

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
Tracey Bonfield
Robert Bonomo
David Buchner
Cathleen Carlin
Sudha Chakrapani
Shu Chen
Gary Clark

Judith French
Monica Gerrek
Sherine Ghafoori
Beata Jastrzebska
Hung-Ying Kao
Stathis Karathanasis
David Katz
Varun Kshetry

Vincent Monnier
Nimitt Patel
P. Ramakrishnan
Ben Roitberg
Satya Sahoo
Scott Simpson
Phoebe Stewart
Charles Sturgis

Members Present
(continued)

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
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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.

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

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 be 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, 13 were 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



SCHOOL OF MEDICINE

CASE WESTERN RESERVE
UNIVERSITY

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.



SCHOOL OF MEDICINE

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



SCHOOL OF MEDICINE

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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)



SCHOOL OF MEDICINE

CASE WESTERN RESERVE
UNIVERSITY

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 Lerner College of Medicine

of

Case Western Reserve University



Every life deserves world class care.

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



SCHOOL OF MEDICINE

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

Communication from Darin Croft: In reflecting more on what happened yesterday in Faculty Council, I am of the opinion that the motion to table Article 3 was out 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 [in this table](#), 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.

Communication from the Steering Committee: 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.



SCHOOL OF MEDICINE

CASE WESTERN RESERVE
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Review of Robert's Rule of Order (Nicole Deming)



SCHOOL OF MEDICINE

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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

Listing of Individual Incidental Motions (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;

Timeliness Requirement for a Point of Order

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. Members have no right to criticize a ruling of the chair unless they appeal from [her] decision.
- An appeal...Is in order when another has the floor, but the appeal must be made at the time of the ruling. If any debate or business has intervened, it is too late to appeal.

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

To:	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 temp., etc.	"Point of privilege"	Yes	No	No	No	Chair Decides
Suspend further consideration of something	"I move that we table it"	No	Yes	No	No	Majority
End debate	"I move the previous question"	No	Yes	No	No	2/3
Postpone consideration of something	"I move we postpone this matter until..."	No	Yes	Yes	Yes	Majority
Amend a motion	"I move that this motion be amended by..."	No	Yes	Yes	Yes	Majority
Introduce business (a primary motion)	"I move that..."	No	Yes	Yes	Yes	Majority

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 below, but you may introduce another that is listed above it.

To:	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."

Rule Classification and Requirements

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

Amendments Discussion from the Bylaws Committee (Darin Croft)



SCHOOL OF MEDICINE

CASE WESTERN RESERVE
UNIVERSITY

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	Topic	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 (I)	3.2b	"	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 (I)	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 (I)	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
David Buchner
Cathleen Carlin
Sudha Chakrapani
Shu Chen
Gary Clark
Brian D'Anza
Piet de Boer
Philipp Dines
Jennifer Dorth
William Dupps
Monica Gerrek

Sherine Ghafoori
Beata Jastrzebska
Hung-Ying Kao
Stathis Karathanasis
Laura Kreiner
Varun Kshetry
Cynthia Kubu
Suet Kam Lam
Maria Cecilia Lansang
Charles Malemud
Danny Manor
Jenifer McBride

Vincent Monnier
Vicki Noble
Hilary Petersen
P. Ramakrishnan
Ben Roitberg
Satya Sahoo
Scott Simpson
Jochen Son-Hing
Phoebe Stewart
Charles Sturgis
Daniel Sweeney
Carlos Trombetta

Members Absent

Corinne Bazella	Zachary Grimmett	Patricia Thomas
Robert Bonomo	Clifford Packer	Melissa Times
Travis Cleland	Nimitt Patel	Anna Valujskikh
Pamela Davis	Aparna Roy	Michael Wolfe
Judith French	Barbara Snyder	Richard Zigmond
Mahmoud Ghannoum	James Howard Swain	

Others Present

Nicole Deming	Joyce Helton
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Chair Announcements

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

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.

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

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 be 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



Cleveland Clinic Lerner College of Medicine
of
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.



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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.

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.

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:

2015 High School	2015 Undergrad	2015 Graduate	2015 Postdoc/Other
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	1 Predoctoral 23 Postdoctoral 6 Research scholars 8 Visiting scientists

		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 6 BME labs; 5 BME labs hosted 4 HS students for “Engineer for a Day”;	60 total (30 year-round) NSF- REU: 8 labs hosted students for 10 wks	35 total CCLCM: several students in BME 11 students in Joint BME/CSU “Applied 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	1 Predoctoral 23 Postdoctoral 6 Research scholars 8 Visiting scientists
2017 High School	2017 Undergrad	2017 Graduate	2017 Postdoc/Other
5 HS students, 4 in “Engineer for a Day” program in 5 BME labs	64 total (30 year-round)	35 total CCLCM: several students	23 Postdoctoral Several international visitors for short-term

		12 students in Joint BME/CSU “Applied 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	research experience or collaborations
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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.



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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,

A handwritten signature in black ink, appearing to read "Gene H. Barnett".

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



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 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.

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
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FAX: 216-444-9404
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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,

A handwritten signature in black ink, appearing to read "Jonathan D. Smith". The signature is fluid and cursive, with a large initial "J" and a long, sweeping underline.

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			
Apte	Suneel	M.B.B.S., D.Phil	Associate Professor	Biomedical Engineering	
Chaudhuri	Pinaki	PhD			
Damaser	Margot	Ph.D.	Professor	Biomedical Engineering	
Das	Dola	Ph.D.	Adjunct Assistant Professor	Biomedical Engineering	
Derwin	Kathleen	M.D.	Assistant Professor	Biomedical Engineering	
Erdemir	Ahmet	Ph.D.	Assistant Professor	Biomedical Engineering	
Fedewa	Russell	Ph.D.	Adjunct Assistant Professor	Biomedical Engineering	
Fleischman	Aaron	Ph.D.	Assistant Professor	Biomedical Engineering	
Fukamachi	Kiyotaka	M.D, Ph.D.	Professor	Biomedical Engineering	
Ghosh	Chaitali	Ph.D.	Assistant Professor	Biomedical Engineering	
Graham	Linda	M.D.	Professor	Biomedical Engineering	
Hascall	Vincent	Ph.D.	Professor	Biomedical Engineering	
Hubert	Christopher	PhD			
Jun	Bong-Jae	Ph.D.	Assistant Professor	Biomedical Engineering	
Karimov	Jamshid	MD, PhD	Adjunct Assistant Professor	Biomedical Engineering	
Krishna	Vijay	Ph.D.	Assistant Professor	Biomedical Engineering	
Labhasetwar	Vinod	Ph.D.	Professor	Biomedical Engineering	
Li	Xiaojuan	PhD			applying for full professor
Li	Zong-Ming	Ph.D.	Professor	Biomedical Engineering	
Linder	Susan		Adjunct Assistant Professor	Biomedical Engineering	
Ma	Jinjin	PhD			
Mack	Judith	Ph.D.	Instructor	Biomedical Engineering	
Mantripragada	Venkata	PhD			
Marasco	Paul	PhD	Adjunct Assistant Professor	Biomedical Engineering	
Maytin	Edward	MD, PhD	Assistant Professor	Biomedical Engineering	applying for assoc. prof.
Mead	Timothy	PhD			
Midura	Ronald	Ph.D.	Associate Professor	Biomedical Engineering	
Nakamura	Kunio	Ph.D.	Assistant Professor	Biomedical Engineering	
Nandadasa	Sumeda	PhD	Instructor	Biomedical Engineering	
Owings	Tammy	DEng	Adjunct Assistant Professor	Biomedical Engineering	
Plow	Ela	Ph.D.	Assistant Professor	Biomedical Engineering	
Ramamurthi	Anand	Ph.D.	Associate Professor	Biomedical Engineering	
Sahoo	Sambit	M.B.B.S., Ph.D.	Instructor	Biomedical Engineering	
Saraswathy	Manju	PhD	Adjunct Assistant Professor	Biomedical Engineering	
Vijayaraghavalu	Sivakumar	PhD	Adjunct Assistant Professor	Biomedical Engineering	
Vince	D. Geoffrey	Ph.D.	Professor & Clinical Chair	Biomedical Engineering	
Wang	Aimin	Ph.D.	Instructor	Biomedical Engineering	
Yang	Jun	MD	Clinical Assistant Professor	Biomedical Engineering	
Yang	Mingrui	PhD			
Zborowski	Maceij	Ph.D.	Associate Professor	Biomedical Engineering	

D. Geoffrey Vince, Ph.D.

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Date of birth:

[REDACTED]

Citizenship:

[REDACTED]

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.

Co-Director, BME Alliance, a joint initiative of the
Departments of Biomedical Engineering of Cleveland Clinic
and Case Western Reserve University, Cleveland, Ohio

2011 – pres.

