

**Faculty Council Meeting**  
**Meeting Minutes**  
Monday, June 13, 2022  
4:00-5:30PM – Hybrid Meeting

Timing	Agenda Item	Presenter	Summary of discussion	Action items/Motions/ Votes
4:01-4:04PM	Welcome and Chair Announcements	Darin Croft	The Chair called the meeting to order at 4:01PM. The ballot for the elections for Faculty Council and standing committees members will go out shortly. Due to a shortage of candidates for Faculty Council, write-in candidates will be permitted. Dr. Croft thanked the Faculty Council members for their participation this academic year, and to those members whose terms are ending.	
4:04-4:05PM	Approval of the May 16 Faculty Council Minutes		There were no suggested edits or corrections to the minutes.	The minutes are accepted as posted.
4:05-4:07PM	Faculty Council Steering Committee Report of Activities	Matthias Buck	Dr. Buck presented a summary report of activities for the June 6 Faculty Council Steering Committee meeting.	
4:07-4:19PM	Biotech MS Proposal	Susan Wang	Dr. Wang presented an overview of the Biotech MS proposal which focuses on hands-on training in laboratory research to prepare graduates for careers in biotechnology.	<p>A motion was proposed by a FC representative and seconded by a FC representative to approve the Biotech MS proposal.</p> <p>Vote: 29 were in favor, 1 was against, and 3 abstained. The motion is approved.</p>

4:19-4:23PM	Medical Student Admissions Committee (MSAC) Charge	Darin Croft	Dr. Croft presented a summary of the changes that have been proposed for the Program Review Committee (PRC) charge.	A motion was proposed by a FC representative and seconded by a FC representative to approve the proposed changes for the Program Review Committee (PRC) charge.  Vote: 32 were in favor, 0 were against, and 1 abstained. The motion is approved.
4:23-4:24PM	New Business		When solicited, no new business items were presented.	
4:24PM	Adjourn		The Chair adjourned the meeting at 4:24PM. All were invited to a reception to follow in the Wolstein Auditorium Lobby.	

**Members Present**

Moises Auron  
Robert Bonomo  
Neil Bruce  
Matthias Buck  
Dan Cai  
Mohammad Chaaban  
Darin Croft  
Margot Damaser  
Jonathan Emery  
Stephen Fink  
Thomas Gerken  
Amy Hise

Alex Huang  
Andrew Jones  
Vijaya Kosaraju  
Kelly Lebak  
Lia Logio  
Peter MacFarlane  
Mariel Manlapaz  
Danny Manor  
Jennifer McBride  
William Merrick  
Sam Mesiano  
David Mihal

Dean Nakamoto  
Anastasia Rowland-Seymour  
Elie Anthony Saade  
Ashleigh Schaffer  
Hemalatha Senthilkumar  
Linda Dalal Shiber  
Usha Stiefel  
Ben Strowbridge  
Daniel Tisch  
Mark Walker  
Susan Wang

**Members Absent**

Blaine (Todd) Bafus  
Corinne Bazella  
Melissa Bonner  
Aleece Caron  
Bryan Carroll  
Jae Sung Cho  
David DiLorenzo  
Katherine DiSano  
Corinna Falck-Ytter  
Robert Geertman  
Stan Gerson  
Wendy Goodman  
Matthew Grabowski  
Peter Harte  
Alia Hdeib

Jeffrey Hopcian  
Alyssa Hubal  
Jessie Jean-Claude  
Peter K. Kaiser  
Eric W. Kalar  
Ankur Kalra  
Thomas J. Knackstedt  
Sangeeta Krishna  
Vinod Labhasetwar  
Erin Lamb  
Bill Leatherberry  
Nathan Mesko  
Rocio Moran  
Attila Nemeth  
George Ochenjele

Nimitt Patel  
Arne Rietsch  
Tamer Said  
Jacek Skowronski  
Courtney Smalley  
Joseph Tagliaferro  
Sarah Tehranisa  
Allison Vidimos  
Satish Viswanath  
Johannes von Lintig  
James Wilson  
Jamie Wood  
Wei Xiong  
Samina Yunus

**Others Present**

Nicole Deming  
Joyce Helton  
Anna Maria Hibbs  
Cynthia Kim

Allyson Kozak  
Varun Kshetry  
Ben Roitberg

Joan Schenkel  
Martin Snider  
Ray White

# Today's agenda

1. Chair's Announcements (Darin Croft)
2. Approval of Minutes from May Meeting
3. Steering Committee Report (Matthias Buck)
4. Proposal for New MS in Biotechnology (Susan Wang)
5. Change to Medical Student Admissions Committee Charge (Darin Croft)
6. New Business

# Elections

**\*\*\*Watch your email for election ballots\*\*\***

**Votes must be received by June 27th**

1. Faculty Council Elections (Steering Committee, NEC)
  - Be prepared to write-in candidates for both committees
2. SOM Elections (Standing Committees of the Faculty)
  - Contact Scott Howard ([n.scott.howard@uhhospitals.org](mailto:n.scott.howard@uhhospitals.org)) or Nicole Deming ([nmd11@case.edu](mailto:nmd11@case.edu)) with questions



**CASE WESTERN RESERVE**  
**UNIVERSITY**  
SCHOOL OF MEDICINE



University  
Hospitals



Cleveland Clinic



**Metro  
Health**

**VA**



U.S. Department  
of Veterans Affairs

# Thank you for your service!

- If your term on Faculty Council is ending, thank you for contributing to Faculty governance in the SOM!
- Continuing members: we will meet again in September
- New members: orientation is Monday, August 15<sup>th</sup>

**\*Year-end reception will follow today's meeting\***



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University  
Hospitals



Cleveland Clinic



Metro  
Health

VA



U.S. Department  
of Veterans Affairs

# Got milk (formula)?

- To donate newborn care baby formula, fill out this form:
  - <https://tinyurl.com/2p8ns6wr>
- If you are seeking formula, fill out this form:
  - <https://tinyurl.com/mrxbubf4>
- All responses and personal information will be kept confidential. Contact Dr. Jessica Madden with any questions: [primrosenewborncare@gmail.com](mailto:primrosenewborncare@gmail.com)



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University  
Hospitals



Cleveland Clinic



Metro  
Health

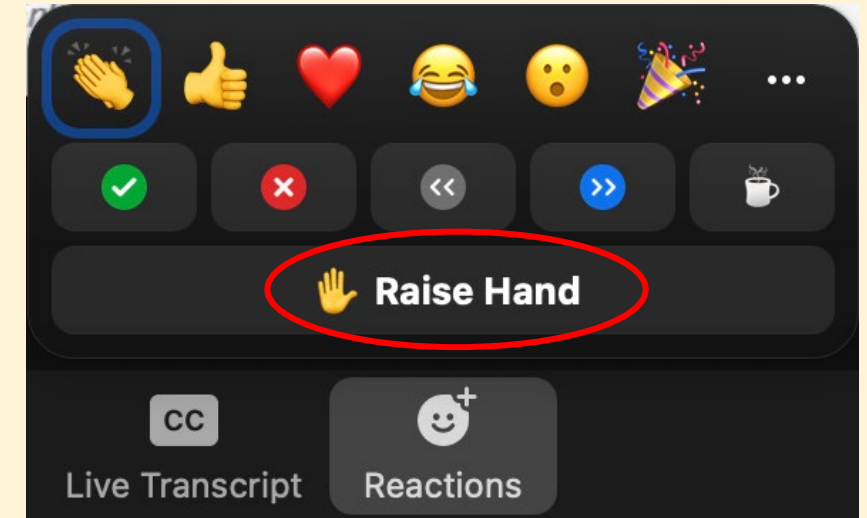
VA



U.S. Department  
of Veterans Affairs

# Have something to say?

- Raise your hand
  - Reactions menu in Zoom
  - Please do this in Wolstein, too!
- Wait to be acknowledged.
- Be clear and to the point.
- TODAY ONLY: If you are attending via Zoom, you can also type your question/comment in Chat; a designated in-person attendee will monitor and read Chat messages





