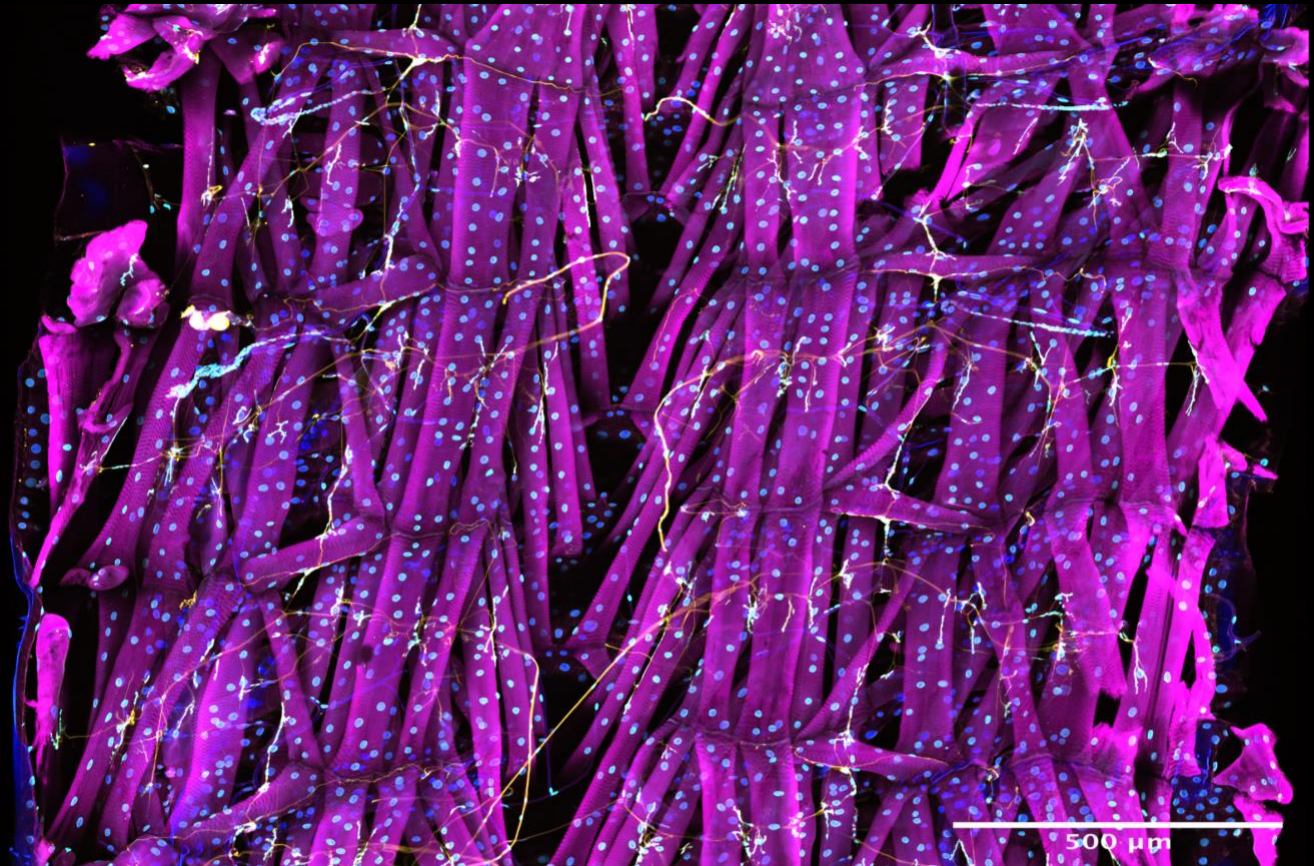


# 2023-2024 BCMB Program Handbook



Actin (Muscles) Lamin (Nuclei) HRP (Motor Neurons)

The cover photo presented is a snapshot of *Drosophila* larval skeletal musculature, credited to Victoria von Saucken from Mary Baylies's lab.



Weill Cornell Graduate School  
of Medical Sciences



Memorial Sloan Kettering  
Cancer Center

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### Biochemistry & Structural Biology

The Biochemistry & Structural (BSB) program offers opportunities for advanced training in the application of biochemical, structural, biophysical and imaging methods, to address questions relating to biological processes and mechanisms.

### Cell & Developmental Biology

The Cell & Developmental Biology (CDB) program comprises over 88 faculty members whose research focuses on a wide range of topics related to the control of normal and malignant cell growth, differentiation, and tissue development.

### Molecular Biology

The Molecular Biology (MB) program provides unique research training to students in the molecular pathways involved in the control of nucleic acid transactions, gene expression, and cell growth and proliferation.