Chairman, 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

Associate Professor/Staff, Dept. of Biomedical Engineering,
Cleveland Clinic, Cleveland, Ohio; joint appointee (2003-5),
Dept. of Cardiovascular Medicine, Division of Medicine,
Cleveland Clinic, Cleveland, Ohio

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	<u>Senior Research Associate</u> , 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 Service

National Institutes of Health

2012 – 8/2015	NIH: NIH Centers for Accelerated Innovations (NCAI) (Cleveland Clinic site: http://www.ncai-cc.ccf.org/) 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/>):
2012 – pres. Member, Cleveland Clinic

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 Center--Cooperative Agreements) –
U54HL119810-01 – \$10.2M – *The Cleveland Clinic
Innovation Accelerator* – Principal Investigator: D. Geoffrey
Vince, PhD.
One of 3 NIH Centers for Accelerated Innovations (NCAs)

nationwide; part of the National Institutes of Health's initiative to improve how basic science advances and discoveries are translated into commercially viable products. NCAs, 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 – *Center for Transformative Nanomedicine* – Co-Principal Investigator: D. Geoffrey Vince, PhD. (with Prof. Simon Benita – HUJI) 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	AMRESKO Inc Industrial Contract: <i>Comparative Immunohistologic Evaluation of Human Tissue Antigens Processed in Histochoice and Neutral Buffered Formalin</i> – \$16,455 – Vince & Tbakhi, co-PIs
1997 – 1999	AHA/Ohio Affiliate Grant-in-Aid: <i>Determination of Coronary Plaque Morphology and Composition using Intravascular Ultrasound</i> – \$61,860 – Principal Investigator
1998 – 2000	Guidant Corporation Industrial Contract: <i>Evaluation of 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 Mechanics</i> – \$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 Intravascular Imaging</i> . – \$3,100,000 – Principal Investigator
2003 – 2004	Volcano Therapeutics, Inc.: <i>Development of IVUSLab Intravascular Ultrasound Analysis Software</i> – \$37, 500 – Principal Investigator
2003 – 2005	Pfizer Inc.: <i>Efficacy Study of Non -Invasive Ultrasound Atherosclerotic Plaque Identification Technique</i> – \$100,000 – Principal Investigator
2006 – 2007	NIH R43 HL084775-01: <i>Micromachined Intravascular 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 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 – <i>ARFI [Acoustic Radiation Force Impulse] and B-Mode Ultrasound Imaging for Transverse Carpal Ligament Pathomechanics</i> – PI: Z.M. Li, PhD; Co-Investigator, D.G. Vince, PhD

Awards:

AHA Ohio Affiliate - Harriet B. Lawrence Award – 1994
 Young Investigator Finalist: XIth 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, Vince DG, Margolis MP, Waters KR.
 Issued June 16, 2015.

8,808,183: **System and method for determining a transfer function.**

Nair A, Vince DG, Klingensmith JD, Kuban, BD.
 Issued August 19, 2014.

8,630,492: **System and method for identifying a vascular border.**

Klingensmith JD, Vince DG, Nair A, Kuban BD.
 Issued January 14, 2014.

8,622,910: **System and Method of Acquiring Blood-Vessel Data.**

Kuban BD, Klingensmith JD, Vince DG, Nair A.

Issued January 7, 2014.

8,449,465: **System and Method for Characterizing Vascular Tissue.**

Nair A, Kuban BD, Vince DG, Klingensmith JD.

Issued May 28, 2013.

7,215,802: **System and Method for Vascular Border Detection.**

Klingensmith JD, Nair A, Kuban BD, Vince DG.

Issued May 8, 2007.

7,175,597: **Non-Invasive Tissue Characterization System and Method.**

Vince DG, Nair A, Klingensmith JD.

Issued February 13, 2007.

7,074,188: **System and Method of Characterizing Vascular Tissue.**

Nair A, Vince DG, Klingensmith JD, Kuban BD.

Issued July 11, 2006.

6,381,350: **Intravascular Ultrasonic Analysis Using Active Contour Method and System.**

Klingensmith JD, Vince DG, Shekhar R.

Issued April 30, 2002.

6,200,268: **Vascular Plaque Characterization.**

Vince DG, 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.
16. *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 Three-dimensional 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** . Three-dimensional 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 Three-dimensional 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.
 23. 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-metalloproteinase 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 ($\alpha_v\beta_3$), 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
38. 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
39. *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
40. 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
49. 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

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

Mentorship:

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

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
Alberts	The Effects of Dual Task Training on Motor and Non-Motor Function in Individuals with Parkinson's Disease	\$99,035.00	8/1/2015	7/31/2017	Davis Phinney
Alberts	Determining Loss of Consciousness in Fighters and Development of Associated Injury Assessment Reference	\$687,111.00	8/1/2015	7/31/2017	DOD
Alberts	MR141261: The Quantification of Visual Function and Postural Stability under Single and Dual-Task Conditions using Mobile Technology	\$1,499,987.00	2/15/2016	2/14/2019	DOD
Alberts	Human Head Impact Dose Concussion Risk Functions and Sensor-Based Military-Specific Environmental Monitoring	\$2,443,020.00	1/1/2017	12/31/2019	DOD
Apte	Fibrillin microfibril regulation by ADAMTSL3	\$100,000.00	1/1/2017	12/31/2018	Marfans Foundation
Apte	Forward and reverse degradomics of cardiovascular extracellular matrix	\$1,500,000.00	10/1/2017	9/30/2020	AHA
Colbrunn	Sim Vitro	\$49,994.00	3/23/2015	4/30/2016	Ohio Development Services Agency
Damaser	Stem Cell Therapy Combined with Growth Factors for Stress Urinary Incontinence	\$22,368.00	9/18/2014	8/31/2015	NIH Subcontract
Damaser	The Urocapsule	\$50,000.00	8/3/2015	8/3/2016	Ohio Development Services Agency
Damaser	Case Urology Translational Research Training Program	\$119,677.00	7/1/2015	6/30/2017	NIH Subcontract
Damaser	Conscious ambulatory bladder monitoring to understand neural control of lower urinary tract infection	\$561,225.00	2/1/2017	11/30/2018	NIH
Damaser	Pharmaceutical Intervention for Stress Urinary Incontinence	\$109,899.00	8/10/2017	9/3/2018	Novartis
Damaser	Conscious ambulatory bladder monitoring to understand neural control of lower urinary tract infection	\$1,013,747.00	2/1/2018	11/30/2018	NIH
Derwin	Failure with continuity and its Relation to Rotator Cuff Repair Clinical Outcomes	\$3,133,048.00	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
erdemir	Automated patient specific artery modeling using ultrasound virtual histology	\$594,378.00	4/1/2016	12/31/2018	NIH Subcontract
erdemir	Reproducibility in simulation-based prediction of natural knee mechanics	\$722,382.00	9/21/2017	6/30/2021	NIH
Fedewa	Ultrasonic Determination of Human Carotid Plaque Composition	\$308,000.00	7/1/2015	6/30/2018	AHA
Fleischman	Telemetric Microsensor for Glaucoma	\$32,380.00	12/1/2015	5/31/2017	NIH Subcontract
Fleischman	NCAI-16-6-APP-CCF-Fleischman Project High Resolution IVUS	\$108,996.00	1/1/2017	7/31/2018	NIH

Fukamachi	Motion-activated system (MAS) to prevent chest tube clogging.	\$135,496.00	3/1/2015	2/29/2016	NIH
Fukamachi	Implantable Ventricular Assist Device Directed to Long Term Right Side Support	\$74,707.00	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
Fukamachi	Evaluation of VentriFlo True Pulse Pump (TPP) in an Acute Pig Model	\$229,441.00	10/1/2015	9/3/2018	Design Mentor
Fukamachi	Advanced Ventricular Assist Device with Pulse Augmentation and Automatic Regurgitation Flow Shutoff	\$430,294.00	7/15/2016	9/30/2019	NIH
Fukamachi	Self-regulating continuous-flow total artificial heart	\$5,426,310.00	7/15/2016	6/30/2020	NIH
Fukamachi	Small Diameter, High Output, Durable Transapical LVAD	\$72,666.00	1/1/2018	11/30/2018	NIH Subcontract
Fukamachi	Development of a Miniaturized, Pediatric Continuous-Flow Total Artificial Heart with a single moving part	\$3,026,814.00	4/1/2018	2/28/2022	NIH
Ghosh	Neurovascular humanized in vitro system to assess drug-induced neurotoxicity	\$40,000.00	8/1/2015	7/31/2016	Alternatives Research & Development Foundation
Ghosh	Cytochrome P450-mediated drug interactions at the human blood-brain barrier	\$1,738,711.00	4/1/2017	12/31/2017	NIH
Ghosh	Drug development for tuberous sclerosis complex and other pediatric epileptogenic	\$18,992.00	7/21/2017	6/30/2022	NIH Subcontract
Graham	HDL blocks TRPC5 activation and preserves endothelial cell migration	\$154,000.00	7/1/2016	6/30/2018	AHA
Graham	Effect of Lipids on Vascular Graft Healing	\$3,006,927.00	12/15/2017	11/30/2021	NIH
Hascall	Hyaluronan (HA) assembly and its Role in Bone Morphogenic Protein-7 Driven Antagonism of Renal Fibrosis	\$57,928.00	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
Janigro	Biorepository Core Lab for the PTSD – TIB Clinical Consortium	\$292,344.00	9/1/2014	8/31/2015	Duke
Karimov	Transcatheter Cardiac Deairing System (TCDS) for Minimally Invasive Cardiac Surgery	\$117,581.00	7/1/2018	12/31/2018	NIH
Krishna	Polyhydroxy Fullerene Sunscreen For Preventing Uv-Induced Skin Cancer	\$442,358.00	9/30/2015	9/29/2017	DOD
Krishna	Engineered Photonic Nanoparticles For In Situ Stimulation Of Cancer Immunotherapy	\$174,542.00	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
labhasetwar	Nanoparticle-based therapy for photoreceptor degeneration	\$1,188,750.00	9/30/2016	8/31/2019	NIH
Li, X	Multi-site multi-vendor cross-validation of cartilage T1RHO and T2 imaging	\$115,640.00	10/1/2017	9/30/158	Arthritis Foundation
Li, X	Longitudinal changes in marrow fat, other fat depots and bone	\$53,153.00	6/1/2017	5/31/2018	NIH Subcontract