**Faculty Council Meeting**  
**Draft Meeting Minutes**  
Monday, May 16, 2022  
4:00-5:30PM – ZOOM Meeting

Timing	Agenda Item	Presenter	Summary of discussion	Action items/Motions/ Votes
4:02-4:04PM	Welcome and Chair Announcements	Darin Croft	The Chair called the meeting to order at 4:02PM. Dr. Croft reminded Faculty Council that today was the deadline to be nominated for the open seats on the Nominations and Elections Committee and Steering Committee. Anyone nominated today must submit a statement of interest.	
4:04-4:05PM	Approval of the April 18 Faculty Council Minutes		There were no suggested edits or corrections to the minutes.	The minutes are accepted as posted.
4:05-4:12PM	Faculty Council Steering Committee Report of Activities	Matthias Buck	<p>Dr. Buck presented a summary report of activities for the May 2 Faculty Council Steering Committee meeting. The benefits of closed captioning for the Faculty Council Meeting was discussed, and it was decided to use this feature during meetings. The issue may be revisited at a future time.</p> <p>Acting on behalf of the Faculty Council in between scheduled meetings, the Faculty Council Steering Committee approved the candidates for graduation.</p>	
4:12-4:22PM	Nominations for Faculty Council Elections for Steering Committee and Nomination and Elections Committee	Darin Croft	<p>Those nominated by others and who accepted their nomination for the Faculty Council Steering Committee were Johannes von Lintig, Peter Harte, and Usha Stiefel. Anastasia Rowland-Seymour self-nominated.</p> <p>No nominations were made during the meeting for the seats on the Nominations &amp; Elections Committee.</p>	Those nominated today must submit their statements of interest as soon as possible.

4:22-4:30PM	Revised Program Review Committee (PRC) Charge	Marvin Nieman	<p>Dr. Nieman presented a summary of the changes that have been proposed for the Program Review Committee (PRC) charge.</p>	<p>A motion was proposed by a FC member to accept the changes made to the Program Review Committee (PRC) charge. The motion does not require a second as it came from the committee.</p> <p>Vote: 43 were in favor, 0 were against, and 0 abstained. The motion is approved.</p>
4:30-5:15PM	New Business		<p>Dr. Matthias Buck under new business introduced an issue that arose from Agata Exner's report on the Committee on Budget and Finance (see attached) concerning the process for the CWRU tenure track appointments for faculty in UH Clinical Departments. There was concern that the tenured and tenure track appointments did not comply with the Faculty Handbook around the tenure guarantee.</p> <p>The Dean logged on and was able to comment. Discussion included comments from members and the Dean on financial obligations and evaluation of tenure.</p> <p>It was decided to refer the matter to the Faculty Senate for consideration and request a report back to the SOM Faculty Council.</p>	<p>A motion was proposed by a FC member, and seconded by a FC member to end the discussion.</p> <p>Vote: 36 were in favor, 2 were against, and 4 abstained. The motion is approved.</p> <p>A motion was proposed by a FC member, and seconded by a FC member that Faculty Council would refer the matter of CWRU-UH Tenure Track/Tenured appointments to the Faculty Senate for review of their compatibility with the Faculty Handbook and consistency with policies and procedures in other schools in the university and that such findings be reported back to the SOM Faculty Council.</p> <p>Vote: 31 were in favor, 1 was against, and 11 abstained. The motion is approved.</p>

5:15PM	Adjourn		There being no other issues to be addressed, the Chair adjourned the meeting at 5:15 PM.	
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**Members Present**

Moises Auron  
Blaine (Todd) Bufus  
Robert Bonomo  
Neil Bruce  
Matthias Buck  
Bryan Carroll  
Mohammad Chaaban  
Darin Croft  
Jonathan Emery  
Stephen Fink  
Stan Gerson  
Wendy Goodman  
Matthew Grabowski  
Peter Harte  
Amy Hise

Alex Huang  
Alyssa Hubal  
Jessie Jean-Claude  
Vijaya Kosaraju  
Vinod Labhasetwar  
Erin Lamb  
Bill Leatherberry  
Kelly Lebak  
Danny Manor  
Jennifer McBride  
William Merrick  
Sam Mesiano  
David Mihal  
Dean Nakamoto  
Attila Nemeth

Arne Rietsch  
Anastasia Rowland-Seymour  
Ashleigh Schaffer  
Hemalatha Senthilkumar  
Courtney Smalley  
Usha Stiefel  
Ben Strowbridge  
Sarah Tehranisa  
Daniel Tisch  
Satish Viswanath  
Johannes von Lintig  
Susan Wang  
Jamie Wood  
Samina Yunus

**Members Absent**

Corinne Bazella  
Melissa Bonner  
Dan Cai  
Aleece Caron  
Jae Sung-Cho  
Margot Damaser  
David DiLorenzo  
Katherine DiSano  
Corinna Falck-Ytter  
Robert Geertman  
Thomas Gerken  
Alia Hdeib

Jeffrey Hopcian  
Andrew Jones  
Peter K. Kaiser  
Eric W. Kalar  
Ankur Kalra  
Thomas J. Knackstedt  
Sangeeta Krishna  
Lia Logio  
Peter MacFarlane  
Mariel Manlapaz  
Nathan Mesko  
Rocio Moran

George Ochenjele  
Nimit Patel  
Elie Anthony Saade  
Tamer Said  
Linda Dalal Shiber  
Jacek Skowronski  
Joseph Tagliaferro  
Allison Vidimos  
Mark Walker  
James Wilson  
Wei Xiong

**Others Present**

Piet de Boer

Nicole Deming

Joyce Helton

Cynthia Kim

Cynthia Kubu

Marvin Nieman

Jo Ann Wise

# **Proposal for an MS in Biotechnology Degree**

There is a need for a program that gives hands-on training in laboratory research to prepare graduates for careers in biotechnology.

The BIOC, NEUR, and PHRM departments are proposing this program to meet that need.

# Proposal for an MS in Biotechnology Degree

The program has 3 key components

-Biotechnology core courses. Developed in the Biochemistry MS. These will move to the new program.

-Tracks in Biochemistry, Neurosciences, and Pharmacology with specialized coursework.

-Internships in biotechnology labs in companies or with CWRU faculty members. EnRich will assist; they have placed MS students in ~20 companies.