### Becoming a Doctoral Candidate- First Year Requirements

In their first year, BCMB Allied students must complete the program's core curriculum courses, attend BCMB Student Seminar, attend BCMB thesis defenses, and complete a minimum of three (3) lab rotations. Lab rotations are an important component of the students' first year in that they help him/her to decide on a research focus and select a thesis mentor, which is required by the end of the first year

### Thesis Mentor

The choice of a mentor determines a student's program assignment: Biochemistry & Structural Biology, Cell & Developmental Biology, or Molecular Biology. The mentor helps the student select his/her Special Committee, consisting of the mentor and two other faculty members knowledgeable in the student's research field. The committee evaluates the student's research and progress through the rest of his/her WCGS career. Selection of the mentor and the committee typically occurs before the student starts their second year of study.

### Admission to Doctoral Candidacy Examination (ACE)

In spring of the second year, the student takes the Admission to Doctoral Candidacy Examination (ACE), which includes a written component (a research proposal), and an oral examination in which the student defends the proposal and demonstrates general knowledge. Committees made up of program faculty members administer the written and oral ACE. When a student passes the ACE, she/he is a candidate for the PhD degree.

### PhD Research and Degree

Within six months of passing the ACE (or before June 30 of their third year), the student must submit a two-page thesis project update to the Special Committee and meet with their committee. Thereafter, the student and the committee must meet together at least annually and students in year 5 and above must meet with their committee every six months. The student must submit a two-page progress report to their committee two weeks prior to each committee meeting. After passing the ACE and while working in the laboratory, the student must also complete two elective courses (two quarters), relevant to their thesis work and future goals.

The culmination of the student's successful progression through the program is the final examination (the "defense") and certification by the Special Committee that the thesis represents an official piece of research that satisfies the requirements of the WCGS for the PhD degree.

### 2023-2024 Rotation Dates

Fall Rotation: Sep 18th - Dec 1st  
Winter Rotation: Jan 2nd - Mar 15th  
Spring Rotation: Mar 25th - Jun 7th

## Academic

# TIMELINE

	Year 1	Year 2	Year 3	Year 4	Year 5
Core Curriculum	●				
Lab Rotations	●				
Attend Thesis Defenses	●				
Join Thesis Research Lab		●			
Admission to Doctoral Candidacy Examination (ACE)		●			
Lab Research		●			
Complete Elective Course Requirements			●	●	
BCMB Student Seminars	●	●	●	●	●
Meetings with Special Committee			●	●	●
Continue thesis research			●	●	●
Continue thesis research and Final Defense					●

# BCMB Educational Program 2023-2024

## CORE COURSES

i) First Year - ***all students must complete the core sequence of:***

BCMB Student Seminar	Quarter I - Quarter IV
Biochemistry	Quarter I
Molecular Genetics	Quarter I Quarter II
Logic and Critical Analysis	Quarters II and III
From Genes to Cells	Quarters III and IV
From Cells to Organisms and Disease	Quarters III and IV
Responsible Conduct in Research (4 live sessions)	

ii) Course in Quantitative Understanding in Biology

All students enrolled in PhD programs within the Weill Graduate School of Biomedical Sciences are required to complete a one quarter course in Biostatistics. **For BCMB students, this course will be taken during Quarter I of their second year in the program.**

iii) Elective Course Work

Before graduation, students must complete additional elective coursework prior to submission of their thesis. In addition to participation in the BCMB Student seminars, two additional quarters or one semester electives must be fulfilled. These electives are generally taken in years 3 and 4.

**BCMB Student Seminar Course.** Learning how to effectively communicate one's science is an important skill to acquire during PhD training. BCMB student seminars involve two research-in-progress presentations from BCMB graduate students, to be scheduled at the beginning of each academic year. BCMB students **are required** to attend in years 1-5 and **are required** to present a 15-minute talk in year 3 and a 30-minute talk in years 4-5, including time for presentations. All other BCMB students are encouraged to attend, and opportunities to present are available to second year students on a volunteer basis. Attendance is assessed by students submitting a seminar evaluation feedback form for each talk.

## BCMB Educational Program 2023-2024

**Elective Courses:** To fulfill the remaining 2 quarter / 1 semester elective requirement, students must take courses on a subject relevant to their thesis project. Possible courses offered at Weill Cornell include Methods in Biophysics, Principles of Developmental Biology, and Cryoelectron Microscopy of Macromolecular Assemblies (@NYSBC). Courses offered at other institutions, including Rockefeller University and the Cornell Tech Campus, can also be used to fulfill this requirement but require prior approval by the program directors and the registrar.

Students are required to complete the core curriculum during the first year and are advised to spread out the elective course requirements between their third and fourth years.

Students must register for all courses, including Student Seminar.