Li, X	Biomarkers of Synovial Fluids after Hyaluronic Acid Injection	\$124,626.00	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
Li, Z	Non-obtrusive tissue manipulation device for treatment of carpal tunnel syndrome	\$168,527.00	6/15/2017	5/31/2019	NIH Subcontract
Linder	Heart-Brain Retraining: Forced Aerobic Exercise for Stroke Rehabilitation	\$120,981.00	7/1/2015	6/30/2017	AHA
Marasco	Functional metrics for humans with bi-directionally integrated prosthetic limbs	\$2,530,100.00	7/27/2016	6/30/2019	DOD
Maytin	Molecular Response and Imaging-based Combination Strategies for Optimal PDT	\$600,550.00	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	4/13/2020	DUSA
Maytin	Painless PDT in AK's - DUSA	\$48,773.00	7/1/2015	6/30/2019	DUSA
Maytin	Vitamin D and Photodynamic Therapy for Human Skin Cancer (SCC and BCC)	\$2,337,110.00	12/27/2016	11/30/2021	NIH
Maytin	Painless PDT Ambient Arm	\$39,284.00	10/1/2017	9/30/2020	SUN Pharmaceuticals
Mclennan	BTGI - Ltr of Intent- Study of Occ Radiation Dose/ Y-90 Radioembolic Products	\$20,000.00	10/1/2014	9/30/2017	BTG International
Mclennan	Measurement of Blood flow using digital Subtraction angiography for fistulography	\$5,000.00	5/1/2016	4/30/2017	CSU
Mclennan	InVitro III AT	\$56,540.00	5/1/2016	4/30/2017	Siemens Medical Solutions
Midura	Optimizing PEMF to Reduce Bone Loss Associated with Osteoporosis:	\$684,035.00	3/15/2016	6/15/2016	Orthofix
Midura	PEMF Stimulation of Mechanosensory Nerves Affecting Bone	\$351,737.00	6/2/2016	7/1/2017	Orthofix
Muschler	Adaptive Orthopedic Biologics for Highly Targeted Regeneration	\$752,558.00	3/1/2016	8/19/2019	Geneva Foundation
Muschler	Quality-by-design approach to create synovial cells from pluripotency	\$400,000.00	7/1/2016	6/30/2017	Rheumatology Research Foundatoin
Muschler	Clinical Evaluation of Decellularized Nerve Allograft with Autologous Bone Marrow	\$67,978.00	5/1/2017	6/30/2018	Henry Jackson Foundatoin
Muschler	Clinical Evaluation of Decellularized Nerve allograft with Autologous Bone Marrow	\$250,486.00	5/1/2017	6/30/2018	Henry Jackson Foundatoin
Muschler	Automated Patient-Specific Analysis and Stem Cell Colony Selection for Bone and Cartilage Regeneration	\$250,000.00	12/1/2017	11/30/2019	Lisa Dean Moseley Foundatoin
Muschler	NCAI-17-7-APP-CCF-Muschler: Cell X Device Validation for iPS Clone Selection and Cardiomyocyte Fabrication	\$114,663.00	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 Atrophy from MRIs Acquired for Genzyme's Phase IIIB-IV Long Term follow-up Study for Patients Who Participated in CAMMS03419	\$454,084.00	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

Owings	Advanced Medical Electronics R43	\$20,050.00	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
Plow	Improving Spinal Cord Injury Rehabilitation Interventions by Retraining the Brain with stimulation	\$100,000.00	10/1/2015	9/30/2016	Conquer Paralysis Now
Plow	Novel brain stimulation therapies in stroke guided by expressions of plasticity	\$154,000.00	1/1/2016	12/31/2018	AHA
Plow	Improving Spinal Cord Injury Rehabilitation Interventions by Retraining the Brain with stimulation	\$2,478,681.00	9/30/2018	9/29/2022	DOD
Plow	A Novel Approach for Brain Stimulation in Severe Stroke	\$300,000.00	7/1/2018	6/30/2021	AHA
Ramamurthi	Collaborative Research: Stem cell-inspired nanotherapeutics for regenerative repair of elastic matrix	\$300,000.00	7/1/2015	6/30/2018	NSF
Ramamurthi	Minimally Invasive Regenerative Therapy for Small Abdominal Aortic Aneurysms	\$150,000.00	1/1/2016	12/31/2018	AHA
Ramamurthi	Regenerative nanopharmacotherapy for small abdominal aortic aneurysms	\$396,250.00	9/15/2016	8/31/2017	NIH
Ramamurthi	Exploring commercialization opportunities for a tissue reparative CVD technology	\$50,000.00	6/15/2017	11/30/2018	NSF
Ramamurthi	Multimodal nanotherapy to improve surgical mesh outcomes in organ prolapse	\$240,000.00	9/11/2017	5/31/2019	NIH
Ramamurthi	NCAI-17-7-APP-CCF-Ramamurthi: Developing Antibody-Targeted Nanoparticle-Drug Conjugates as a Non-Surgical Treatment for AAAs	\$118,875.00	8/1/2017	7/31/2018	NIH
Ramamurthi	Matrix Regenerative Nanotherapeutics for Small Abdominal Aortic Aneurysm Repair	\$1,603,542.00	12/15/2017	11/30/2021	NIH
Rosenfeldt	Altering Parkinson's Disease Progression through a Community Based Pedling for Parkinson's Program	\$96,608.00	9/1/2018	8/31/2020	Davis Phinney
Sahoo	Hyaluronan Barrier Coating as a Strategy to Improve Durability of Biologic Hernia	\$435,875.00	9/26/2016	7/31/2018	NIH
Vince	Vascular Plaque Determination for Stroke Risk Assessment	\$1,756,026.00	9/15/2016	9/14/2019	DOD
Vince	NCAI: The Cleveland Clinic Innovation Accelerator-Supplement	\$10,124,944.00	8/1/2015	7/30/2020	NIH
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
West	Validation of IOPS guidewire catheter tracking and software platforms	\$31,570.00	4/15/2016	12/31/2018	Centerline Biomedical
West	IOPS Technology	\$393,750.00	1/1/2017	12/31/2017	Centerline Biomedical
West	3D Image Guidance System to Reduce Fluoroscopic Radiation Dose during Endovascula	\$133,826.00	2/15/2018	8/14/2019	Centerline Biomedical
West	Holographic Visualizatin for Performance of Percutaneous Ablation of Solid Tumors	\$68,488.00	4/1/2018	3/31/2019	Velosano
Zborowski	PEMF vibrational study in bone in-vitro and in-vivo	\$463,456.00	6/21/2016	12/20/2017	Orthofix
Zborowski	Fractionation of aged RBCs based on hemoglobin content	\$449,643.00	1/1/2017	12/31/2020	NIH Subcontract

Zborowski	Simulation of PEMF-induced E field for comparison with AC E field for insulated e	\$39,122.00	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 (I	Misra, Suniti; Hascall, Vincent C.;	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	Liu, Jianmin; Das, Mitali; Yang, Jun	NATURE STRUCTUR	22	5	383-U54	2015
MEDLINE:24951091	Rethinking Stimulation of the Brain in Stroke Rehabil	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; B	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; Petr	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, Wali	JOURNAL OF HEART	34	8	999-1004	2015
MEDLINE:25194451	Assessment of Inter-Hemispheric Imbalance Using In	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
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MEDLINE:26657033 Anti-ADAMTS5 monoclonal antibodies: implications	Apte, Suneel S.	BIOCHEMICAL JOU	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 Fl	Huang, HE; Yang, Jun; Luciano, M;	NEUROCHEMICAL F	41	7	1713-1722	2016
MEDLINE:27496286 Quality of life outcomes following cervical decomp	Xiao, Roy; Xiao, Roy; Miller, Jacob	SPINE JOURNAL	16	11	1358-1366	2016
MEDLINE:26147210 The impact of vaginal delivery on pelvic floor functio	Callewaert, G.; Albersen, M.; Jans;	BJOG-AN INTERNA	123	5	678-681	2016
MEDLINE:27013773 Monitoring and Surveillance of Hemodialysis Access	Koirala, Nischal; Koirala, Nischal; /	SEMINARS IN INTE	33	1	25-30	2016
MEDLINE:27280845 Differential contribution of complement receptor C5	McCullough, Rebecca L.; McMulle	MOLECULAR IMMUN	75	n/a	122-132	2016
MEDLINE:26684685 Median Sternotomy or Right Thoracotomy Techniqu	Karimov, Jamshid H.; Moazami, N;	ARTIFICIAL ORGAN	40	10	1022-1027	2016
MEDLINE:26601955 Hyaluronan Rafts on Airway Epithelial Cells	Abbad, Amina; Abbad, Amina; La	JOURNAL OF BIOLO	291	3	1448-1455	2016
MEDLINE:26830683 Magnetically Responsive Bone Marrow Mesenchym	Swaminathan, Ganesh; Swaminat	TISSUE ENGINEERIN	22	4	301-311	2016
MEDLINE:27013942 Influence of Corticospinal Tracts from Higher Order	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:26926380 Correlates of the timed 25 foot walk in a multiple scl	Bethoux, Francois A.; Palfy, Dylan	INTERNATIONAL JO	39	2	134-139	2016
MEDLINE:28268710 Inductive Passive Sensor for Intraparenchymal and Ir	Behfar, Mohammad H.; Abada, En	2016 38TH ANNUAL	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, Elian	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