# Proposal for an MS in Biotechnology Degree

Leadership: Susan Wang (BIOC), Chris Dealwis (PHRM) and David Friel (NEUR), with an oversight committee.

Enrollment: We expect 5 students the first year, with growth after that. The program is sustainable with 10-15 per year.

# Proposal for an MS in Biotechnology Degree

Finances: Will generate net tuition income with full enrollment.

Endorsements: Endorsed by Dean Gerson, the three participating departments, and the SOM ad hoc program review committee.



# **Proposal for a Master's Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology**

## **Introduction:**

The Departments of Biochemistry, Neurosciences, and Pharmacology are proposing a new Master's Degree in Biotechnology for motivated students who wish to prepare for entry into the biotechnology and/or pharmaceutical industries. Many entry-level employees have little experience in hands-on laboratory techniques and in working academic and industrial laboratories. They must be trained on the job. Our proposed non-thesis MS program will bridge this gap by providing fundamental laboratory experience that an industrial employer can build upon with more specialized knowledge and skills.

The key to this degree is an internship in industry or an academic research laboratory. Further, students can choose a concentration in either Biochemistry, Neurosciences, or Pharmacology, depending on their interests. The program provides students with laboratory experience through a combination of hands-on laboratory coursework as well as a culminating semester-long internship in a biotech company or an academic laboratory. This MS program builds upon the Biochemistry Department's initiative in Experimental Biotechnology and recently-approved Graduate Certificate in Experimental Biotechnology.

The Master's degree in Biotechnology requires 30 credit hours of work and can be completed in 1.5-2 years of full-time study. We anticipate that this degree will be attractive for research assistants at CWRU who wish to add to their skills and/or seek promotion. As a consequence, the degree can be completed on a part time basis.

Biochemistry and Pharmacology faculty members conducted "listening tours", consulting with faculty colleagues and with scientists at biotechnology and pharmaceutical companies including Athersys, Sherwin-Williams, BioEnterprise, and Eli Lilly. From these meetings, we defined a set of skills and knowledge about research that employers value. 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. The program was designed based on information we collected from these conversations.

## **Biotechnology Curriculum**

The program consists of the following elements, which are described in detail below:

- **Biotechnology Core Curriculum**. This section gives students a solid foundation in laboratory skills, the design and interpretation of experiments, and the practice of science.
- **Tracks in Biochemistry, Pharmacology, and Neurosciences**. Didactic courses in these tracks give students a solid foundation in one of these areas of biomedical science.
- **Internship**. Hands-on laboratory experiences in labs at CWRU or in internships at biotechnology companies will give students real-world experiences that will be valuable assets as they move into the real world after graduation.

## **Biotechnology Core Curriculum**

Students will complete the biotechnology core curriculum (7-10 credits) in their first year as follows:

## **Proposal for a Master's Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology**

- Basic laboratory skills: BIOC 500, Biotechnology Laboratory: Molecular Biology Basics (fall semester). This course establishes the foundation for hands-on experience with basic laboratory skills, standard operating procedures, and laboratory notebook maintenance essentials.
- Advanced laboratory skills: BIOC 502A-C (spring semester): a set of in-depth lab courses in biochemistry and molecular biology. These cover experimental techniques used for the engineering, preparation, and study of proteins and nucleic acids, methods focusing upon eukaryotic and prokaryotic cells, and mass spectrometry techniques. *Students will take some or all these courses, depending on which track they choose.*
- Experimental design: BIOC 501, Biochemical and Cellular Techniques for Biotechnology (fall semester) introduces the rationale underlying key techniques and presents how these techniques are used to answer experimental questions.
- Biotechnology practice, funding, and intellectual property: BIOC 511, Practice and Professionalism in Biotechnology (fall semester) introduces students to the business and practical aspects of biotechnology.

### **Tracks in Biochemistry, Neurosciences, and Pharmacology**

The tracks will allow students to specialize in one of these three areas (see Appendix 1). The tracks include specialized courses, which will give students a core of knowledge. Students will also take some or all our laboratory courses, BIOC 502A-C, with topics selected to reflect the skills needed for research in that track. Finally, students will select their internship or research experiences to fit their interests and areas of specialization.

## Proposal for a Master's Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology

**Biochemistry Track:** The Biochemistry track has the following requirements:

<u>Biotechnology Core</u>		<u>Track-specific courses</u>		<u>Internship</u>	
BIOC 500 (1)	Biotechnology Laboratory	BIOC 407 (4)	Introduction to Biochemistry: From Molecules To Medical Science	BIOC 610	Internship
BIOC 501 (3)	Biochemical and Cellular Techniques for Biotechnology	BIOC 408 (4)	Molecular Biology		
BIOC 502ABC (5)	Biotechnology Laboratory. (biochemical, molecular and cell biological, and mass spectrometric techniques)	Elective Courses (9)*			
BIOC 511 (1)	Practice and Professionalism in Biotechnology				
<b>10 credits</b>		<b>17 credits</b>		<b>3 credits</b>	

\*Electives for the Biochemistry Track:

BIOC 410 <sup>†</sup>	Microbial Physiology and Therapeutic Opportunities	BIOC 601	Biochemical Research
BIOC 411 <sup>†</sup>	Antimicrobial Therapies and Resistance	BIOL 426	Genetics
BIOC 412	Proteins and Enzymes	BIOL 443	Microbiology
BIOC 415 <sup>†</sup>	Biological Membranes and Their Proteins	PATH 416	Fundamental Immunology
BIOC 434	Structural Biology	PATH 475	Cell and Molecular Foundations of Pathology
BIOC 444 <sup>†</sup>	Molecular Endocrinology	PHOL 401AB	Physiology and Biophysics of Molecules and Cells
BIOC 445 <sup>†</sup>	Metabolic Dysregulation and Human Disease	PHRM 409	Principles of Pharmacology
BIOC 450	Molecular Basis of Cancer	PQHS 431	Statistical Methods I
BIOC 453 <sup>†</sup>	Biochemical Pathways in Cancer Therapeutics	SYBB 411ABC	Survey of Bioinformatics
BIOC 460	Advanced Technologies for Cancer Research		

<sup>†</sup>The Biochemistry Department has proposed 6 new courses. These will be available as electives to Biotechnology MS students once they are approved.

## Proposal for a Master’s Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology

**Pharmacology Tracks:** There will be tracks in Pharmacology and in Research-Intensive Pharmacology. The Pharmacology track is appropriate for students who seek employment immediately after completing their degree, whereas the research-intensive track is appropriate for students who wish to pursue a PhD. Full-time students in the Pharmacology and Research-Intensive Pharmacology tracks must complete their internships during the spring semester of the second year.