All core courses must be completed with a grade of high pass or better to remain in good academic standing (see "Good Standing Within the BCMB Program" below). All of the core courses cover material that is not usually taught at the undergraduate level and is crucial for success in science. "Logic and Critical Analysis", "From Genes to Cells" and "From Cells to Organisms and Disease" rely heavily on primary literature and classroom discussions. Active participation is expected and required to receive a passing grade in these courses. Failure to participate fully and obtain a High Pass or better will result in the review of a student's status by the program co-directors. Elective courses must be passed to count towards the BCMB allied graduate program's course requirements.

Courses taken prior to matriculating in the BCMB Program may not be used to substitute for any of the course requirements.

## BCMB Educational Program 2023-2024

### LABORATORY ROTATIONS

**All students are required to complete three laboratory rotations and receive a “pass” from each rotation faculty member.**

#### **Rotation periods are:**

Fall Rotation: Sep 18th - Dec 1st

Winter Rotation: Jan 2nd - Mar 17th

Spring Rotation: Mar 25th - Jun 7th

#### **Laboratory Rotation Policies:**

Lab rotations are an important aspect of your first-year curriculum. It is a chance for you to learn new techniques, to demonstrate your curiosity for scientific research and reasoning, and to determine whether that particular lab is a good match for you. It is also a time for the rotation faculty mentor to evaluate your ability to do bench research and your understanding of the technical and theoretical aspects of the project and the broader set of questions being addressed in the lab.

You must inform the BCMB co-directors of each of your rotation choices. At the beginning of each rotation, you must electronically submit a beginning of rotation form called the "Lab Rotation Agreement" on which you and your rotation faculty mentor outline the goals and expectations of your rotation. At the end of each lab rotation, it is your responsibility to prepare a brief lab report. Your rotation lab report should summarize your work in a maximum of two pages of text, excluding figures and references. Please attach a front page (example provided at the end of this handbook) with your name and the signatures of your rotation mentor and first-year advisor (see later) to indicate their approval of your report. Reports should be completed and approved by the rotation mentor by the end of the rotation. These reports should be submitted to the first year advisors. Once approved and signed by the first year advisor, reports are then submitted to Vanessa Dodson's office, 1300 York Ave, room A-131. You must also forward an electronic version to Vanessa Dodson. At the end of the rotation, you will submit an end of rotation form called the "Lab Rotation Evaluation" on which the rotation faculty mentor will submit electronically their evaluation of your rotation. You should schedule a meeting with your rotation faculty mentor at the conclusion of the rotation to discuss your progress and for a critique of your performance. Submission of all three rotation lab reports is required to remain in good academic standing and to progress to the elective courses and the ACE exam I.

i) It is expected that students will have chosen a thesis mentor by July 1st. The choice of mentor determines the student's Program assignment, (Biochemistry & Structural Biology, Cell and Developmental Biology or Molecular Biology). Students must inform Vanessa Dodson once they have chosen a thesis mentor.

ii) Each lab is eligible to take a maximum of 2 students per year from within the BCMB Allied Program.



## BCMB Educational Program 2023-2024

iii) Each lab is eligible to take a maximum of 2 students per year from within the BCMB Allied Program.

### **FIRST YEAR REVIEW**

The progress of all 1st year students is reviewed by the program directors at the end of the first year and reported to the curriculum committee. If a student has encountered difficulties during the 1st year curriculum, leading to the student being placed on academic probation, the student's case will be re-viewed by the full curriculum committee. The main purpose of this review is to identify the strengths and weaknesses of each student, so that, if possible, the student and faculty can work together to remedy any deficiency in training. At the end of the review, the curriculum committee will make a decision regarding the resolution of the student's probation status, which can range from prescribing a course of action to remediate any evident weaknesses (examples include requiring the student to re-take courses or recommending that the student be dismissed from the program). The student will receive a formal letter describing the committee's decision, which will be placed in his/her graduate school file.

### **FIRST YEAR ADVISORS AND FIRST YEAR MEETING**

All first year students will be assigned to a faculty member at orientation who will serve as their "first year advisor". They are available to assist the student and help make the first year go as smoothly as possible. While each student will be assigned to a first year advisor, they should feel free to contact any of the first year advisors for information, discuss possible rotations, problems etc.

First year meeting is held every two weeks (in the early evening) throughout the first year. Attendance by first year students is expected. During first year meeting, students will learn to present effective chalk talks. It is also an opportunity for students to raise concerns and to ask the Program Co-directors and first year advisors for information.

### **CURRICULUM COMMITTEE**

Co-chaired by the Program Co-directors, Drs. Dirk Remus, Jessica Tyler and additional faculty members, this committee oversees all educational aspects of the Programs. They are responsible for assembling the curriculum, setting course requirements, administrating the evaluation of students at the end of their first year, and establishing the format of the Admission to Candidacy Examination (ACE).