MEDLINE:27301359	Suppression of Ischemia-Induced Hippocampal Pyramidal Neuron Excitability	Sunabori, Takehiko; Koike, Masato; AMERICAN JOURNAL OF NEUROLOGY	186	8	2143-2151	2016
n/a	Ultralow-power Data Compression for Implantable Brain-Machine Interfaces	Karam, Robert; Karam, Robert; Mousavi, Amir; PROCEEDINGS OF THE IEEE	n/a	n/a	500-503	2016
MEDLINE:27741209	Pterygopalatine Fossa Anatomy for a Surgical Approach to the Foramen Rotundum	Frautschi, Russell S.; Halasa, Brian; JOURNAL OF CRANIOFACIAL SURGERY	27	7	1866-1869	2016
MEDLINE:26912300	The Contribution to Hemodynamics Even at Very Low Flow Rates of a Novel Transcatheter Aortic Valve	Sunagawa, Gengo; Byram, Nicole; ANNALS OF THORACIC SURGERY	101	6	2260-2264	2016
MEDLINE:26851211	Challenges in Recruitment for the Study of Noninvasive Brain Stimulation in Patients with Stroke	Potter-Baker, Kelsey A.; Bonnett, Christopher; JOURNAL OF STROKE	25	4	927-937	2016
MEDLINE:26911917	Application of magnetic cytosmear for the estimation of parasite load in malaria	Sumari, Deborah; Sumari, Debora; MALARIA JOURNAL	15	n/a	n/a	2016
MEDLINE:26886467	The Role of Virtual Histology Intravascular Ultrasound in the Diagnosis of Coronary Artery Disease	Sinclair, Hannah; Veerasamy, Murugesan; RADIOLOGY	24	6	303-309	2016
MEDLINE:26895598	The effects of prosthetic humeral head shape on glenohumeral joint kinematics	Jun, Bong Jae; Lee, Thay Q.; McGarr, John; JOURNAL OF SHOULDER SURGERY	25	7	1084-1093	2016
MEDLINE:28269570	Real-time, Autonomous Bladder Event Classification Using a Deep Learning Approach	Karam, Robert; Karam, Robert; Bhattacharya, Arun; 2016 38TH ANNUAL CONFERENCE OF THE IEEE	n/a	n/a	5789-5792	2016
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MEDLINE:27243106	Pathological Hyaluronan Matrices in Cystic Fibrosis Airway Disease	Matuska, Brittany; Comhair, Suzy; AMERICAN JOURNAL OF RESPIRATORY AND CRITICAL CARE MEDICINE	55	4	576-585	2016
MEDLINE:27460854	Smooth Muscle Progenitor Cells Derived From Human Placenta Can Differentiate into Smooth Muscle Cells	Li, Yanhui; Li, Yanhui; Wen, Yan; STEM CELLS TRANSFORMED CELL TECHNOLOGIES	5	12	1719-1729	2016
MEDLINE:27045553	Reliability of TMS metrics in patients with chronic intracranial aneurysms	Potter-Baker, K. A.; Janini, D. P.; FISHBEIN, J. M.; SPINAL CORD	54	11	980-990	2016
MEDLINE:27687499	Impaired ADAMTS9 secretion: A potential mechanism for osteoarthritis	Dubail, Johanne; Dubail, Johanne; SCIENTIFIC REPORTS	6	n/a	n/a	2016
MEDLINE:27106620	Limitations to Chronic Right Ventricular Assist Device Therapy in Patients with End Stage Heart Failure	Karimov, Jamshid H.; Sunagawa, Gengo; ANNALS OF THORACIC SURGERY	102	2	651-658	2016
MEDLINE:26662276	Carpal arch and median nerve changes during radiofrequency ablation of the medial branch of the lumbar facet joint	Marquardt, Tamara L.; Evans, Peter; JOURNAL OF ORTHOPAEDIC SURGERY	34	7	1234-1240	2016
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MEDLINE:26895354	Evaluating Iatrogenic Complications of the Total-Condom Catheter	Owings, Tammy M.; Nicolosi, Nico; JOURNAL OF THE AMERICAN COLLEGE OF SURGEONS	106	1	6-Jan	2016
MEDLINE:26088829	Combination histamine and serotonin treatment after stroke	Song, Qi-Xiang; Song, Qi-Xiang; SO NEUROUROLOGY A	35	6	703-710	2016
n/a	Optic cup-specific ablation of Adamts9, encoding a secreted proteoglycan	Earp, Sarah; Dubail, Johanne; APTA INVESTIGATIVE OPHTHALMOLOGY	57	12	n/a	2016
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n/a	Cognitive and Balance Correlates of Exposure and Brain Atrophy in Multiple Sclerosis	Banks, Sarah; Alberts, Jay; Bernick, David; NEUROLOGY	86	n/a	n/a	2016
MEDLINE:27722366	Differential regulation of NSC phenotype and genotype in human pluripotent stem cells	Farrell, Kurt; Borazjani, Ali; Borazjani, Ali; INTEGRATIVE BIOLOGY	8	11	1145-1157	2016
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n/a	Imaging cortical demyelination using T1/T2-weighted MRI	Nakamura, K.; Chen, J. T.; Fox, R. J; MULTIPLE SCLEROSIS	22	n/a	526-526	2016
n/a	Combination photodynamic therapy using 5-fluorouracil and a photosensitizer	Maytin, Edward V.; Anand, Sanjay; OPTICAL METHODS	9694	n/a	n/a	2016
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n/a	Cellular modelling in functional tissue engineering: a multi-scale approach	Ferreira, Joao; Parente, Marco; M. PROCEEDINGS OF THE IEEE	230	1	17-May	2016
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n/a	Maternal sleep position, sleep disordered breathing and child neurodevelopment	Dorrian, J.; Morrison, J.; O'Brien, L; JOURNAL OF SLEEP	25	n/a	171-172	2016
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n/a	Altered dermal fibroblast function contributes to endothelial dysfunction	Wang, Y.; Mack, J.; Maytin, E. V. JOURNAL OF INVESTIGATIVE DERMATOLOGY	136	5	S129-S129	2016
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n/a	Vitamin D for combination photodynamic therapy of Anand, Sanjay; Thomas, Erik; Hasse, A. OPTICAL METHODS	9694	n/a	n/a	n/a	2016
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MEDLINE:27357716	Anti-NR2 antibodies, blood-brain barrier, and cognitive function in Alzheimer's disease	Gulati, Gaurav; Iffland, Philip H., II CLINICAL RHEUMATOLOGY	135	12	2989-2997	2016
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MEDLINE:27401044	In vivo tissue interaction between the transverse carpal ligament and the median nerve	Gabra, Joseph N.; Gordon, Joshua MEDICAL ENGINEERING	38	10	1055-1062	2016
n/a	Elastic Matrix-Regenerative Nanoparticles for Targeted Drug Delivery	Fox, J.; Ramamurthi, A. TISSUE ENGINEERING	22	n/a	S9-S9	2016
n/a	Wireless Bladder Pressure Monitor for Closed-Loop Control of a Bladder Prosthesis	Majerus, Steve; Basu, Anisha S.; B. 2016 IEEE SENSORS	n/a	n/a	n/a	2016
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n/a	Optimizing Soft Tissue Management And Spacer Design For Transcatheter Aortic Valve Replacement	Luangphakdy, V.; Boehm, C.; Zachary, J. TISSUE ENGINEERING	22	n/a	S37-S37	2016
n/a	Evaluation of Changes in Flow Associated with Heart Failure	Karimov, J. H.; Tong, M.; Byram, N. JOURNAL OF HEART FAILURE	135	4	S325-S326	2016
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n/a	Advanced Ventricular Assist Device with Pulse Augmentation	Fukamachi, K.; Horvath, D. J.; Byram, N. JOURNAL OF HEART FAILURE	135	4	S329-S330	2016
n/a	Quantitative analysis of normal-appearing brain tissue in multiple sclerosis	Nakamura, K.; Deshmane, A.; Shal, J. MULTIPLE SCLEROSIS	22	n/a	526-527	2016
n/a	Mechanical Stress on Suspended Cortical Bone Samples	Schwab, Samuel M.; Androjna, Ch IEEE TRANSACTION ON MEDICAL BIOLOGY	52	7	n/a	2016
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n/a	Optimization of Orthogonal-Coil RF Probe for Miniaturized Antennas	Behfar, Mohammad H.; Sydanheir, 2016 IEEE ANTENNAS AND PROPAGATION LETTERS	n/a	n/a	1047-1048	2016
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MEDLINE:28724581 MRI evidence of acute inflammation in leukocortical Maranzano, Josefina; Rudko, Davi NEUROLOGY	89	7	714-721	2017
n/a Histopathological assessment of primary osteoarthritis Mantripragada, V. P.; Piuuzzi, N. S.; CURRENT RESEARC	65	4	133-139	2017

MEDLINE:28087488	Cathepsin K-targeted sub-micron particles for regene	Jennewine, Brenton; Jennewine, E	ACTA BIOMATERIALI	52	n/a	60-73	2017
MEDLINE:2693314C	Characterizing Information Processing With a Mobile	Burke, Daniel; Linder, Susan; Hirsch	ASSESSMENT	24	7	885-895	2017
MEDLINE:28080262	Processing speed test: Validation of a self-administer	Rao, Stephen M.; Losinski, Genna; MULTIPLE SCLEROS	23	14	1929-1937	2017	
MEDLINE:28633397	Impact of a refined advanced design for left atrial ap	Sunagawa, Gengo; Karimov, Jamsl	EUROPEAN JOURN	52	6	1098-1103	2017
MEDLINE:28336806	Fluorouracil Enhances Photodynamic Therapy of Squ	Anand, Sanjay; Rollakanti, Kishore	MOLECULAR CANC	16	6	1092-1101	2017
MEDLINE:27739941	Biomechanical evaluation of the craniovertebral junc	Kshettry, Varun R.; Healy, Andrew	JOURNAL OF NEUR	127	4	829-836	2017
MEDLINE:28323982	Versican Proteolysis by ADAMTS Proteases and Its In	Gueye, Ndeye-Aicha; Mead, Timo	JOURNAL OF CLINIC	102	5	1631-1641	2017
MEDLINE:28457317	Development of a critical-sized ventral hernia model	Sahoo, Sambit; Baker, Andrew R.; JOURNAL OF SURGI	210	n/a	115-123	2017	
MEDLINE:28976432	The Efficiency of Bone Marrow Aspiration for the Ha	Patterson, Thomas E.; Boehm, Cyr	JOURNAL OF BONE	99	19	n/a	2017
MEDLINE:28863216	Hyaluronan Rich Microenvironment in the Limbal Ste	Gesteira, Tarsis F.; Sun, Mingxia; C	INVESTIGATIVE OP	58	11	4407-4421	2017
MEDLINE:28075436	Gait Kinematic Deviations in Patients With Develop	Nie, Yong; Ning, Ning; Pei, Fuxing; ORTHOPEDICS	40	3	E425-E431	2017	
MEDLINE:27670925	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:28195352	Re: Industry response: Abrams P, Damaser MS, Nible	Abrams, Paul; Gammie, Andrew; I	NEUROUROLOGY A	36	7	1946-1946	2017
MEDLINE:28860944	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:28027272	Reply: Applying to Integrated Plastic Surgery Reside	Tadisina, Kashyap Komarraju; Tad	PLASTIC AND RECO	139	1	330E-331E	2017
MEDLINE:28826804	Early Wound Morbidity after Open Ventral Hernia Re	Sahoo, Sambit; Haskins, Ivy N.; Hu	JOURNAL OF THE A	225	4	472-+	2017
MEDLINE:28091708	The effect of motor overflow on bimanual asymmetr	Cunningham, David A.; Cunningha	EXPERIMENTAL BR	235	4	1097-1105	2017
MEDLINE:28625583	Bridging suture makes consistent and secure fixation	Fukuhara, Tetsutaro; Fukuhara, Te	JOURNAL OF ORTH	22	5	852-857	2017
MEDLINE:29028208	Tunable and Lightweight On-Chip Event Detection fo	Karam, Robert; Karam, Robert; M	IEEE TRANSACTION	11	6	1303-1312	2017
n/a	Superior Elastogenicity And Pro-elastogenic And Ant	Dahal, S.; Ramamurthi, A.	TISSUE ENGINEERIN	23	n/a	S142-S143	2017
n/a	Camp-Dependent Activation Of Protein Kinase A Att	Rezaee, F.; Harford, T. J.; Altawall	AMERICAN JOURN	195	n/a	n/a	2017
n/a	Degradation Of Hyaluronan Matrices By Extracellular	Tseng, V.; Woods, C.; Maltzahn, J.	AMERICAN JOURN	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:28575012	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	l 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:28337412	Differential involvement of corticospinal tract (CST) f	Rajagopalan, Venkateswaran; Raj	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:28500513	Surgeons' views on sling tensioning during surgery fc	Borazjani, Ali; Pizarro-Berdichevsk	INTERNATIONAL UF	28	10	1497-1498	2017
MEDLINE:28793966	Delivery of antioxidant enzymes for prevention of ul	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:29251846	Neurobiology of substance use in adolescents and pc	Nock, Nora L.; Minnes, Sonia; Alb	BIRTH DEFECTS RES	109	20	1711-1729	2017
MEDLINE:28527232	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.; I	MULTIPLE SCLEROS	23	n/a	359-360	2017