The Pharmacology Track has the following requirements:

<u>Biotechnology Core</u>		<u>Track-specific courses</u>		<u>Internship</u>
BIOC 500 (1)	Biotechnology Laboratory	PHRM 409 (3)	Principles of Pharmacology	PHRM 610 Internship
BIOC 501 (3)	Biochemical and Cellular Techniques for Biotechnology	PHRM 525 (3)	Topics in Cell and Molecular Pharmacology	
BIOC 502A (2)	Biotechnology Laboratory.	PHRM 511 (1)	Pharmacology Seminar Series (2x)	
BIOC 511 (1)	Practice and Professionalism in Biotechnology	PHRM 528 (3)	Contemporary Approaches to Drug Discovery	
		PQHS 432 (3)	Statistical Methods 1	
		Elective Courses (6)*		
<b>7 credits</b>		<b>20 credits</b>		<b>3 credits</b>

\*Electives for the Pharmacology Track:

BIOC 502B (2)	Biotechnology Laboratory: Eukaryotic Molecular and Cellular Biology,
BIOC 502C (1)	Biotechnology Laboratory: Mass Spectrometry
EBME 426 (3)	Nanomedicine
PHRM 527 (3)	Pathways to Personalized Medicine
PHRM 466 (3)	Cell Signaling
PHRM 601	Independent Study and Research
PQHS 457 (3)	Current Issues in Genetic Epidemiology: Design and Analysis of Sequencing Studies

**Proposal for a Master’s Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology**

**The Research-Intensive Pharmacology track has the following requirements:**

<u>Biotechnology Core</u>		<u>Track-specific courses</u>		<u>Internship</u>	
BIOC 500 (1)	Biotechnology Laboratory	PHRM 401 (3)	Principles of Pharmacology I: The Molecular Basis of Therapeutics	PHRM 610	Internship
BIOC 501 (3)	Biochemical and Cellular Techniques for Biotechnology	PHRM 402 (3)	Principles of Pharmacology I: The Physiological Basis of Therapeutics		
BIOC 502A (2)	Biotechnology Laboratory.	PHRM 511 (1)	Pharmacology Seminar Series (2x)		
BIOC 511 (1)	Practice and Professionalism in Biotechnology	PHRM 525 (3)	Topics in Cell and Molecular Pharmacology		
		PHRM 528 (3)	Contemporary Approaches to Drug Discovery		
		PQHS 431 (3)	Statistical Methods 1		
		Elective Courses (3)*			
<b>7 credits</b>		<b>20 credits</b>		<b>3 credits</b>	

\*Electives for the Pharmacology Research-Intensive Track:

BIOC 502B (2)	Biotechnology Laboratory: Eukaryotic Molecular and Cellular Biology
BIOC 502C (1)	Biotechnology Laboratory: Mass Spectrometry
EBME 426 (3)	Nanomedicine
PHRM 527 (3)	Pathways to Personalized Medicine
PHRM 466 (3)	Cell Signaling
PHRM 601	Independent Study and Research
PQHS 457 (3)	Current Issues in Genetic Epidemiology: Design and Analysis of Sequencing Studies.
EBME 416 (3)	Biomaterials for Drug Delivery. <i>(May be selected if it is taught at a different time; it currently conflicts with required courses.)</i>

## Proposal for a Master's Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology

**Neurosciences Track:** The Neurosciences track has the following components:

<u>Biotechnology Core</u>		<u>Track-specific courses</u>		<u>Internship</u>	
BIOC 500 (1)	Biotechnology Laboratory	NEUR 401 (3)	Biological Mechanisms of Brain Disorders	NEUR 610	Internship
BIOC 501 (3)	Biochemical and Cellular Techniques for Biotechnology	NEUR 402 (3)	Principles of Neural Science		
		NEUR 403 (3)	Methods in Neuroscience Research		
BIOC 502B (2)	Biotechnology Laboratory: Eukaryotic Molecular and Cellular Biology	NEUR 415 (1+1)	Neuroscience Seminar, 2 semesters		
BIOC 511 (1)	Practice and Professionalism in Biotechnology	Elective Courses (9)*			
<b>7 credits</b>		<b>20 credits</b>		<b>3 credits</b>	

\*Electives for the Neurosciences Track:

BIOC 412	Proteins and Enzymes	PATH 475	Cell and Molecular Foundations of Pathology
BIOC 434	Structural Biology	PHOL 401AB	Physiology and Biophysics of Molecules and Cells
BIOC 450	Molecular Basis of Cancer	PHRM 409	Principles of Pharmacology
BIOC 460	Advanced Technologies for Cancer Research	PHRM 466	Cell Signaling
BIOL 426	Genetics	PQHS 431	Statistical Methods I
NEUR 419	Critical Thinking in Neuroscience	SYBB 411ABC	Survey of Bioinformatics
NEUR 601	Research in Neuroscience		

# **Proposal for a Master's Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology**

## **Internship**

The program requires an internship at a biotechnology company or in a faculty research lab at CWRU that will serve as the culminating experience for the MS degree. This course (BIOC/NEUR/PHRM 610, Internship in Experimental Biotechnology) will provide the student with an opportunity to enhance their resume and future employment prospects with real-world experience. The internship must be completed in a laboratory and involve some type of benchwork. Students are expected to work ~150 hours to accumulate 3 credit hours. This is consistent with the university's definition of a graduate credit hour. Students must complete 3 credit hours but are encouraged to participate in the internship program for a longer period.

Our program will work with the EnRICH office in the School of Medicine and the Office of Post-Graduate Planning and Experiential Education to find internships for students at biotech companies. They have placed students in nearly 300 experiences with over 30 local companies and organizations since 2016. A letter from Dr. Tessianna Misko, the EnRICH director is included with the revised proposal. In addition, several companies outside of Cleveland (e.g., New England Biolabs) regularly offer competitive and typically paid summer internship programs. Dr. Susan Wang, current Director of Master's Programs in Biochemistry, has experience securing summer and/or semester-long student internships from her past experience as a trainer on Washington State University's NIH-funded Protein Biotechnology Training Grant (2009-2017). Students in the Biotechnology MS will be encouraged to compete for paid positions. Columbus-based Forge Biologics has a partnership with the School of Medicine and is looking for interns who could progress to permanent positions in the company. One of our previous master's students in Biochemistry who completed the biotechnology track worked with Forge in 2021. She had a great experience and may receive an employment offer.

Students may also perform research in a faculty laboratory for their internship. The expected workload/time commitment is similar: completion of ~150 hours of laboratory research for 3 credits. Part-time students who are already employed in a laboratory may complete their internship in their existing laboratory so long as they work on a defined research project in which they are involved in the design and execution of experiments and the interpretation of results.

**Expectations:** Students will be responsible for background reading and obtaining information about the internship before it begins. They will meet with the supervisor (either in a company or a CWRU faculty member) ahead of time to define the project and expectations. They will be responsible for completing 150 hours of work, keeping research records and reporting on their progress. They will participate in research and in all laboratory activities. They will meet with supervisor regularly and provide three interim progress updates (3-5 pages) to the MS directors during the semester. They will also complete a detailed written report (10-20 pages) and make an oral presentation about their work to MS program students.

**Evaluation:** The faculty supervisor or mentor at the company will submit a written evaluation of the student. Upon completion of the internship, the student will submit a written report and make an oral presentation to a committee of faculty of the Biotechnology MS program. This presentation may be given remotely if the student is unable to return to CWRU. The course will

## **Proposal for a Master's Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology**

be graded Pass/No Pass. Grades will be assigned based on student effort (as evaluated by the supervisor) and the student's written report and presentation.