## **BCMB Educational Program 2023-2024**

### **GOOD STANDING WITHIN THE BCMB PROGRAM**

To remain in good academic standing in the Programs, students must achieve a grade of B or better (High Pass) in each required course and maintain a High Pass average in all course work. A grade of Low Pass or Fail is unacceptable and may result in the student being placed on academic probation status. Completed rotation lab reports and achieving a “pass” for all rotations is also required to remain in good standing. Students in the 2nd year or above are also required to have a thesis mentor to remain in good standing. Students in the 3rd year or above are required to present annually at a scientific meeting (see below). Students in the 3rd and 4th year are required to complete an annual Special Committee meeting by July 1 each year to remain in good standing. Students in year 5 and above are required to complete an annual Special Committee meeting by January 1 and July 1 each year to remain in good standing. If a student at any point fails to meet the requirements for good standing, they may be placed on academic probation and either the Curriculum Committee or another appropriate committee empowered by the Curriculum Committee will meet to discuss the case and can make one of three recommendations to the Dean: i) that the student be prescribed a course of action for returning to good standing, ii) that the student be allowed to continue to pursue a Ph.D., iii) that the student be asked to leave the Program. If a student is allowed to attempt to return to good standing, the student will remain on probation until fulfilling all of the specified requirements to the satisfaction of the Curriculum Committee.

## **BCMB Educational Program 2023-2024**

### **ADVANCE TO CANDIDACY EXAM**

A student must be in good academic standing to take the ACE. The ACE is administered in two sections: a written exam and an oral exam. For the written exam, the student prepares a research proposal on a topic selected by the student and approved by the major sponsor / thesis advisor. The written proposal is reviewed by three WCGSBS faculty that have been nominated by the student to serve on their ACE Examining Committee, and reviews are returned to the student as a written critique. The oral exam tests the student's ability to respond to comments in the critique, as well as the student's general knowledge. The Examining Committee for the oral consists of four faculty members: the Special Committee (i.e., the research mentor and two additional faculty members) and a chairperson. Before taking the ACE, students must have completed the core sequence of courses. The ACE is taken during the Spring of the second year. The official description of the requirements and procedures for the ACE is contained in a separate document, "BCMB ACE Guidelines 2024" that will be provided to students upon completion of their first-year requirements.

Between six months after completion of the ACE and no later than June 30th of their third year, each student is required to convene her/his first Special Committee meeting (see below for composition of the Special Committee). In addition, the student is required to prepare a written document outlining their thesis progress to date. This document should be no longer than 2 pages, excluding illustrations and references. It must be submitted to the Special Committee members at least 2 week in advance of this meeting. At the meeting, the student should be prepared to discuss in depth the background (general and specific) of the project, approaches that will be taken, and what has already been accomplished. This meeting will serve as a mechanism to ensure that the student's thesis work is progressing. It will also serve to update the Committee with the student's project and to allow the committee to provide constructive comments. The 2 page document must be approved by the committee. A brief report will be completed by one of the committee members (not the thesis mentor) in LEARN for forwarding to the Program Directors. Completion of the post-ACE first Special Committee meeting is required to remain in good academic standing.

### **ACE TOPIC CHOICE**

The topic is up to the student, with the following advisory considerations: It is the student's privilege to have flexibility and latitude in choice of the ACE topic. However, it is the student's responsibility to convincingly demonstrate independence of thought. The closer the ACE topic is to research projects previously conceived by the student's mentor or already being conducted in the host laboratory, the more difficult it may be to establish the independence of the student's thinking. However, it is often the case that the ACE is taken at a point when the thesis topic is not defined or the thesis topic that was initially chosen does not pan out. An independently-conceived ACE topic may give shape to or even become a thesis topic; this is welcomed.



## BCMB Educational Program 2023-2024

The only restriction on topic choice is that all portions of the document must be written entirely independently from the student's mentor. While the student is encouraged to build on work previously conducted in the host laboratory, direct incorporation of specific aims, hypotheses, or conclusions from a previously written grant application from the mentor (or anyone else) is not allowed. The mentor must certify that the specific aims were developed and written independently, and that the content of the ACE proposal was not "lifted" from a pre-existing research plan. The student will be held responsible for all ideas expressed in the proposal, and will be expected to explain, justify, and defend all concepts described in the written document.

A suitable topic is one that incorporates experimentally testable models or hypotheses, is amenable to rational experimental design, and results in more than one predictable outcome for the experiments. Research topics that are seen as "fishing expeditions" or are not hypothesis-driven will generally not be approved.

As noted above, the thesis mentor head will be given the proposed specific aims page and the completed written proposal. For the student to proceed to the oral exam, the thesis mentor must attest that the specific aims and written proposal were prepared independently and that they reflect the original work of the student.

### **SPECIAL COMMITTEE**

Once a thesis mentor has been agreed upon (which should occur by July 1), the student, in consultation with the mentor, forms a Special Committee composed of the thesis mentor and two additional faculty members. This committee acts to evaluate a student's research and should also serve as an informational resource to the student. Special Committee forms are available from the graduate office (Cornell A -131) or on the Graduate School Website.