n/a	Genetic insights on provisional extracellular matrix reformation	Apte, Suneel	GENETICS RESEARCH	99	n/a	n/a	2017
MEDLINE:28238150	Moderate hypothermia technique for chronic implantation	Karimov, Jamshid H.; Grady, Patricia	JOURNAL OF ARTIFICIAL	20	2	182-185	2017
n/a	Initial In Vitro Testing of a Pediatric Continuous-Flow Pump	Fukamachi, K.; Horvath, D. J.; Kari	JOURNAL OF HEART	136	4	S164-S164	2017
MEDLINE:28029574	The axial continuous-flow blood pump: Bench evaluation	Karimov, Jamshid H.; Tong, Michael	JOURNAL OF HEART	136	1	106-112	2017
MEDLINE:29149885	Setting the pace: insights and advancements gained	McDaniel, John; McDaniel, John; L	JOURNAL OF NEURO	14	n/a	n/a	2017
MEDLINE:28539399	Using theoretical models from adult stroke recovery	Lin, Yin-Liang; Potter-Baker, Kelse	JOURNAL OF NEURO	118	3	1435-1438	2017
n/a	Magnetic resonance fingerprinting indicates thalamic	Ontaneda, D.; Nakamura, K.; Saka	MULTIPLE SCLEROS	23	n/a	815-815	2017
MEDLINE:28761992	Novel technique for airless connection of artificial heart	Karimov, Jamshid H.; Gao, Shengq	JOURNAL OF ARTIFICI	20	4	386-389	2017
n/a	Automated Quantitative Image Analysis and Precision	Mantripragada, V.; Luangphakdy,	TISSUE ENGINEERING	23	n/a	S65-S65	2017
MEDLINE:28607523	Understanding cortical topographical changes in limbic	Potter-Baker, K. A.; Lin, Y-L; Plow,	SPINAL CORD	55	9	882-884	2017
n/a	JNK-inhibitory Nanotherapeutics to Augment Vascular	Camardo, A.; Seshadri, D.; Broeke	TISSUE ENGINEERING	23	n/a	S66-S66	2017
n/a	Comparison of Therapeutic Magnetic Stimulation With	Zborowski, Maciej; Androjna, Ch	IEEE TRANSACTION	53	2	n/a	2017
MEDLINE: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 SIGNALING	10	506	n/a	2017
MEDLINE:28602151	Assessment of Human Acellular Dermis Graft in Porcine	Sahoo, Sambit; Baker, Andrew R.	TISSUE ENGINEERING	23	11	718-727	2017
n/a	Moderate Hypothermia Technique for Chronic Implantation	Karimov, J. H.; Grady, P.; Sinkewicz	JOURNAL OF HEART	136	4	S438-S439	2017
MEDLINE: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 cutaneous	Anand, Sanjay; Bullock, Taylor; M	OPTICAL METHODS	10047	n/a	n/a	2017
MEDLINE:28391521	Generating pulsatility by pump speed modulation with	Fukamachi, Kiyotaka; Karimov, Jar	JOURNAL OF ARTIFICI	20	4	381-385	2017
n/a	Convergent validity of acceleration-derived parameters	Bethoux, F.; Li, H.; Schindler, D.; M	MULTIPLE SCLEROS	23	n/a	146-146	2017
MEDLINE:28875964	Vascular Graft Bridged En Bloc Resection for Bilioportal	Lai, Yun-Gang; Gao, Yue; Liu, Jun-C	CHINESE MEDICAL J	130	18	2259-+	2017
MEDLINE:27892719	Is a pulse absolutely necessary during cardiopulmonary	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
MEDLINE:28759570	cAMP-dependent activation of protein kinase A attenuates	Rezaee, Fariba; Harford, Terri J.; L	PLOS ONE	12	7	n/a	2017
n/a	Brain atrophy rates in multiple sclerosis changes along	Andorra, M.; Nakamura, K.; Lamp	MULTIPLE SCLEROS	23	n/a	11-Oct	2017
n/a	Are we underestimating the severity of cognitive dysfunction	Weber, M.; Mourany, L.; Losinski,	MULTIPLE SCLEROS	23	n/a	283-283	2017
n/a	LATERAL FEMORAL CONDYLE IN VARUS KNEES OF PATIENTS	Mantripragada, V. R.; Piuze, N.; Z	OSTEOARTHRITIS A	25	n/a	S303-S304	2017
MEDLINE:28746384	Detection of brain-directed autoantibodies in the serum	Banjara, Manoj; Ghosh, Chaitali; C	PLOS ONE	12	7	n/a	2017
n/a	C-Jun N-terminal Kinase Gene Silencing as an Effective	Ortiz-Seranno, D.; Camardo, A.; R	TISSUE ENGINEERING	23	n/a	S66-S66	2017
MEDLINE:28775338	NIH Centers for Accelerated Innovations Program: preliminary	Antman, Elliott M.; Di Corleto, Pat	NATURE REVIEWS C	16	10	663-664	2017
MEDLINE:28199000	Overexpression of pregnane X and glucocorticoid receptors	Ghosh, Chaitali; Hossain, Moham	EPILEPSIA	58	4	576-585	2017
MEDLINE:29122888	TNF-stimulated gene 6 promotes formation of hyaluronan	Stober, Vandy P.; Johnson, Collin	JOURNAL OF BIOLOGI	292	51	20845-20858	2017
n/a	Polymeric Nanoparticles (NPs)-Mediated Gene Delivery	Joshi, C. R.; Labhasetwar, V.; Ghor	JOURNAL OF NEURO	12	n/a	S30-S30	2017
n/a	Validation of fully automated machine-learning algorithm	Feng, J. J.; Nakamura, K.; Hersch, C	MULTIPLE SCLEROS	23	n/a	268-269	2017
n/a	Adult Stem and Progenitor Cell Heterogeneity in Human	Qadan, M. A.; Qadan, M. A.; Qada	TISSUE ENGINEERING	23	n/a	S78-S78	2017
MEDLINE:28589998	Magnetic field application or mechanical stimulation	Dikina, A. D.; Lai, B. P.; Cao, M.; Z	BIOMATERIALS SCIE	5	7	1241-1245	2017
MEDLINE:28112590	"Go! to Sleep": A Web-Based Therapy for Insomnia	Bernstein, Adam M.; Bernstein, A	TELEMEDICINE AND	23	7	590-599	2017
n/a	Can MS patients accurately self-time the 25-foot walk	Freiburger, J. L.; Mourany, L.; We	MULTIPLE SCLEROS	23	n/a	738-739	2017
n/a	Pilot Clinical Study of a Novel Unobtrusive Carpal Tunnel	Luong, Pauline; King, Frank; Li, Z	ARTHRITIS & RHEUM	69	n/a	n/a	2017
n/a	CHARACTERIZATION OF HUMAN BONE AND ADIPOSE TISSUE	Qadan, M.; Qadan, M.; Qadan, M.	CYTOTHERAPY	19	5	S109-S111	2017

