotechnological and/or industry careers. All other graduate students and/or undergraduate students must contact the instructor for permission to enroll.

Instructors: Dr. Susan Wang will direct the course. A laboratory assistant will be available during all class periods for technical assistance. Dr. Focco van den Akker (prokaryotic module) and Dr. Hung-Ying Kao (eukaryotic module) will be available for consultation and/or experimental assistance.

Learning Objectives:

Acquire familiarity with and good laboratory practices (GLP), including use of standard operating procedures (SOPs).

Gain experience in protein biochemistry and bacterial molecular biology experimentation, including the necessary equipment in a laboratory environment.

Gain experience in mammalian cell culture and mammalian molecular and cell biology experimentation including the necessary equipment in a laboratory environment.

Gain experience in the use of mass spectrometry (MS), high performance liquid chromatography (HPLC), and automation in a laboratory environment.

Collaborate with peer scientists in a laboratory environment.

Prepare laboratory reports with an emphasis on procedures relevant to an industrial setting.

Course Details:

This course will be taught during the spring semester. Class expectations will meet those anticipated for a 5-credit course. Class will meet for \sim 3 hours per day, Monday-Friday so students may perform handson, project-based laboratory experiments. To match standard university time blocks, meetings MWF are from 2:15-5:05 PM, and meetings TR are from 1-3:45 PM. Thus the time spent in lab will be \sim 12.5 hours/week. Additional time outside of class is expected to be used by students for data analysis, laboratory report write-ups, and preparation for practical and written exams.

The course is made up of 3 modules: a prokaryotic module (M1), a eukaryotic module (M2), and a mass spectrometry (MS) module (M3). Within each module, groups of 2 students will rotate among weekly lab stations. A representative schedule is illustrated below. Weeks 1, 14, and 15 are fixed for all students

Sch	edule:	
SUI	cuuic.	

Week	Dates	Topics
Week 1	1/15-1/18	Laboratory safety and general laboratory familiarization
	М	No class (Martin Luther King, Jr., Day holiday)
	Т	Introduction and lab tour; general laboratory safety training
	W	Biosafety training, autoclaving, sterile technique
	R	Calculations for buffers, solutions, and media
	F	Buffers, solutions, and media; autoclaving
Module		Prokaryotic Techniques
1 (M1)		
Week		Nucleic acids and bacterial cell manipulation
M1.1		
	M	DNA quantification and polymerase chain reaction (PCR)
		I ransformation and overnight cultures
	W	Plasmid preparation, sequencing, and restriction digestion
	K E	DNA gel electrophoresis
	Г	Data analysis
Week M1.2		Recombinant protein expression in bacteria
	М	Sequence analysis; media preparation
	Т	Transformation
	W	Culturing and overexpression
	R	Culturing and overexpression
	F	Spin down and collect cells
Week M1.3		Protein purification
	Μ	Solution preparation
	Т	Protein purification
	W	Size exclusion chromatography

	R	Size exclusion chromatography
	F	Protein gel electrophoresis and quantitation
Week		Enzyme and stability assays
M1.4		
	Μ	Ultraviolet-visible (UV-vis) spectrophotometry assays
	Т	UV-vis spectrophotometry assays
	W	Thermal shift assays
	R	Thermal shift assays
	F	Data analysis; Laboratory report for weeks M1.1-M1.3 due
Week		Enzyme assays
M1.5		
	М	96-well plate assay preparation
	Т	96-well plate assay
	W	Data analysis
	R	Data analysis
	F	Data analysis and clean-up: Inspection of laboratory notebooks
		5 I, I
Module		Eukarvotic Techniques
2 (M2)		J I
Week		Maintenance of mammalian cells
M2.1		
	Μ	Making growth medium & thawing cells
	Т	Making growth medium
	W	Splitting cells
	R	Making cell stocks
	F	Splitting cells; Laboratory report for weeks M1.4-M1.5 due
Week		Transient transfection, immunoprecipitation, Western blotting
M2.2		
	Μ	Splitting cells, transient transfection
	Т	Harvest cells & Immunoprecipitation
	W	Splitting cells, SDS-PAGE
	R	Western blotting
	F	Splitting cells
Week		Transient transfection, immunostaining, immunofluorescence
M2.3		microscopy
	М	
	Т	Split and seed cells
	W	Transient transfection
	R	Split cells, Immunostaining
	F	Imaging
		Split cells