A Program Chair (usually Dr. Kirk Deitsch) or a Program Co-director must sign these forms, which are then returned to Vanessa Dodson, who files them with the Dean's office. Any subsequent changes must be approved by a student's mentor and the appropriate Program Director and be indicated on the form on file in the Dean's office.

The Special Committee must meet at least once per year from year 3 through year 4, by July 1 and 5th year students and up must have a committee meeting every 6 months by January 1 and July 1 each year. Annual Special committee meetings are a requirement for remaining in good academic standing. For each Special Committee meeting (following the one that occurs within 6 months of completing the ACE), the student should prepare a 1-2 page written outline of progress and future goals. This must be submitted to all committee members prior to the meeting.

# BCMB Educational Program 2023-2024

## REQUIREMENTS FOR FORMAL PRESENTATIONS OF SCIENTIFIC DATA

The ability to accurately and effectively present scientific data in a formal setting is vital to a productive scientific career. To encourage students to gain such experience, all students upon completion of their ACE must annually present original data at a formal scientific venue. This requirement can be fulfilled by presenting a Talk or Poster at the annual Vincent Du Vigneaud Memorial Symposium hosted by the Weill Cornell Graduate School, the annual BCMB Program Retreat held every Fall, various Departmental Seminar Series or at any National or International Scientific meeting. Fulfillment of this requirement must be verified at the student's annual special committee meeting. The student is required to submit to the special committee the abstract of the presentation.

## REQUIREMENTS FOR SUBMITTING A STUDENT FELLOWSHIP

All BCMB students are required to submit a fellowship application during their time in the WCGSBS. To qualify for this requirement, the fellowship application must include their writing a scientific proposal. Awarding of a fellowship is not required.

Nora McCall in the graduate school office is available to provide lists of available fellowship opportunities and deadlines, to help with writing, editing, and submitting fellowship applications.

## ACADEMIC REQUIREMENTS FOR MD/PHD STUDENTS

MD/PhD students enter the Graduate Program following completion of:

- the Frontiers in Biomedical Science courses, which they take in the first two years of medical school, - three lab rotations, during the summers preceding the first and second years of medical school and the summer after the second year of medical school.

- the first two years of the Medical School curriculum. MD/PhD students select their thesis laboratories and initiate their thesis research in the fall of their third year. During this year they also take four additional quarters of graduate courses, which they can take at either the Weill or the Rockefeller graduate schools. The ACE is administered to MD/PhD students in the Spring/summer of their third year. MD/PhD students must submit their Rockefeller Thesis Proposal (RTP) to both the MD/PhD office and the program coordinator at the Graduate School. All Weill Graduate School MD-PhD students must have a faculty member from the Rockefeller Graduate School on their special committee.

BCMB has no additional requirements for MD/PHD students, with the exception of attendance of BCMB Student Seminars in years G1-G4 and giving a BCMB Student Seminar presentation in year G2 (15 minute talk) and G3-G4 (30 minute talk).

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Schwer	Beate	bschwer@med.cornell.edu	Molecular Biology	
Seandel	Marco	mas9066@med.cornell.edu	Cell & Developmental Biology	
Sfeir	Agnel	sfeirA@mskcc.org	Molecular Biology	
Shaykhiev	Renat	res2003@med.cornell.edu	Cell & Developmental Biology	
Shen	Wen	wes2007@med.cornell.edu	Cell & Developmental Biology	
Sherman	Mara	shermam1@mskcc.org	Cell & Developmental Biology	
Shuman	Stewart	shumans@mskcc.org	Molecular Biology	Biochemistry & Structural Biology
Simon	David	djs4002@med.cornell.edu	Biochemistry & Structural Biology	Neuroscience
Siolas	Despina	des2025@med.cornell.edu	Cell & Developmental Biology	
Solit	David	solitd@mskcc.org	Cell & Developmental Biology	
Stadtfeld	Matthias	mas4011@med.cornell.edu	Cell & Developmental Biology	
Stuhlmann	Heidi	hes2011@med.cornell.edu	Cell & Developmental Biology	Physiology, Biophysics & Systems Biology
Tammela	Tuomas	tammelat@mskcc.org	Cell & Developmental Biology	
Teruel	Mary	mnt4002@med.cornell.edu	Biochemistry & Structural Biology	
Thompson	Craig	thompsonc@mskcc.org	Cell & Developmental Biology	Immunology & Microbial Pathogenesis
Tsou	M. Bryan	tsoum@mskcc.org	Cell & Developmental Biology	
Tulpule	Asmin	tulpulea@mskcc.org	Molecular Biology	
Tyler	Jessica	jet2021@med.cornell.edu	Molecular Biology	Physiology, Biophysics & Systems Biology
Ventura	Andrea	venturaa@mskcc.org	Cell & Developmental Biology	Computational Biology
Vierbuchen	Thomas	vierbuct@mskcc.org	Cell & Developmental Biology	Neuroscience
Walther	Tobias	TWalther@mskcc.org	Cell & Developmental Biology	
Wang	Baolin	baw2001@med.cornell.edu	Molecular Biology	
Wendel	Hans-Guido	wendelh@mskcc.org	Cell & Developmental Biology	
Whitehouse	Iestyn	whitehoi@mskcc.org	Molecular Biology	
Zallen	Jennifer	zallenj@mskcc.org	Cell & Developmental Biology	
Zhao	Baohong	baz3002@med.cornell.edu	Cell & Developmental Biology	