MEDLINE:28560091	A 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-fibrotic Wang, Y.; Mack, J.; Maytin, E. V.	JOURNAL OF INVESTIGATIVE DERMATOLOGY	137	5	S158-S158	2017
MEDLINE:27636223	Transcriptional Regulation of Connective Tissue Metalloproteinase 1 by Estrogen Borazjani, Ali; Borazjani, Ali; Kow, F.	FEMALE PELVIC MEDICINE & REPRODUCTIVE SCIENCES	23	1	44-52	2017
MEDLINE:26439973	Authors' Response Re: Valentini P, Nelson P. Letter to the Editor Damaser, Margot S.	NEUROUROLOGY AND NEUROLOGY	36	1	209-210	2017
n/a	Enhanced skin tumor development in CHOP knockout mice Anand, S.; Maytin, E. V.	JOURNAL OF INVESTIGATIVE DERMATOLOGY	137	5	S128-S128	2017
n/a	Quantitative Assessment of Cell and Progenitor Populations in the Skin Mantripragada, V.; Boehm, C.; Bonfield, W.	TISSUE ENGINEERING	23	n/a	S14-S14	2017
n/a	Stromal Versican Regulates Tumor Growth by Promoting Cell Migration Asano, Keiichi; Nelson, Courtney M	SCIENTIFIC REPORTS	7	n/a	n/a	2017
MEDLINE:29104346	Tessellated permanent magnet circuits for flow-through MRI Moore, Lee R.; Williams, P. Stephen	JOURNAL OF MAGNETIC RESONANCE	427	n/a	325-330	2017
n/a	Visible Light Photocatalytic Bacterial Inactivation on Nanoparticles Nandakumar, Vignesh; Han, Zhao; Kona	POWDER AND NANOTECHNOLOGY	n/a	34	234-240	2017
MEDLINE:28617542	Assessment of behavioral tasks performed by hemiparetic mice Bashir, S.; Bashir, S.; Caipa, A.; Plo	EUROPEAN REVIEW OF MEDICAL AND BIOLOGICAL SCIENCES	21	10	2443-2451	2017
MEDLINE:28722276	Identification and functional analysis of an ADAMTS1 gene mutation Hendee, Kathryn; Wang, Lauren M	HUMAN MUTATION	38	11	1485-1490	2017
MEDLINE:28395539	Unlocking the box: basic requirements for an ideal vaccine Medvedev, Alexander L.; Karimov, I.	EXPERT REVIEW OF VACCINES	14	5	393-400	2017
n/a	Durable reduction in MRI disease activity and slowing of disease progression Arnold, D. L.; Barnett, M.; Comi, G	MULTIPLE SCLEROSIS	23	n/a	628-628	2017
MEDLINE:28248847	Effect of Pregnancy and Delivery on Cytokine Expression Couri, Bruna M.; Lenis, Andrew T.; F	FEMALE PELVIC MEDICINE & REPRODUCTIVE SCIENCES	23	6	449-456	2017
n/a	How to Resolve Large Atelectasis in Ex Vivo Lung Perfusion Okamoto, T.; Niikawa, H.; Wheeler, J.	JOURNAL OF HEART LUNG TRANSPLANTATION	36	4	S313-S313	2017
MEDLINE:28073093	Subject-specific finite element analysis of the carpal tunnel Walia, Piyush; Erdemir, Ahmet; Li, C.	CLINICAL BIOMECHANICS	42	n/a	25-30	2017
MEDLINE:29111978	The eukaryotic translation initiation factor eIF4E has a role in hair cell development Zahreddine, Hiba Ahmad; Culjkovi	ELIFE	6	n/a	n/a	2017
n/a	Hepatic Stellate Cell-Induced Cytotoxicity in Liver Cancer Cells Fayazzadeh, Ehsan; Das, Dola; Lan	HEPATOLOGY	66	n/a	721A-721A	2017
MEDLINE:29170462	Structure of Rap1b bound to talin reveals a pathway for integrin activation Zhu, Liang; Zhu, Liang; Yang, Jun; Li	NATURE COMMUNICATIONS	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 IDs 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

		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

IDs 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

	BME	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%

BYLAWS

THE FACULTY OF MEDICINE

CASE WESTERN RESERVE UNIVERSITY

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

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13	3.4 Terms of office of Faculty Council representatives	10
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ARTICLE 3: THE FACULTY COUNCIL

3.1: Purpose and Functions of the Faculty Council

The Faculty of Medicine delegates all powers not reserved to the Faculty of Medicine itself (see Article 2) to a Faculty Council. The Faculty Council shall serve as the Executive Committee of the Faculty of Medicine, in accordance with Article X.1 of the Bylaws of the Faculty Senate. The Faculty Council shall meet regularly to exercise its powers and obligations, which shall include but not be limited to the following:

- a. To act for the Faculty of Medicine regarding the planning and execution of educational programs and the formulation of policies concerning curricula, student admissions, and the conduct of research in consultation with the appropriate standing committee of the Faculty of Medicine. It shall review the requirements for the M.D. degree and the recommendations of the Committee on Students regarding student standings and student promotions;
- b. To hear reports of the Standing Committees of the Faculty of Medicine and of the Faculty Council and recommend action on such reports;
- c. To make recommendations to the Faculty of Medicine concerning the establishment, discontinuance, and merging of departments;
- d. To make recommendations to the Faculty of Medicine concerning the establishment, discontinuance, and initial charge and representative composition of the membership of all Faculty of Medicine standing committees (see Article 2.6c);
- e. To elect a chair, a chair-elect, members of the Steering Committee, and the Faculty Council members of the Nomination and Elections Committee;
- f. To classify any issue requiring a vote of the faculty so as to determine the eligibility of the adjunct/clinical and student members to vote on that issue (per 2.4biii and 2.4bv); and
- g. To create *ad hoc* committees to make recommendations concerning its various functions and duties (see Article 3:6d).

3.2: Membership of the Faculty Council

a. Voting Members. Voting members of the Faculty Council shall include one representative of each academic department (all references hereafter to academic departments include the Division of General Medical Sciences (DGMS), which has departmental status; see Article 4.7). When more than one autonomous department exists within a single academic discipline, as per section 4.3 below, a representative of each such department shall be elected to

Commented [A1]: Approved by the Bylaws Committee on 23 January, 2018, 6:0.
SUBSTANTIVE: Explicitly identifies the Executive Committee of the Faculty of Medicine for the first time.
Rationale: In response to a query from the Faculty Senate, Faculty Council at its meeting on December 12, 2016 agreed that the full representative body and not its Steering Committee serves in this capacity.

Deleted: the

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Commented [A2]: Approved 5-0 10 April 2018.
Rationale: To make Article 3.1a compatible with Article 2.6a.6.

Deleted: to approve

Commented [A3]: Approved by the Bylaws Committee 5-0 on April 10, 2018.
Rationale: This is now the first time DGMS is mentioned, so the words in its title are written out.

Deleted: DGMS

1 the Faculty Council. These representatives shall be referred to as departmental representatives.
2 Other voting members shall include two representatives from the special faculty whose titles are
3 modified by the adjective adjunct or clinical, one representative from each affiliated institution,
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
8 activities, the dean of the School of Medicine, the associate dean for medical education of the
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.D.-Ph.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, ad hoc member, in accordance with each committee's charge. If a~~
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~~
26 ~~(see Article 2.3). Elections shall be held by democratic process. Complaints concerning the~~
27 ~~occurrence of undemocratic selections of representatives shall be brought to the attention of the~~
28 ~~chair of the Faculty Council.~~

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~~
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. To be eligible to serve~~
33 ~~as a departmental representative to the Faculty Council, a faculty member must be appointed~~
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~~
36 ~~representatives shall be brought to the attention of the chair of the Faculty Council.~~

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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 on 10 April 2018.
SUBSTANTIVE: Generalizes the right of each Standing Committee of the Faculty to have a non-voting representative to the Faculty Council.

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

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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: ¶
→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]

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~~b. At-large representatives: The at-large representatives shall be nominated by the Nomination and Elections committee (see Article 3:6b) and shall be elected by the full-time members of the faculty. The dean shall be requested to supply the Nomination and Elections committee with a list of the basic and clinical science departments and rosters of the full-time faculty members with primary appointments in each department. Five at-large representatives shall be elected from basic science departments and five shall be elected from clinical science departments. There shall be at least two nominees for each of these positions. Those nominees who are not elected shall serve as alternates in the order of votes received (see Article 3:4).~~

~~The terms of at-large Faculty Council members shall be staggered such that one or two basic science and one or two clinical representatives are elected each year. No more than one at-large representative shall be from a single department.~~

~~c. Institutional representatives: 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.~~

~~d. Special Faculty representatives: The Nomination and Elections Committee (see Article 3:6b) shall nominate at least four members of the special faculty whose titles are modified by the adjective adjunct or clinical as candidates for representative to the Faculty Council. Two of these nominees shall be elected by the special faculty whose titles are modified by the adjective adjunct or clinical. The remaining nominees will serve as alternates in the order of votes received.~~

3.4: Terms of Office of Faculty Council Representatives

~~Departmental and at-large representatives shall serve for a period of three years. Representatives may not serve consecutive terms but may stand for election after an absence of one year. A department representative who is unable for any reason to complete a term of office shall be replaced by a full-time faculty member from the same academic department, elected by democratic process within that department. The new member shall complete the term of the former member and shall be eligible for reelection if the remaining term so completed has been less than two years. A departmental member on leave of absence shall be replaced during that leave by a faculty member from the same academic department, elected by democratic process within that department. Upon return from leave, the returned faculty member shall complete the original term of office. An at-large representative who is unable for any reason to complete a term of office shall be replaced by an alternate (per 3:3d) who shall serve during the remainder of the term or during the leave of the representative, as outlined for department representatives. A representative of the special faculty who is unable for any reason to complete a term shall be~~

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. ¶

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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

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

Deleted: →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

1 replaced by an alternate (see Article 3:3e) who shall serve during the remaining term or during
2 the leave of the representative. A representative of an affiliated institution who is unable for any
3 reason to complete a term shall be replaced by a full-time faculty member with a primary base at
4 the same institution. That individual shall be chosen by the same mechanism as the original
5 representative, and shall serve for the remaining term or during the leave of the original
6 member, as outlined above for department representatives.

7 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 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 3.5: Officers of the Faculty Council

14 Each year the Faculty Council shall elect a chair-elect from ~~among current members of~~
15 ~~the Faculty Council. 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.

25 3.6: Committees of the Faculty Council

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. ~~Steering Committee meetings shall be conducted according to Robert's Rules of~~
36 ~~Order, Newly Revised.~~ The Steering Committee shall act for the Faculty Council and faculty in

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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

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).

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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 chair-elect.