### **Evidence of Need**

The creation of this program arose from the "listening tour" of biotechnology and pharmaceutical firms conducted by Biochemistry and Pharmacology faculty described on p. 1. From these discussions, we defined skills and knowledge that will be important for people entering the labs of companies in these industries. The laboratory and didactic experiences in the proposed program will give students that skill set. Moreover, in a survey of biotech and pharmaceutical firms conducted by the SOM graduate education office, the desirable components of a biotech MS program were deemed to be graduate level science courses, laboratory techniques, technical scientific communication, the FDA regulatory process, and intellectual property. All of these components are strongly represented in this program.

The US Bureau of Labor Statistics predicts the 10-year of jobs in the biotech and pharmaceutical industry at 7 - 17%, above the average for all occupations. This supports a steady demand for graduates of our program.

**Similar programs at other institutions:** There are undergraduate- and associate-level programs in biotechnology at several institutions in Ohio, including Kent State, Stark State, and Ursuline. However, there are no existing biotechnology MS programs in Ohio. Nationwide, there are ~20 programs similar to the ones proposed here. These programs are mostly on the east coast, so we have an opportunity to recruit and engage students from our region.

**Overlap with other programs and courses at CWRU:** The Department of Biology offers an Entrepreneurial Biotechnology Master's Degree. This is a professional MS program that is thesis-based (Plan A). The overlap between our proposed curricula and their existing master's degree is minimal, as they have a business/entrepreneurship focus and do not require laboratory coursework.

The National Center for Regenerative Medicine in the School of Medicine offers a Regenerative Medicine and Entrepreneurship Master's Degree. The scientific focus of this program upon regenerative medicine and stem cell biology differs from our proposed Biotechnology tracks in Biochemistry, Neurosciences, and Pharmacology. Our curriculum focuses on hands-on laboratory coursework, which is not required in their master's degree.

The existing Experimental Biotechnology Track in the Biochemistry MS program does overlap with the Biochemistry Track of the Biotechnology MS degree. When this Biotechnology MS proposal is approved, we will eliminate the Experimental Biotechnology Track as an option for incoming Biochemistry MS students, beginning with Biochemistry MS students who enroll in the semester after the Biotechnology MS program begins. A Program Action Form to end this track has been submitted. However, Biochemistry MS students will still be able to take BIOC 500, 501, and 502A-C courses that make up this track. Most students in the Biochemistry MS program wish to pursue PhD degrees, a focus that is different from the Biotechnology MS



## **Proposal for a Master's Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology**

program. Therefore, even though students in the two programs will take some of the same courses, this does not represent significant overlap.

The Department of Pharmacology is developing a new MS program in Translational Pharmaceutical Science. This program will be targeted to 1) students with an undergraduate degree seeking an entry-level position in the pharmaceutical industry, and 2) students entering with a clinical, scientific, or other terminal degree hoping to leverage their prior training and job experience to enter the pharmaceutical industry. The proposed Translational Pharmaceutical Science MS program does overlap somewhat with the Pharmacology Tracks for the Biotechnology MS degree. However, the Translational Pharmaceutical Science MS program will not require hands-on laboratory coursework and will provide a more multidisciplinary curriculum, including tracks and electives in Pharmacology and Drug Discovery; Biostatistics and Bioinformatics; and Pharmaceutical Business and Law.

Other departments offer laboratory courses that bear some similarity to the core laboratory courses, BIOC 500 and 502. However, they have limited overlap with these offerings. BIOL 401, Biotechnology Laboratory: Genes and Genetic Engineering is a 3-credit course that focuses on molecular biology in plants; it does not include the study of proteins, mammalian cell culture, and other frequently used analytical techniques 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 does not include molecular biology techniques and it is an undergraduate course. Based on these comparisons, BIOC 500 and 502 are courses that offer experience in research areas that are not represented well in other courses. A new regenerative medicine (RGME) laboratory course is under development. This course includes some cell culture techniques, as does BIOC 502B, but it focuses upon flow cytometry and other techniques that are not covered in 502B and is currently projected to only be open to RGME master's students.

### **Projected Enrollment**

We expect to enroll 5 students in this program in its first year and increase to 15 students per year by the third year, which is a sustainable enrollment, based on projected availability of internships and space in the biotechnology lab courses. If we can recruit higher numbers of students, we will need to expand teaching lab space. This can be supported by the increased tuition income.

### **Leadership**

The program will be led by the MS program directors or the chair's designee in the three departments. The current leaders are Dr. Susan Wang (Biochemistry), Dr. Chris Dealwis (Pharmacology) and David Friel (Neurosciences). These co-directors will oversee the development and delivery of the curriculum. They will also oversee admissions, orientation of new students, and will advise students in the programs. They will meet individually with every student at least once per semester. More frequent meetings will be held at the request of students and/or for students who are having academic difficulties.

## **Proposal for a Master's Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology**

The program will have an oversight committee that will meet quarterly with the program co-directors. The oversight committee will have a representative from each department. These representatives will be chairs of the departments' Graduate Education Committees, Vice Chair for Education, or the chairs' designees. The oversight committee will meet with the program co-directors at least three times per year to discuss student progress, recruiting, admissions. During the first few years of the program, these meetings will be particularly important to establish policies, assess space in teaching labs, and evaluate student success in securing internships.

### **Admission**

An MS Biotechnology admissions committee including members from all departments will be convened to evaluate applications. The committee will have members from all departments, who will be appointed by their respective department chairs.. Applicants must have an undergraduate degree in chemistry or the biological sciences along with a minimum GPA of 3.0 and must indicate a preference for Biochemistry, Neuroscience, or Pharmacology. International applicants must meet the Graduate School's standards for proficiency in English. This program will be marketed through a webpage on the SOM site that is independent of the participating departments.

Due to capacity limitations in our biotechnology teaching laboratory, we can accommodate a maximum of 28 students per year in the BIOC 500 and 502ABC laboratory courses. Since the BIOC 502 courses are taught by the Department of Biochemistry and are available to Biochemistry MS students, this limit includes students in both MS programs. In the short term, space in the laboratory courses will not be a problem. The Biochemistry MS program averages 10 students per year, so there will be ample space for Biotechnology MS students. If teaching lab space is an issue in the long term, we will work with leadership in the SOM to increase the size of the teaching laboratory.

### **Administrative support**

The educational coordinators from each of the participating departments will share equally in administration and support of this MS program. We estimate that this will require 5% effort from each of the administrators. Since the departments already have full-time graduate coordinators, they will be able to accommodate the small amount of additional effort.

### **Effort**

Running this program will take significant additional effort. However, sharing this effort among faculty and administrators from the participating departments will make the workload manageable with our existing faculty and staff. In addition, the tuition income from this program will provide enough income to support the departments' efforts.

### **Finances**

This program will use a formula for the distribution of tuition income that is different from the one used for most MS students in the School of Medicine. This is because this program involves several departments and students will be based in the program, rather than a single department. Tuition income will be distributed as follows:

- When students take a course from one of the participating departments, the entire tuition return will go to that department.