<b><u>LAST NAME</u></b>	<b><u>FIRST NAME</u></b>	<b><u>EMAIL ADDRESS</u></b>	<b><u>PRIMARY AFFILIATION</u></b>	<b><u>SECONDARY AFFILIATION</u></b>
Zhao	Xiaolan	zhaox1@mskcc.org	Molecular Biology	
Zhou	Pengbo	pez2001@med.cornell.edu	Molecular Biology	Pharmacology
Zhou	Qiao	jqz4001@med.cornell.edu	Cell & Developmental Biology	
Accardi	Alessio	ala2022@med.cornell.edu	Physiology, Biophysics & Systems Biology	Biochemistry & Structural Biology
Andersen	Olaf	sparre@med.cornell.edu	Physiology, Biophysics & Systems Biology	Biochemistry & Structural Biology
Barany	Francis	barany@med.cornell.edu	Molecular Biology	Biochemistry & Structural Biology
Blenis	John	job2064@med.cornell.edu	Pharmacology	Biochemistry & Structural Biology
Boudker	Olga	olb2003@med.cornell.edu	Physiology, Biophysics & Systems Biology	Biochemistry & Structural Biology
Brown	Anthony	amcbrown@med.cornell.edu	Cell & Developmental Biology	Molecular Biology
Cesarman	Ethel	ecesarm@med.cornell.edu	Immunology & Microbial Pathogenesis	Cell & Developmental Biology
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Keeney	Scott	keeney@mskcc.org	Molecular Biology	Biochemistry & Structural Biology
Kelly	Thomas	tkelly@mskcc.org	Molecular Biology	Biochemistry & Structural Biology
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Kolesnick	Richard	r-kolesnick@ski.mskcc.org	Pharmacology	Biochemistry & Structural Biology
Lo	James	Jal2063@med.cornell.edu	Pharmacology	Cell & Developmental Biology
Marians	Kenneth	MariansK@mskcc.org	Molecular Biology	Biochemistry & Structural Biology



<u>LAST NAME</u>	<u>FIRST NAME</u>	<u>EMAIL ADDRESS</u>	<u>PRIMARY AFFILIATION</u>	<u>SECONDARY AFFILIATION</u>
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Rogatsky	Inez	inr2005@med.cornell.edu	Immunology & Microbial Pathogenesis	Molecular Biology
Rosen	Neal	rosenn@mskcc.org	Pharmacology	Cell & Developmental Biology
Scheuring	Simon	sis2019@med.cornell.edu	Physiology, Biophysics & Systems Biology	Biochemistry & Structural Biology
Schultz	Nikolaus	schultzn@mskcc.org	Computational Biology	Molecular Biology
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Sung	Ching-Hwa	chsung@med.cornell.edu	Neuroscience	Cell & Developmental Biology
Wagner	John	jawagne@med.cornell.edu	Neuroscience	Cell & Developmental Biology

The following pages include schedules of the BCMB core courses from 2022-2023, to provide examples of the material covered.

Core Courses:

- Biochemistry
- Molecular Genetics
- Logic and Critical Analysis
- Genes to Cells
- Cells to Organisms and Disease

\*The courses in 2023-2024 will be very similar, but with different dates, and will be provided to the students as they become available”.

BIOCHEMISTRY COURSE - FALL 2022

Director: Baran Ersoy - bersoy@med.cornell.edu; (415) 215 1555; Belfer Research Building Rm 628

Co-Director: Elena Piskounova - elp2025@med.cornell.edu; (646) 962 6167; Belfer Research Building Rm 1326

TAs: 2nd Year: Katharine Carter - kac4008@med.cornell.edu; Kevan Chu - kec4008@med.cornell.edu; Abraham Shim - acs4002@med.cornell.edu

1st Year: Claudia Edgar - cle4001@med.cornell.edu; William Fall - wbf4001@med.cornell.edu