Rationale: As stated in Article 3.5.

ask the chair of Faculty Council to appoint a single ad hoc voting member to serve on the 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 Elections Committee, the appointee should be a regular member of the Faculty of Medicine.

In addition, the Nomination and Elections Committee shall nominate (1) candidates for the at-large representatives to the Faculty Council, (2) candidates for the representatives of the special faculty whose titles are modified by the adjective adjunct or clinical to the Faculty Council, (3) candidates for standing committees of the Faculty of Medicine, and (4) candidates for the University Faculty Senate. In the case of at-large representatives, senators, or members of the Committee on Appointments, Promotions, and Tenure, the number of ~~candidates~~ shall be at least twice the number of positions to be filled. ~~In recruiting faculty for the ballot, the NEC shall strive to produce a diverse slate of nominees, considering gender, race, institutional affiliation and representation of basic and clinical departments. A nominee may not be put on the ballot if in winning the election they would serve on more than two standing committees of the Faculty of Medicine or Faculty Council (ad hoc committees are not included in this count). Exceptions will be made only if no other candidates come forward to fill a committee vacancy. Elections shall be conducted by e-mail or other electronic means, using a preferential voting system. Ballots shall include a clear explanation of the preferential voting system.~~ Ballots listing candidates for the representatives of the special faculty on the Faculty Council shall be ~~distributed~~ to all special faculty whose titles are modified by the adjective adjunct or clinical. Ballots listing candidates for committees dealing with the planning and approval of the curriculum, the execution of the instructional program, and the formulation of policies with regard to student affairs shall be ~~distributed~~ to all members of the faculty. Elections shall be conducted as far in advance of the completion of the terms of sitting members as is practicable. ~~Elections shall be conducted through the campus and first class mail or by email or other electronic means. All electronic~~ ballots shall provide space for write-in candidates. At least two weeks shall be allowed between the distribution of all ballots and the close of the election and determination of election results. Distribution of the ballots and the determination and publication of the election results shall be the responsibility of the Nomination and Elections Committee. After each election, the Committee ~~shall~~ count the votes and publish all the vote totals. Any irregularities or issues in the conduct of the elections shall be investigated and resolved by the Committee. The Nomination and Elections Committee shall report its investigation and resolution to the Faculty Council and the Faculty of the School of Medicine. The dean shall be requested to supply administrative support for the elections.

c. Special Committee to Nominate Candidates for the Search Advisory Committee to the President on the Selection of the Dean of the School of Medicine. This special nominating

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

Rationale: Curatorial.

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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.

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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).

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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.

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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.

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

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

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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.

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

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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.

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

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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.

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

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 3.8: Annual Report of the Faculty Council

5 Each year the chair of the Faculty Council shall submit to the faculty a report on the
6 activities of the Faculty Council.

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

BYLAWS

THE FACULTY OF MEDICINE

CASE WESTERN RESERVE UNIVERSITY

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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

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1 ARTICLE 3: THE FACULTY COUNCIL

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
8 shall include but not be limited to the following:

- 9 a. To act for the Faculty of Medicine regarding the planning and execution of
10 educational programs and the formulation of policies concerning curricula, student
11 admissions, and the conduct of research in consultation with the appropriate
12 standing committee of the Faculty of Medicine. It shall review the requirements for
13 the M.D. degree and the recommendations of the Committee on Students regarding
14 student standings and student promotions;
- 15 b. To hear reports of the Standing Committees of the Faculty of Medicine and of the
16 Faculty Council and recommend action on such reports;
- 17 c. To make recommendations to the Faculty of Medicine concerning the establishment,
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).

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
34 Article 4.7). When more than one autonomous department exists within a single academic
35 discipline, as per section 4.3 below, a representative of each such department shall be elected to

Commented [A1]: Approved by the Bylaws Committee on 23 January, 2018, 6:0.
SUBSTANTIVE: Explicitly identifies the Executive Committee of the Faculty of Medicine for the first time.
Rationale: In response to a query from the Faculty Senate, Faculty Council at its meeting on December 12, 2016 agreed that the full representative body and not its Steering Committee serves in this capacity.

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Deleted: of the Faculty Council

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Commented [A2]: Approved 5-0 10 April 2018.
Rationale: To make Article 3.1a compatible with Article 2.6a.6.

Deleted: to approve

Commented [A3]: Approved by the Bylaws Committee 5-0 on April 10, 2018.
Rationale: This is now the first time DGMS is mentioned, so the words in its title are written out.

Deleted: DGMS

1 the Faculty Council. These representatives shall be referred to as departmental representatives.
2 Other voting members shall include two representatives from the special faculty whose titles are
3 modified by the adjective adjunct or clinical, one representative from each affiliated institution,
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
8 activities, the dean of the School of Medicine, the associate dean for medical education of the
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.D.-Ph.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, ad hoc member, in accordance with each committee's charge. If a~~
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.~~

24 3.3: Election of the Members of the Faculty Council

25 ~~Faculty members have the power and obligation to elect Faculty Council representatives~~
26 ~~(see Article 2.3). Elections shall be held by democratic process. Complaints concerning the~~
27 ~~occurrence of undemocratic selections of representatives shall be brought to the attention of the~~
28 ~~chair of the Faculty Council.~~

29 *The following section in green will not be discussed at the November Faculty Council Meeting.*

30 ~~a. Departmental representatives: When the term of a departmental representative is~~
31 ~~coming to an end, the dean shall inform all full-time faculty members of that department. The~~
32 ~~department shall elect its new representative no later than April 30 of each year, with newly~~
33 ~~elected members beginning their terms of office on the following July 1. To be eligible to serve~~
34 ~~as a departmental representative to the Faculty Council, a faculty member must be appointed~~
35 ~~full-time and hold a primary appointment in that department. The election shall be held by~~

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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 on 10 April 2018.
SUBSTANTIVE: Generalizes the right of each Standing Committee of the Faculty to have a non-voting representative to the Faculty Council.

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

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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 3.5b, paragraph 3. ¶
a. Shall be held

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

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democratic process. Complaints concerning the occurrence of undemocratic selections of representatives shall be brought to the attention of the chair of the Faculty Council.

b. At-large representatives: The at-large representatives shall be nominated by the ~~Nomination and Elections~~ committee (see Article 3:6b) and shall be elected by the full-time members of the faculty. The dean shall be requested to supply the ~~Nomination and Elections~~ committee with a list of the ~~basic~~ and clinical science departments and rosters of the full-time faculty members with primary appointments in each department. Five at-large representatives shall be ~~elected~~ from ~~basic science~~ departments and five shall be ~~elected~~ from clinical science departments. There shall be at least two nominees for each of these positions. Those nominees who are not elected shall serve as alternates in the order of votes received (see ~~Article 3:4~~).

The terms of at-large Faculty Council members shall be staggered such that one or two ~~basic science~~ and one or two ~~clinical~~ representatives are elected each year. No more than one at-large representative shall be from a single department.

c. Institutional representatives: 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.

d. Special Faculty representatives: The ~~Nomination and Elections~~ Committee (see Article 3:6b) shall nominate at least four members of the special faculty whose titles are modified by the adjective adjunct or clinical as candidates for representative to the Faculty Council. Two of these nominees shall be elected by the special faculty whose titles are modified by the adjective adjunct or clinical. The remaining nominees will serve as alternates in the order of votes received.

3.4: Terms of Office of Faculty Council Representatives

Departmental and at-large representatives shall serve for a period of three years. Representatives may not serve consecutive terms but may ~~stand for election~~ after an absence of one year. A department representative who is unable for any reason to complete a term of office shall be replaced by a full-time faculty member from the same academic department, elected by democratic process within that department. The new member shall complete the term of the former member and shall be eligible for reelection if the remaining term so completed has been less than two years. A departmental member on leave of absence shall be replaced during that leave by a faculty member from the same academic department, elected by democratic process within that department. Upon return from leave, the returned faculty member shall complete the original term of office. An at-large representative who is unable for any reason to complete a term of office shall be replaced by an alternate (per 3:3d) who shall serve during the remainder

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. ¶~~

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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.~~

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

Deleted: ~~c. 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.

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of the term or during the leave of the representative, as outlined for department representatives. A representative of the special faculty who is unable for any reason to complete a term shall be 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 resign from the Faculty Council unless their absences were excused by the chair of the Faculty Council. A warning letter will be sent to the Faculty Council member after two absences, with a copy to the department chair. Selection of replacements for members who resign is discussed in the preceding paragraph.

3.5: Officers of the Faculty Council

Each year the Faculty Council shall elect a chair-elect from ~~among current members of the Faculty Council~~. ~~There shall be at least two nominees for the position of chair-elect.~~ The chair-elect shall serve as vice-chair of the Faculty Council during the first year following election and succeed to the chair the following year. The chair of the Faculty Council (or the vice-chair of the Faculty Council in the absence of the chair) shall preside over the Faculty Council and shall be vice-chair of the Faculty of Medicine. Following completion of this term of office, the immediate past chair of the Faculty Council shall serve one additional year as a member of the Faculty Council and as a member of its Steering Committee. For procedures to be followed in the election of the officers and committees of the Faculty Council, see article 3:6b. The dean shall be requested to provide administrative support to these officers.

3.6: Committees of the Faculty Council

a. Steering Committee. The Steering Committee shall consist of eight members: the chair of the Faculty Council, the vice-chair of the Faculty Council, the immediate past chair of the Faculty Council, and five other Faculty Council members who shall be elected by the Faculty Council for one-year terms. These members may be reelected successively to the Steering Committee for the duration of their terms as members of the Faculty Council. The chair of the Faculty Council (or the vice-chair of the Faculty Council in the absence of the chair) shall serve as chair of the Steering Committee. The Steering Committee shall set the agenda for meetings of the Faculty Council. The Steering Committee shall be empowered to act for the Faculty Council between meetings. The Steering Committee shall report all actions and recommendations to the

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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. Steering Committee meetings shall be conducted according to Robert's Rules of
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
6 shall advise the president concerning the appointment of an interim or acting dean of the School
7 of 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

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).