## Proposal for a Master’s Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology

- When students take an elective course taught by a department that doesn’t participate in the program, we will use a modification of the SOM formula that shares tuition income between the department that offers the course and the student’s home department. In this case, the teaching department will receive the share specified by the SOM formula. The share that is allocated to the home department will be shared equally by the participating departments.

### Revenue projection

This projection is based on the following information and projections:

Tuition income for credit hours taken in a participating department	\$1,065 per credit hour
Tuition income for courses taken outside of a participating department	\$777 for the "home department" and \$288 for the department that offers the course

### Credit hours taken by students:

Credits by Department	Biochemistry Track	Pharmacology Track	Research-Intensive Pharmacology Track	Neuroscience Track
Biochemistry	24	7	7	7
Pharmacology		14	17	
Neurosciences				17
Other Departments	6	9	6	6

### Tuition flows to departments per student (during entire enrollment in the program)

	Biochemistry Track	Pharmacology Track	Research-Intensive Pharmacology Track	Neuroscience Track
To Biochemistry	\$27,114	\$9,786	\$9,009	\$9,009
To Pharmacology	\$1,554	\$17,241	\$19,659	\$1,554
To Neurosciences	\$1,554	\$2,331	\$1,554	\$19,659
To Other Departments	\$1,728	\$2,592	\$1,728	\$1,728

### Costs of running the Biotechnology Core Courses

All the courses in Biotechnology Core are presented by the Biochemistry Department. The laboratory courses in the core (BIOC 500, 502ABC) represent a significant expense because of the costs for equipment and supplies and the salary of a laboratory manager. Our revenue distribution arrangement, where department that teaches a course will receive all the tuition revenue will offset these expenses, as shown in the projection below.

## Proposal for a Master's Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology

### Revenue to the Biochemistry Department for the Biotechnology Core courses (BIOC 500, 501, 502ABC)

Students/year	BIOC Track students	NEUR Track students	PHRM Track students	Total Credits	Tuition Income
5	2	1	2	41	<b>43,665</b>
10	4	3	3	82	<b>87,330</b>
15	5	5	5	120	<b>127,800</b>

The Biochemistry Track requires 10 credit hours in the Biotechnology Core. The other tracks require 7 credits in the Biotechnology Core

### Cost of Teaching the Biotechnology Laboratory Courses:

Students/year	Supplies	Lab manager salary + fringe	Total expense	Tuition Income	Net
5	21,000	55,000	<b>76,000</b>	<b>43,665</b>	<b>-32,335</b>
10	24,000	55,000	<b>79,000</b>	<b>87,330</b>	<b>8,330</b>
15	27,000	55,000	<b>82,000</b>	<b>127,800</b>	<b>45,800</b>

The illustration shows that ten MS Biotech students per year will generate enough revenue to meet the costs of the lab courses. This is acceptable because additional revenue for the Biochemistry Department will be generated by i) enrollment of Biochemistry MS students in these courses and ii) enrollment of Biotechnology MS students in other didactic Biochemistry courses.

Note that we have excluded the startup costs for the teaching lab from this analysis because these costs have already been defrayed by tuition from the Biochemistry MS program during the creation of the Biotechnology Track within this program.



SCHOOL OF MEDICINE  
CASE WESTERN RESERVE  
UNIVERSITY

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January 18, 2022

J. Alan Diehl, Ph.D.  
Leonard and Jean Skeggs Professor Chair Department of Biochemistry  
Deputy Director and COO, Case Comprehensive Cancer Center  
Case Western Reserve University  
Cleveland, OH 44106

Dear Alan,

I am writing to confirm my enthusiastic support for the creation of an MS in Biotechnology Program in the School of Medicine. This program, which is a cooperative effort of the Biochemistry, Neurosciences, and Pharmacology departments in our school, will be a strong addition to our educational portfolio.

The goal of this program is to educate and train students for employment in the biotechnology and pharmaceutical industries and in academic laboratories. The design of this program is well-suited for that purpose. The biotechnology core courses give students education in experimental design and hands-on training in lab techniques. In addition, the program's tracks in Biochemistry, Neurosciences, and Pharmacology will prepare students for specialized work in those areas. Finally, the program's internship in a biotech company or academic laboratory will give students specialized and deep experience that will make them ready for the next step in their careers.

I understand that this program will be incorporate curricular elements that already exist, particularly the biotechnology core courses offered by the Biochemistry Department, so this program can be offered with relatively little additional effort and its startup costs will be small.

In summary, this program will be an important addition to the educational portfolios of the School of Medicine and the Departments of Biochemistry, Neurosciences, and Pharmacology. I am happy to endorse this effort.

Sincerely,

A handwritten signature in black ink, appearing to read "Stanton L. Gerson".

Stanton L. Gerson, M.D.



SCHOOL OF MEDICINE

CASE WESTERN RESERVE  
UNIVERSITY

April 28, 2022

To whom this may concern:

I am writing this letter in support of the Master of Science Program in Biotechnology jointly housed in the Departments of Biochemistry, Neuroscience and Pharmacology.

[Enhancing Industry Research and Career Horizons](#) (EnRICH) is an experiential learning program housed in the Graduate Education Office here at CWRU School of Medicine (SOM). The program was designed to provide our graduate students with the resources and experiences needed to discover their career ambitions and gain the skills to get there. Through EnRICH, students can engage in a variety of experiences that fit their goals and time constraints for career and professional development, including career mentorship, volunteering, networking, shadowing, and internships (part/full-time and remote). Since 2016, EnRICH has placed students in nearly 300 experiences with over 30 local companies and organizations.

Having an ever-growing portfolio of local and national companies who work with us, EnRICH has become a resource for departments at the SOM who encourage their students to engage in an internship experience as a part of their degree. To provide experiences that are most helpful to our student's development, we welcome partners in a variety of spaces, including but not limited to Research and Development, Intellectual Property/Patent law, Regulatory, Business Development/Entrepreneurship, Medical/Scientific writing, Bioinformatics/Bio IT, and Clinical Research. Local Biotech/Pharmaceutical partners who have provided internships to our students include Athersys, CMC Pharma, Abeona and GenomOncology.

Currently, we work closely with the Regenerative Medicine and Entrepreneurship (RGME) master's program to be a source of student placement into company internships for those that choose to participate in a company internship rather than a research experience here at CWRU. We are currently averaging about 10 internship placements a year, keeping in mind that before RGME began, there was not a consistent need for internships and limitations because of the pandemic had temporarily dampen some outreach and placement of students. I have full confidence that with in-person work resuming, there will be an increased interest from companies to place students. Additionally, until now, EnRICH's focus has been to place students in mostly local internships so that they can participate in tandem with their other coursework or lab obligations. With the freedom to open the internship search beyond the Greater Cleveland area, more opportunities for internships will be available, leaving me with no doubt that EnRICH will be able to support this program's internship needs as well.

If you have any questions or need more information about EnRICH or how we can support this master's program, please feel free to reach out.

Kind regards,

A handwritten signature in cursive script, appearing to read 'Tessianna Misko'.