Week M2.4		Transient reporter assays
	М	Split cells, transient transfection
	Т	Change media & add ligands
	W	Split and harvest cells & reporter assay
	R	Data analysis
	F	Split cells; Laboratory report for weeks M2.1-M2.3 due
Week M2.5		Isolation of total RNA & RT-qPCR
	М	Treat cells with ligands
	Т	Extract RNA from mammalian cells
	W	Reverse transcription (RT) of RNA to generate cDNA
	R	Quantitative real-time PCR (qPCR)
	F	Data analysis and clean-up; Inspection of laboratory notebooks
Module 3 (M3)		Mass spectrometry (MS)
Week M3.1		MS basics and familiarization
	М	Familiarization with mass spectrometry software
	Т	Familiarization with high performance liquid chromatography (HPLC) software
	W	Tuning, standards, and optimization of direct infusion
	R	HPLC setup and operation: tuning, standards, and optimization
	F	HPLC operation; Laboratory report for weeks M2.4-M2.5 due
Week M3.2		MS assays
	М	Assays and HPLC/MS sample prep
	Т	HPLC/MS runs
	W	HPLC/MS runs
	R	Data analysis
	F	Data analysis and clean-up
Week 14	4/22-4/26	Wrap-up: Laboratory practical exam week
	Μ	Review
	Т	No class; finish laboratory notebooks and laboratory reports

- W Laboratory practical exam, part 1
- R Laboratory practical exam, part 2
- F Laboratory report for Weeks M3.1-M3.2 due

Week 15	4/29-5/3	Last Day of Classes and Finals Week
	М	End-of-class clean-up and check-out; laboratory notebooks due
	R	exam scheduling for Spring 2019 semester)

Resources:

Recommended text: Basic Laboratory Methods for Biotechnology (Seidman and Moore). Required materials including laboratory protocols and standard operating procedures (SOPs) will be posted on Canvas.

Tests:

There will be 2 exams: a lab practical exam and a written exam. The lab practical exam will be administered during the last week of classes in the laboratory space. The written exam will be administered during finals week.

Written assignments:

All assignments and exams must be the student's own, individual work and submission. Though collaboration in the lab environment is encouraged and even required, students must submit their own data and analyses for grading. Exceptions are permitted only in case of approved absence (in which a student may obtain data from her/his partner) and/or if the experiment only permits collection of a single shared data set. More detailed instructions and examples will be provided during the first week of class.

A major component for this course is maintenance of a laboratory notebook in approximate accordance with GLP. We are aware that biotech companies handle this aspect of recordkeeping in different ways, but we wish to make students aware of the importance of recordkeeping in an industrial setting. Each page of a student's laboratory notebook must be initialed by her/his lab partner at the end of each class period. Notebooks will be checked and graded three times during the semester.

Another major component of this course is experience in concise and clear written communication. This will be assessed via written laboratory reports. These reports will summarize and interpret results and data. Five reports will be submitted for grading: two reports each for the prokaryotic and eukaryotic modules, and one report for the mass spectrometry module.

Class attendance and participation:

Regular attendance and participation are required to succeed in this laboratory class and to fulfill the course objectives. A student may miss up to 4 days, with each absence resulting in a deduction of 3% of the student's overall grade, and still earn a passing grade. In addition, each absence will result in a loss of points from the laboratory notebook grade. If circumstances permit, students may be required to perform missed experiments and collect data during downtime on other class days/modules. A 5th unexcused absence during the semester will result in automatic failure of the course with a grade of F. At this time, make-up laboratory sessions are not permitted. In case of emergency and/or extenuating circumstances, please contact the instructor.

Grading:

Students will be graded using standard letter grades (A-F). Grades will be assigned based on the following weights:

Laboratory notebook	30%
Laboratory reports	30%
Laboratory practical exam	30%
Written final exam	10%

Students with Disabilities:

During the semester, the instructors are prepared to meet individually, by appointment, with any and all students enrolled in this course. The course director would like especially to meet with students with disabilities who are registered with the Coordinator of Disability Services (216-368-5230) and who may need individual arrangements.

Academic Integrity Policy:

Academic integrity is the cornerstone of higher education. As such, all members of the university community share responsibility for maintaining and promoting the principles of integrity in all activities, including academic integrity and honest scholarship. Academic dishonesty includes cheating, plagiarism (submission of another's work as your own), and/or misrepresentation. If you have any questions about what is and is not allowed in this course, you should ask the course director before proceeding. Academic integrity will be strongly enforced in this course. If a violation occurs, and the violation is the student's first violation, the student will receive a zero for the assignment. A second violation will result in failure of the course without the option to withdraw with the possibility of expulsion from the university. For more details, visit http://students.case.edu/community/conduct/aiboard/violations.html.

BIOC 511

Practice and Professionalism in Biotechnology CWRU Biochemistry Department

Course Description

This fall course provides an overview of a variety of topics that are relevant to biotechnology research and development in academic and industrial settings. It also provides an opportunity for students to develop professional written and oral communication skills.