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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 chair-elect.
Rationale: As stated in Article 3.5.

the Nomination and Elections Committee perceives a significant deficit in the representation of faculty constituencies within its membership following the annual election, either committee may ask the chair of Faculty Council to appoint a single ad hoc voting member to serve on the 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 Elections Committee, the appointee should be a regular member of the Faculty of Medicine.

In addition, the Nomination and Elections Committee shall nominate (1) candidates for the at-large representatives to the Faculty Council, (2) candidates for the representatives of the special faculty whose titles are modified by the adjective adjunct or clinical to the Faculty Council, (3) candidates for standing committees of the Faculty of Medicine, and (4) candidates for the University Faculty Senate. In the case of at-large representatives, senators, or members of the Committee on Appointments, Promotions, and Tenure, the number of ~~candidates~~ shall be at least twice the number of positions to be filled. ~~In recruiting faculty for the ballot, the NEC shall strive to produce a diverse slate of nominees, considering gender, race, institutional affiliation and representation of basic and clinical departments. A nominee may not be put on the ballot if in winning the election they would serve on more than two standing committees of the Faculty of Medicine or Faculty Council (ad hoc committees are not included in this count). Exceptions will be made only if no other candidates come forward to fill a committee vacancy. Elections shall be conducted by e-mail or other electronic means, using a preferential voting system. Ballots shall include a clear explanation of the preferential voting system.~~ Ballots listing candidates for the representatives of the special faculty on the Faculty Council shall be ~~distributed~~ to all special faculty whose titles are modified by the adjective adjunct or clinical. Ballots listing candidates for committees dealing with the planning and approval of the curriculum, the execution of the instructional program, and the formulation of policies with regard to student affairs shall be ~~distributed~~ to all members of the faculty. Elections shall be conducted as far in advance of the completion of the terms of sitting members as is practicable. ~~Elections shall be conducted through the campus and first class mail or by email or other electronic means. All electronic~~ ballots shall provide space for write-in candidates. At least two weeks shall be allowed between the distribution of all ballots and the close of the election and determination of election results. Distribution of the ballots and the determination and publication of the election results shall be the responsibility of the Nomination and Elections Committee. After each election, the Committee shall count the votes and publish all the vote totals. Any irregularities or issues in the conduct of the elections shall be investigated and resolved by the Committee. The Nomination and Elections Committee shall report its investigation and resolution to the Faculty Council and the Faculty of the School of Medicine. The dean shall be requested to supply administrative support for the elections.

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

Rationale: Curatorial.

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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.

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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).

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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.

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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.

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

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

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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 3.7: Meetings of the Faculty Council

22 a. The Faculty Council shall meet at least once every two months from September
23 through June of each academic year. Special meetings may be called by a majority vote of the
24 Steering Committee, by a written petition of 10 members of the faculty addressed to the chair of
25 the Faculty Council, or by the dean.

26 b. The agenda for each meeting shall be prepared by the Steering Committee, posted
27 electronically, and sent electronically to all faculty members at least one week in advance of
28 regular meetings and at least two days in advance of special meetings

29 c. Minutes of the meetings shall be kept and shall be distributed in a timely fashion to
30 Faculty Council members, to the dean, to all department chairs, and to each member of the
31 Faculty of Medicine. Approved minutes shall be posted electronically and sent electronically to all
32 faculty members. The dean is requested to provide administrative support for this purpose.

33 d. The meetings shall be conducted according to Robert's Rules of Order, Newly Revised.

34 A parliamentarian may be appointed by the Faculty Council Chair in order to facilitate orderly
35 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.

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

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

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 3.8: Annual Report of the Faculty Council

6 Each year the chair of the Faculty Council shall submit to the faculty a report on the
7 activities of the Faculty Council.

Proposed Modifications to the Biochemistry Plan B MS Program Experimental Biotechnology Track

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

Proposed Modifications to the Biochemistry Plan B MS Program Experimental Biotechnology Track

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.

**Proposed Modifications to the Biochemistry Plan B MS Program
Experimental Biotechnology Track**

Suggested Schedule for Students in the Biotechnology Track

YEAR 1	
Fall	
BIOC 407 (4)	Introduction to Biochemistry: From Molecules To Medical Science
BIOC 500 (1)*	Biotechnology Laboratory: Molecular Biology Basics
BIOC 501 (3)*	Biochemical and Cellular Techniques for Biotechnology
BIOC 511 (1)*	Practice and Professionalism in Biotechnology
Spring	
BIOC 408 (4)	Molecular Biology
BIOC 502 (5)*	Biotechnology Laboratory: Biochemical and Cellular Techniques for Biotechnology
YEAR 2	
Fall	
BIOC 412 (3)	Proteins and Enzymes
BIOC 601 (3)	Biochemical Research
Elective (3)	
Spring	
BIOC 434 (3)	Structural Biology
BIOC 601 (2) or elective (2)	Biochemical Research
Elective (3)	
Exam 600 (1)	Master's Comprehensive Exam

* New courses

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

Proposed Modifications to the Biochemistry Plan B MS Program Experimental Biotechnology Track

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.

Startup costs—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.

Ongoing costs—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 for teaching lab courses

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

Income—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.

Net Income—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.

<u>Ongoing Costs</u>	<u>Additional students per year</u>	
	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
<u>Income</u>		
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
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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

Proposed Modifications to the Biochemistry Plan B MS Program Experimental Biotechnology Track

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.

Proposed Modifications to the Biochemistry Plan B MS Program Experimental Biotechnology Track

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

Instructors **Dr. Susan Wang** (Course Director), Wood W445, 216-368-3921, scw10@case.edu
Office hours by appointment; please access Dr. Wang's Google calendar for availability
Caroline Gray (Laboratory Assistant), Wood W446, 216-368-4973, cdg16@case.edu
Office hours Tuesdays 1-3 pm by appointment; otherwise please e-mail for availability

Classrooms 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 (<http://canvas.case.edu>). 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.

Laboratory Schedule:

Week	Date	Topic
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

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 <i>gfp</i> PCR product
10	10/31	<i>gfp</i> 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); <i>gfp</i> -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 or get more information on how to begin the process (<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 more details, visit <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 David Navratil, B&B Microscopes/Hunt Optics, and Min Lam, Assistant 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 ½ 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 Thu 11/8	Standard Operating Procedures (SOP), Quality Control, and record keeping in academia and industry (<i>Guest Lecture by Cathy Schenk, Sr. Director Quality Assurance at Athersys, Inc.</i>) Example of activity assay: β -lactamase (<i>Guest Lecture by Dr. Krisztina Papp-Wallace</i>)
Week 12	Tue 11/13 Thu 11/15	Protein quantification and purity analysis Fundamental aspects of mass spectrometry (<i>Guest Lecture by Dr. Susan Wang</i>)
Week 13	Tue 11/20 Thu 11/22	Examples of analysis of mass spectrometry (<i>Guest Lecture by Dr. Susan Wang</i>) 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 $\frac{1}{2}$ 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

Draft Syllabus for BIOC 502

Biotechnology Laboratory: Molecular and Cell Biology and Biochemical Techniques

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.

Draft Syllabus for BIOC 502

Biotechnology Laboratory: Molecular and Cell Biology and Biochemical Techniques

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 ~3 hours per day, Monday-Friday so students may perform hands-on, 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 ~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

Schedule:

Week	Dates	Topics
Week 1	1/15-1/18	Laboratory safety and general laboratory familiarization
	M	<i>No class (Martin Luther King, Jr., Day holiday)</i>
	T	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 1 (M1)	Prokaryotic Techniques	
Week M1.1	<i>Nucleic acids and bacterial cell manipulation</i>	
	M	DNA quantification and polymerase chain reaction (PCR)
	T	Transformation and overnight cultures
	W	Plasmid preparation, sequencing, and restriction digestion
	R	DNA gel electrophoresis
	F	Data analysis
Week M1.2	<i>Recombinant protein expression in bacteria</i>	
	M	Sequence analysis; media preparation
	T	Transformation
	W	Culturing and overexpression
	R	Culturing and overexpression
	F	Spin down and collect cells
Week M1.3	<i>Protein purification</i>	
	M	Solution preparation
	T	Protein purification
	W	Size exclusion chromatography

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Biotechnology Laboratory: Molecular and Cell Biology and Biochemical Techniques

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

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Biotechnology Laboratory: Molecular and Cell Biology and Biochemical Techniques

Week M2.4		<i>Transient reporter assays</i>
	M	Split cells, transient transfection
	T	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		<i>Isolation of total RNA & RT-qPCR</i>
	M	Treat cells with ligands
	T	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		<i>MS basics and familiarization</i>
	M	Familiarization with mass spectrometry software
	T	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		<i>MS assays</i>
	M	Assays and HPLC/MS sample prep
	T	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
	M	Review
	T	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

Draft Syllabus for BIOC 502
Biotechnology Laboratory: Molecular and Cell Biology and Biochemical Techniques

Week	4/29-5/3	Last Day of Classes and Finals Week
15		
	M	End-of-class clean-up and check-out; laboratory notebooks due
	R	Final written exam, 8-11 AM (subject to change based on university final 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.

Draft Syllabus for BIOC 502

Biotechnology Laboratory: Molecular and Cell Biology and Biochemical Techniques

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.

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

Week	Date	Topic
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

Resources:

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

- “The Billion Dollar Molecule” by Barry Werth (Simon & Schuster, 1995)
- “The Antidote: Inside the World of New Pharma” by Barry Werth (Simon & Schuster, 2014)
- “Genentech: The Beginnings of Biotech” by Sally Smith Hughes (University of Chicago Press, 2011)
- “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)
- “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 and the student has a previous violation at CWRU, this violation will result in failure of the 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>.

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 after 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,

A handwritten signature in black ink, reading "Martin D. Snider". The signature is fluid and cursive, with the first name "Martin" and last name "Snider" clearly distinguishable.

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