Tessianna Misko, PhD

*Program Manager of Training and Educational opportunities*

CWRU School of Medicine, Graduate Education Office

10900 Euclid Ave. Wood 175

Cleveland, Ohio 44106

Phone: (216) 368-1158

Email: enrich@case.edu

**Proposal for a Master's Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology**

**Appendix 1 Suggested schedules for students in the Biochemistry, Neurosciences, and Pharmacology tracks**

**Table 1: Schedule for the Biochemistry Track, Full-time students**

<b>Full-Time</b> (credit hours in parentheses)	
<b>Year 1</b>	
<b>Fall</b>	
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
<b>Spring</b>	
BIOC 408 (4)	Molecular Biology
BIOC 502A (2)	Biotechnology Laboratory: Molecular Biology and Biochemical Techniques
BIOC 502B (2)	Biotechnology Laboratory: Eukaryotic Molecular and Cellular Biology
BIOC 502C (1)	Biotechnology Laboratory: Mass Spectrometry Techniques
<b>Year 2</b>	
<b>Fall</b>	
(9)	BIOC and/or other electives
<b>Spring</b>	
BIOC 610*** (3)	Internship

\*\* Students may be excused from BIOC 500 if they have taken an equivalent course elsewhere or have learned the material covered in this course through hands-on experience.

\*\*\* Students may opt to take their required internship during the summer between their first and second years

**Proposal for a Master's Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology**

**Appendix 1 Suggested schedules for students in the Biochemistry, Neurosciences, and Pharmacology tracks**

**Table 2: Schedule for the Biochemistry Track, Part-Time Students**

<b>Part-Time</b>	
<b>Year 1</b>	
<b>Fall</b>	
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
<b>Spring</b>	
BIOC 408 (4)	Molecular Biology
BIOC 502C (1)	Biotechnology Laboratory: Mass Spectrometry Techniques
<b>Year Total: 5 units Fall, 5 units Spring</b>	
<b>Year 2</b>	
<b>Fall</b>	
BIOC 407 (4)*	Introduction to Biochemistry: From Molecules To Medical Science
<b>Spring</b>	
BIOC 502A (2)*	Biotechnology Laboratory: Molecular Biology and Biochemical Techniques
(3)	Elective
<b>Year Total: 4 units Fall, 5 units Spring</b>	
<b>Year 3</b>	
(6)	Electives
<b>Spring</b>	
BIOC 502B (2)	Biotechnology Laboratory: Eukaryotic Molecular and Cellular Biology
BIOC 610*** (3)	Internship

\*\* Students may be excused from BIOC 500 if they have taken an equivalent course elsewhere or have learned the material covered in this course through hands-on experience.

\*\*\*\* Students employed by a research laboratory/company may complete their internship in that laboratory/company but must work on a different project and/or different area of the company



**Proposal for a Master’s Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology**

**Appendix 1 Suggested schedules for students in the Biochemistry, Neurosciences, and Pharmacology tracks**

**Table 3: Schedule for Pharmacology Track, Full-Time Students**

<b>Full-Time</b> (credit hours in parentheses)	
<b>Year 1</b>	
<b>Fall</b>	
PHRM 511 (1)	Pharmacology Seminar Series
PQHS 431 (3)	Statistical Methods I
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
<b>Spring</b>	
PHRM 511 (1)	Pharmacology Seminar Series
BIOC 502A (2)	Biotechnology Laboratory: Molecular Biology and Biochemical Techniques
(6)*****	Approved electives
<b>Year 2</b>	
<b>Fall</b>	
PHRM 409 (3)	Principles of Pharmacology
PHRM 528 (3)	Contemporary Approaches to Drug Discovery
PHRM 525 (3)	Topics in Cell and Molecular Pharmacology
<b>Spring</b>	
PHRM 610*** (3)	Internship

\*\*\*\*\*Approved electives include BIOC 502B (2): Biotechnology Laboratory: Eukaryotic Molecular and Cellular Biology, BIOC 502C (1): Biotechnology Laboratory: Mass Spectrometry, EBME 426 (3): Nanomedicine, PHRM 527 (3): Pathways to Personalized Medicine, PHRM 466 (3): Cell Signaling, or PQHS 457 (3): Current Issues in Genetic Epidemiology: Design and Analysis of Sequencing Studies

**Proposal for a Master’s Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology**

**Appendix 1 Suggested schedules for students in the Biochemistry, Neurosciences, and Pharmacology tracks**

**Table 4: Schedule for Pharmacology (Research-Intensive Track), Full-Time Students**

<b>Full-Time</b> (credit hours in parentheses)	
<b>Year 1</b>	
<b>Fall</b>	
PHRM 511 (1)	Pharmacology Seminar Series
PQHS 431 (3)	Statistical Methods I
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
<b>Spring</b>	
PHRM 401 (3)	Principles of Pharmacology I: The Molecular Basis of Therapeutics
PHRM 511 (1)	Pharmacology Seminar Series
BIOC 502A (2)	Biotechnology Laboratory: Molecular Biology and Biochemical Techniques
(3)*****	Approved elective(s)
<b>Year 2</b>	
<b>Fall</b>	
PHRM 402 (3)	Principles of Pharmacology II: The Physiological Basis of Therapeutics
PHRM 528 (3)	Contemporary Approaches to Drug Discovery
PHRM 525 (3)	Topics in Cell and Molecular Pharmacology
<b>Spring</b>	
PHRM 610*** (3)	Internship

\*\*\*Approved electives include BIOC 502B (2): Biotechnology Laboratory: Eukaryotic Molecular and Cellular Biology, BIOC 502C (1): Biotechnology Laboratory: Mass Spectrometry, EBME 426 (3): Nanomedicine, PHRM 527 (3): Pathways to Personalized Medicine, PHRM 466 (3): Cell Signaling, or PQHS 457 (3): Current Issues in Genetic Epidemiology: Design and Analysis of Sequencing Studies. EBME 416 (3): Biomaterials for Drug Delivery may be an elective if it is taught at a different time (currently conflicts with required courses).

**Proposal for a Master’s Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology**

**Appendix 1 Suggested schedules for students in the Biochemistry, Neurosciences, and Pharmacology tracks**

**Table 5: Schedule for Neuroscience Track, Full-Time Students**

<b>Full-Time</b> (credit hours in parentheses)	
<b>Year 1</b>	
<b>Fall</b>	
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
NEUR 401 (3)	Biological Mechanisms of Brain Disorders
NEUR 415 (1)	Seminars in Neuroscience
<b>Spring</b>	
BIOC 502B (2)	Biotechnology Laboratory: Eukaryotic Molecular and Cellular Techniques
NEUR 402 (3)	Principles of Neural Science
NEUR 415 (1)	Seminars in Neuroscience
NEUR 403 (3)	Methods in Neuroscience Research
<b>Year 2</b>	
<b>Fall</b>	
(6)	Electives***
PHRM 528 (3)	Contemporary Approaches to Drug Discovery
<b>Spring</b>	
NEUR 610*** (3)	Internship

\*\*\*Electives include: BIOC 412: Proteins and Enzymes, BIOC 434: Structural Biology, BIOC 450: Molecular Basis of Cancer, BIOC 460: Advanced Technologies for Cancer Research, BIOL 426: Genetics , NEUR 419: Critical Thinking in Neuroscience, PATH 475: Cell and Molecular Foundations of Pathology, PHOL 401AB: Physiology and Biophysics of Molecules and Cells, PHRM 409: Principles of Pharmacology, PHRM 466 : Cell Signaling, PQHS 431: Statistical Methods I, SYBB 411ABC: Survey of Bioinformatics.