Specific topics include: Professional communications by email, letters, reports, and oral presentations; data documentation, security, and confidentiality; laboratory safety, certification, and regulation; intellectual property protection and patents; the drug discovery pipeline and approval process; financial aspects of research and development.

Prerequisites: Biochemistry graduate student standing. All other graduate students and/or undergraduate students need the instructor's permission.

Instructor:

Dr. Vivien Yee will direct and teach the course, with guest lectures provided by experts when available.

Learning Objectives:

To develop skills to communicate professionally and effectively both in writing and in oral presentations

To be aware of safety and regulatory processes for research, clinical trials, and manufacturing

To understand expected procedures for the handling and security of data and materials

To be aware of financial aspects of research and development in academia and industry

To understand confidentiality, intellectual property, and the patent process.

Course Details:

This course will be taught during the fall semester. Class expectations will meet those for a 1-credit course. The class will meet for 1 hour on Tuesdays (11:30 AM - 12:20 PM). Students are expected to spend time outside class reading supporting materials and preparing both written and oral presentation assignments. A representative schedule for Fall 2018 is on the next page.

Week	Date	Торіс
1	8/28	Introduction and overview
2	9/4	Professional communications
3	9/11	Clinical study reports, SWOT analyses, and oral presentations
4	9/18	Documentation, data security, confidentiality, quality control, transfer of materials
5	9/25	Lab safety and regulation
6	10/2	Good Lab Practice; Clinical Laboratory Improvement Amendments; Chemistry, Manufacturing and Controls; Good Manufacturing Practice
7	10/9	Financing research and development in nonprofits
8	10/16	Financing research and development in industry
9	10/23	Intellectual property, patents
10	10/30	Drug discovery pipeline, Contract Research Organizations
11	11/6	(Pre) Clinical trials, FDA (written assignments are due)
12	11/13	Peer review of written assignments
13	11/20	Student oral presentations
14	11/27	Student oral presentations
15	12/4	Student oral presentations

Preliminary schedule (the order of topics may change during the semester):

Resources:

Students will be expected to read <u>one</u> of the following recommended texts as the basis for their major writing assignment and oral presentation:

- a) "The Billion Dollar Molecule" by Barry Werth (Simon & Schuster, 1995)
- b) "The Antidote: Inside the World of New Pharma" by Barry Werth (Simon & Schuster, 2014)
- c) "Genentech: The Beginnings of Biotech" by Sally Smith Hughes (University of Chicago Press, 2011)
- d) "New Drugs: An Insider's Guide to the FDA's New Drug Approval Process for Scientists, Investors, and Patients" by Lawrence Friedhoff (University of Chicago Press, 2013)
- e) "Her-2: The Making of Herceptin, a Revolutionary Treatment for Breast Cancer" by Robert Bazell (Random House, 1998)

Students may read a different book describing a case study of a biotechnology development with the approval by the course director.

Tests:

There will be no exams.

Written assignments:

There will be one major written assignment. This assignment must be the student's own individual work and submission. Although discussion is encouraged, students must submit an assignment that they wrote independently for grading. The written assignment will describe the development of a biotechnology invention or product, covering multiple aspects discussed in this course. More detailed instructions and examples will be provided during the first two weeks of class. In addition, there will be smaller written assignments as part of in-classroom work and homework, that will contribute to the participation grade.

Oral presentation:

There will be one oral presentation. This presentation must be the student's own individual work, and will provide a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis of the case study documented in the student's written assignment.

Class attendance and participation:

Regular attendance and participation are required to succeed in this class and to fulfill the course objectives. To earn a passing grade, each class session missed due to absence must be made up with a writing assignment covering the topic(s) discussed in the missed class session. In case of emergency and/or extenuating circumstances, please contact the instructor. Part of the participation grade will be from small written assignments completed in class or as part of homework.

Grading:

Students will be graded using standard letter grades (A-F). Grades will be assigned based on the following weights:

Attendance and participation	25%
Major written assignment	50%
Oral presentation	25%

Students with Disabilities:

Students with disabilities who are registered with the Coordinator of Disability Services (216-368-5230) and who may need individual arrangements should arrange by appointment to meet with the course director during the first two weeks of the course to discuss accommodations.

Academic Integrity Policy:

Academic integrity is the cornerstone of higher education. As such, all members of the university community share responsibility for maintaining and promoting the principles of integrity in all activities, including academic integrity and honest scholarship. Academic dishonesty includes cheating, plagiarism (submission of another's work as your own), and/or misrepresentation. If you have any questions about what is and is not allowed in this course, you should ask the course director before proceeding. Academic integrity will be strongly enforced in this course. If a violation occurs in this course and the violation is the student's first violation at CWRU, the student will receive a zero for the assignment and the violation will be reported to the student's academic program director and the School of Undergraduate or Graduate Studies (as appropriate). If a violation occurs in this course without the option to withdraw and the violation will be reported to the student's academic program director, the School of Undergraduate or Graduate Studies (as appropriate), and the appropriate academic integrity board. For more details, visit http://students.case.edu/community/conduct/aiboard/violations.html.