Lecture #	Date	Day	Topic	Faculty	TA1	TA2	Discussion	Time	Location
1	26-Aug	F	Physical principles that govern chemical reactions	Tim Ryan	Abraham Shim	William Fall		9.30 AM - 11.00 AM	WGC-A
2	29-Aug	M	Enzymes: Why do they work?	Christopher Lima	Abraham Shim	Kevan Chu		9.30 AM - 11.00 AM	WGC-A
Discussion	30-Aug	T	PYMOL workshop + course review		Abraham Shim	Kevan Chu	PYMOL	5.30 PM - 7.00 PM	BB-302-C/D
3	31-Aug	W	Reaction mechanisms: PYMOL exercise	Christopher Lima	Abraham Shim	Kevan Chu		9.30 AM - 11.00 AM	WGC-A
4	2-Sep	F	X-Ray crystallography	Steven Long	Kati Carter	William Fall		9.30 AM - 11.00 AM	WGC-A
5	7-Sep	W	Cryo-EM	Richard Hite	Abraham Shim	Kevan Chu		9.30 AM - 11.00 AM	WGC-A
Discussion	8-Sep	R	Review of essential math + course review		Abraham Shim	Kevan Chu	Math review	3.30 PM - 5.00 PM	BB-302-C/D
6	9-Sep	F	Statistical mechanics of biomolecules II	John Chodera	Abraham Shim	Kevan Chu		9.30 AM - 11.00 AM	WGC-A
7	12-Sep	M	Statistical mechanics of biomolecules II	John Chodera	Abraham Shim	Kevan Chu		9.30 AM - 11.00 AM	WGC-A
8	14-Sep	W	Ligand Binding	Michael Roehrl	Abraham Shim	Kevan Chu		9.30 AM - 11.00 AM	WGC-A
Discussion	15-Sep	R	Course review		Abe & Kevan		1-8	5.30 PM - 7.00 PM	BB-302-C/D
9	16-Sep	F	Protein folding. Non-covalent forces	David Eliezer	Kati Carter	William Fall		9.30 AM - 11.00 AM	WGC-A
10	19-Sep	M	Protein-protein interactions	Jonathan Goldberg	Kati Carter	William Fall		9.30 AM - 11.00 AM	WGC-A
Discussion	20-Sep	T	Practice question(s)		Abe & Kevan		1-5	5.30 PM - 7.00 PM	WGC-B
Discussion	21-Sep	W	Practice question(s)		Abe, Kati & William		6-10	9.30 AM - 11.00 AM	WGC-A
<b>Midterm (Handed on Sep 21, due back by Oct 3)</b>									
11	28-Sep	W	Protein purification I	Stewart Shuman	Claudia Edgar	William Fall		9.30 AM - 11.00 AM	WGC-B
12	30-Sep	F	Protein purification II (to be confirmed)	Stewart Shuman	Claudia Edgar	William Fall		9.30 AM - 11.00 AM	BB-204-C
13	3-Oct	M	Post-translational modification-mediated signaling	Andrew Koff	Claudia Edgar	Kati Carter		9.30 AM - 11.00 AM	WGC-A
14	7-Oct	F	Mass spectrometry of polypeptides	Alban Ordureau	Claudia Edgar	Kati Carter		9.30 AM - 11.00 AM	BB-204-C
15	10-Oct	M	Metabolomics and metabolite profiling	Steven Gross	Claudia Edgar	Kati Carter		9.30 AM - 11.00 AM	WGC-A
Discussion	11-Oct	T	Course review		Josefine & Kati		11-15	5.30 PM - 7.00 PM	BB-204-A/B
16	12-Oct	W	Biochemistry of lipids and membranes	Anant Menon	Claudia Edgar	William Fall		3.30 PM - 5.00 PM	WGC-A
17	14-Oct	F	Lipid metabolism	Baran Ersoy	Claudia Edgar	Kati Carter		9.30 AM - 11.00 AM	WGC-A
18	17-Oct	M	Glucose metabolism and cancer	Andrew Intlekofer	Kevan Chu	Kati Carter		9.30 AM - 11.00 AM	WGC-A
Discussion	18-Oct	T	Course review		Josefine & Kati		16-18	5.30 PM - 7.00 PM	WGC-C
19	19-Oct	W	Genomic tools and data analysis	Iestyn Whitehouse	William Fall	Kati Carter		9.30 AM - 11.00 AM	WGC-A
20	21-Oct	F	Proteins and nucleic acids	Elena Piskounova	William Fall	Kevan Chu		9.30 AM - 11.00 AM	WGC-C
21	24-Oct	M	Fluorescence-based technologies	Morgan Huse	Claudia Edgar	Abraham Shim		3.30 PM - 5.00 PM	WGC-C
Discussion	25-Oct	T	Practice question(s)		Claudia & Kati		13-16	5.30 PM - 7.00 PM	WGC-B/C
Discussion	26-Oct	W	Practice question(s)		William, Claudia & Kevan		17-21	9.30 PM - 11.00 AM	BB-302-A
<b>Final (Handed on Oct 26, due back by Nov 5)</b>									

WBG: 1305 York Ave. Escalators to 2nd floor, turn left.