**Proposal for a Master’s Degree in Biotechnology with Tracks in Biochemistry, Neurosciences, and Pharmacology**

**Appendix 1 Suggested schedules for students in the Biochemistry, Neurosciences, and Pharmacology tracks**

**Table 6: Schedule for Neuroscience Track, Part-Time Students**

<b>Part-Time</b>	
<b>Year 1</b>	
<b>Fall</b>	
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
<b>Spring</b>	
BIOC 502B (2)	Biotechnology Laboratory: Eukaryotic Molecular and Cellular Techniques
NEUR 402 (3)	Principles of Neural Science
<b>Year Total: 5 units Fall, 5 units Spring</b>	
<b>Year 2</b>	
<b>Fall</b>	
NEUR 401 (3)	Biological Mechanisms of Brain Disorders
NEUR 415 (1)	Seminars in Neuroscience
<b>Spring</b>	
NEUR 403(3) NEUR 601 (2)	Methods in Neuroscience Research
<b>Year Total: 4 units Fall, 5 units Spring</b>	
<b>Year 3</b>	
(6)	Electives
NEUR 415 (1)	Seminars in Neuroscience
<b>Spring</b>	
NEUR 610*** (3)	Internship

\*\*\*Electives include: BIOC 412: Proteins and Enzymes, BIOC 434: Structural Biology, BIOC 450: Molecular Basis of Cancer, BIOC 460: Advanced Technologies for Cancer Research, BIOL 426: Genetics , NEUR 419: Critical Thinking in Neuroscience, PATH 475: Cell and Molecular Foundations of Pathology, PHOL 401AB: Physiology and Biophysics of Molecules and Cells, PHRM 409: Principles of Pharmacology, PHRM 466: Cell Signaling, PQHS 431: Statistical Methods I, SYBB 411ABC: Survey of Bioinformatics.

## CASE WESTERN RESERVE UNIVERSITY MEDICAL STUDENT ADMISSIONS COMMITTEE

### 1 Charge:

2 The Medical Student Admissions Committee (MSAC) participates in both annual decision-  
3 making regarding individual applicants and in the establishment of admissions policy and  
4 procedure. The committee will recommend standards of Medical School admission for  
5 undergraduate medical students and M.D./Ph.D. candidates, assist in the interview process,  
6 and approve candidates for; 1) the traditional CWRU MD program (“the University Program”),  
7 2) the Cleveland Clinic Lerner College of Medicine of CWRU program (“the College Program”),  
8 and 3) the Medical Scientist Training program (“the MSTP program”) for admission.

### 9 Membership:

10 The committee will have nine members elected from among the full-time faculty. Three of the  
11 elected members shall be from basic science departments and six of the elected members shall  
12 be from clinical departments. The dean may appoint up to four additional full-time faculty to  
13 serve as members of the committee. These elected and appointed faculty committee members  
14 will have voting privileges and each shall serve a five-year term. To be eligible for membership  
15 on the committee, individuals should have completed at least one-year of applicant interviews  
16 for the University Program, College Program, or MSTP Program (10 interviews minimum).  
17 Members may serve a maximum of two consecutive terms, but are eligible to rejoin following a  
18 one-year hiatus from the committee.

19 One Society Dean, appointed by the Chair of Faculty Council in consultation with the Associate  
20 Dean for Admissions, and the Director of Diversity, Equity, and Inclusion for Students in Medical  
21 Education or their designees, shall serve ex officio with voting privileges. The Associate Dean for  
22 Admissions, Senior Associate Director of Admissions and Financial Aid, and Assistant Dean for  
23 Admissions, will serve ex officio without voting privileges.

24 The committee will have two voting student members, one from the second-year class and one  
25 from the fourth-year class. Given the nature of medical student commitments, two students  
26 from each class will be eligible to vote, ensuring that student participation will be maximized.  
27 For the first half of the admissions cycle, one student from the second-year Student Committee  
28 on Admissions (SCA) group will vote at each meeting. Permanent student committee members  
29 will then be elected near the end of the first semester by the medical student body, normally  
30 from members of the SCA who wish to be considered. Certain situations may lead to non-SCA  
31 members being considered for election. These elected second-year student members will serve  
32 as eligible voting members of the committee for the duration of this admissions cycle, with one  
33 voting at each meeting. In the third year, these elected student members will not attend  
34 admissions committee meetings and will serve as application screeners, returning as voting  
35 members in their fourth year. Fourth-year medical students may also serve as application  
36 screeners, based on their availability.

37

**Commented [DC1]:** This is the new title for this role.

**Deleted:** Medical Education Director of Diversity Initiatives  
and Community Outreach Programs

CASE WESTERN RESERVE UNIVERSITY MEDICAL STUDENT  
ADMISSIONS COMMITTEE

40 The MSAC Chair will be appointed from amongst elected or appointed faculty committee  
41 members by the Chair of the Faculty Council upon recommendation by the Associate Dean for  
42 Admissions, with interest solicited from current committee members. Chair selection will be  
43 based on several criteria including: years of service on the committee, familiarity with medical  
44 school admissions processes, leadership skills, organizational skills, and commitment to  
45 diversity and inclusion. The appointed Chair will serve a five-year term, unless deemed  
46 otherwise by the Chair of the Faculty Council and/or upon recommendation by the Associate  
47 Dean for Admissions. The MSAC Chair may serve a maximum of two consecutive terms, and is  
48 eligible to rejoin the committee as a regular member or chair following a one-year hiatus.

49 The quorum required to conduct the committee's business shall be the presence of 50% or  
50 more of the voting members.

51 The Medical Student Admissions Committee of the School of Medicine has final authority for  
52 the University Program, the College Program, and the MSTP Program admissions decisions. The  
53 MSAC works with two admissions subcommittees, one from the College Program and one from  
54 the MSTP Program, both of whom submit recommendations for acceptance of candidates with  
55 final approval made by the MSAC. The subcommittees may appeal to the MSAC for formal  
56 reconsideration of a negative acceptance decision by the MSAC; the MSAC vote on  
57 reconsideration represents the final decision and will prevail.

58 Due to the sensitive nature of the admission process, faculty and students serving on the  
59 committee and subcommittees must maintain the highest levels of confidentiality and  
60 professionalism. Alleged breaches of these standards will be reviewed by the committee and by  
61 the Associate Dean for Admissions, and may be referred to other administrative offices as  
62 required by Faculty Handbook and University Policy, with appropriate action taken at their  
63 discretion.

64  
65 *September 21, 2015, amended by the Faculty Council*  
66 *April 1, 2013, amended by Faculty Council*  
67 *May 15, 2007, amended by Faculty Council*  
68 *April 25, 2003, amended by Faculty Council*  
69 *October 19, 2001, approved by Faculty of Medicine*  
70 *December 11, 2000, amended by Faculty Council*  
71 *December 19, 1983, amended by Steering Committee of Faculty Council*  
72 *October 11, 1982, original charge approved by Faculty Council*  
73