Department of Biochemistry

10900 Euclid Avenue Cleveland, Ohio 44106-4935

Visitors and Deliveries 2109 Adelbert Road, Wood W433

> Phone 216.368.5572 Fax 216.368.3419

http://www.case.edu/med/biochemistry

October 11, 2018

Dear Dean Deming,

I am writing to submit the revised version of our proposal for an **Experimental Biotechnology Track** in the Biochemistry MS (Plan B) program. I have submitted two versions of the document: one that shows the changes and one that does not.

The revisions in this version were made in response to the thoughtful comments of the review committee. Our responses to these comments are detailed below.

1) include support from Dean for startup

Dean Davis has written a supporting letter that is included in the revised proposal.

2) address space concerns

Our lab courses (BIOC 500 and 502) are being taught in space in the Biochemistry Department. Because most of the lab space in the department has an open floor plan, it will be easy to adjust the size of the teaching lab in the future to meet the demands of this course. This issue is discussed in the revised proposal in a new paragraph at the bottom of p. 1.

3) discuss any overlap with other courses

Our new courses have some overlap with other courses. This is discussed on p. 2 of the revised proposal. We believe that this overlap is minimal and that the new courses do not represent duplicated effort.

4) include submitted (can be in process, but should be complete) course action forms

The new courses (BIOC 500, 501, 502, and 511) have all been approved and are listed in the University Bulletin and all are being offered in the 2018-19 academic year. Instead of CAFs, we are providing descriptions and detailed syllabi for the new courses in Appendices 1 and 2.

5) discuss lab fees

Provost Vinson has put a hold on new lab fees while a university-wide policy is formulated. We have contemplated adding a lab fee for BIOC 500 and 502, and will make a decision are the Provost's review is completed. This is discussed on p. 4 of the revised proposal.

6) identify student enrollment limitation

The new laboratory courses (500 and 502) are being taught with enrollment limits of 12-16 in 2018-19. These limits were chosen to keep the number of students manageable as we work through the first offerings of these courses. We will increase the limits to 20 in subsequent years. Our MS program has matriculated an average of 7.5 students per year in recent years. We expect that Experimental Biotechnology track will increase visibility of our MS program and allow us to recruit more students. Nevertheless, we will be able to accommodate a sizeable increase in enrollment. This issue is discussed at the bottom of page 1 of the revised proposal.

7) elaborate on the financial impact on the department

A financial analysis is now included on p. 4 of the revised document. This analysis shows that the track will produce net income to the department with the addition of 5 additional students per year. Based on our recruiting effort in 2018 and the response of our current first-year MS students, we expect that the track will allow us to increase our class size.

8) include information on the listening tours conducted at local biotech companies, and the high level of interest for this lab course.

A description of the "listening tour" is included in the second paragraph of the revised document.

Again, we thank the committee for helpful comments and hope that the revised proposal is now acceptable.

Sincerely,

Marta Denis

Martin D. Snider, Ph.D., Associate Professor Vice Chair for Education, Department of Biochemistry





October 16, 2018

Dear Colleagues:

We are pleased to inform you that Case Western Reserve University School of Medicine and University Hospitals have agreed to take steps together to further support biomedical research conducted by scientists connected to both institutions.

Our organizations recently agreed to jointly support the salary and employment of PhD research investigators employed by CWRU and who also work in a clinical department at UH. Additionally, CWRU and UH will also share support for the salary and employment of physician-scientists employed by both entities.

We will also establish a framework to jointly coordinate recruitment efforts for research faculty (scientists and physician-scientists) in the School of Medicine's academic clinical departments based at UH Cleveland Medical Center.

Additionally, the current advisory council, comprising faculty from the two institutions, will act as a forum for exploring and developing mutual opportunities, including research activities, and then make recommendations to CWRU and UH leadership.

These modifications to the School of Medicine and UH revised affiliation agreement are retroactive to July 1, 2018.

This amendment strengthens the affiliation between our two institutions and the commitment we share to support our outstanding faculty who work to advance the science of health and improve the lives of our patients and community. We also anticipate that, as a result of this recent agreement, additional collaborations and partnerships will advance future research efforts and solidify our longstanding and valued relationship.

Sincerely,

Pamela B. Davis, MD, PhD Dean, School of Medicine Senior Vice President for Medical Affairs Case Western Reserve University Daniel Simon, MD President, UH Medical Centers Chief Academic Officer University Hospitals