BB: 413 E 69th st. 2nd or 3rd floor

**Molecular Genetics Fall 2021**

Lectures	Tue/Thurs 10-11:30AM	Location: 1305 York Avenue, 2nd Floor; Classroom WGC-B, WGC-C (Greenberg)
TA discussion sessions	Wednesday 5:30-6:30pm and then 6:30-7:30pm. Sign up for each session.	Location: 1300 York Avenue, 2nd Floor, Classroom; A [B210], B [B212]
Review sessions		
<b>Course Directors:</b>		
Effie Apostolou (WCMC)	<a href="mailto:efa2001@med.cornell.edu">efa2001@med.cornell.edu</a>	
Eric Lai (MSKCC)	<a href="mailto:laie@mskcc.org">laie@mskcc.org</a>	
<b>Course TAs</b>	email	phone number
Kritika Kasliwal	<a href="mailto:krk4004@med.cornell.edu">krk4004@med.cornell.edu</a>	
Hadjimichael, Evi	<a href="mailto:evh4001@med.cornell.edu">evh4001@med.cornell.edu</a>	
Miller-Browne, Victoria Nicole	<a href="mailto:vnm4001@med.cornell.edu">vnm4001@med.cornell.edu</a>	
Liberatore, Katarina	<a href="mailto:kal4006@med.cornell.edu">kal4006@med.cornell.edu</a>	
<b>Lecture number</b>	<b>Date</b>	<b>Topic</b>
	1	8/25/22 Genome modification & Genetic concepts
	2	8/30/22 Genome modification & DNA repair
		8/31/22 Discussion on lectures 1&2
	3	9/1/22 Meiotic recombination
	4	9/6/22 RNAi
		9/7/22 Discussion on lectures 3&4
	5	9/8/22 Advanced Genetic Approaches-1
	6	9/13/22 Advanced Genetic Approaches-2
		9/14/22 Discussion on lectures 5&6
	7	9/15/22 Drosophila-1
	8	9/20/22 Drosophila-2
		9/21/22 Discussion on lectures 7&8
		9/22/22 NO LECTURE
	9	9/27/22 C. elegans genetics
		9/28/22 Discussion on lectures 9
	10	9/29/22 Mouse genetics-1
	11	10/4/22 Mouse genetics-2
***		10/5/22 Discussion on lecture 10&11
	12	10/6/22 Mouse genetics-3
	13	10/11/22 Cancer genetics
		10/12/22 Discussion on lectures 12&13
	14	10/13/22 Human genetics
	15	10/18/22 Zebrafish genetics
		10/19/22 Discussion on lectures 14&15
	16	10/20/22 Epigenetics 1
	17	10/25/22 Epigenetics 2
		10/26/22 Discussion on lectures 14&15
Review	10/27/22	Review Session #1
Review	11/1/22	Review Session #2
		Danwei Huangfu
		Maria Jasin
		Scott Keeney
		Eric Lai
		Xiaolan Zhao
		Xiaolan Zhao
		Jen Zallen
		Mary Baylies
		BCMB RETREAT
		Zhirong Bao
		Kat Hadjantonakis
		Alex Joyner
		Alex Joyner
		Andrea Ventura
		Ken Offit
		Richard White
		Effie Apostolou
		Alexandros Pertsinidis
		TAs and Course Directors
		TAs and Course Directors

## **BCMB Logic and Critical Analysis 2021**

**Course Director:** Tommy Vierbuchen (Assistant Professor, MSKCC Developmental Biology Program)

### **Faculty (paper discussion section leaders)**

Xiaolan Zhao (MSKCC, Molecular Biology)

Matthias Stadtfeld (WCMC, Department of Medicine)

Tommy Vierbuchen (MSKCC, Developmental Biology Program)

### **Overview:**

This course is designed to reinforce two facets of your training as a research scientist: first, your ability to think along a logical experimental path, and second, and equally important, the ability to critically analyze information and data. While the first is self-explanatory, how to accomplish the second is often unclear. To accomplish this, we have designed this course to encourage you to ask questions about what you read: what did an experiment really examine, were all controls included, were the author's interpretations valid or are there additional interpretations that they did not elaborate on? You will also consider: what was the question or hypothesis, how were the results interpreted in the context of the hypothesis/model, and what are the critical next steps and unresolved issues? This is not an inclusive list and other points will come out as we read and discuss these papers.

*The papers we chose for this course may extend beyond your current knowledge. In your chosen field, where you may already have a foundation of knowledge, a single read of a paper can be sufficient to gain some understanding; however, reading through a paper once will not be sufficient to permit the level of discussion that we seek. As you read these papers, you need to be thinking of the questions above, and we recommend that you read-through the paper once to get an overall impression of the questions and approaches being used, and then you may need to read it many times to achieve a greater understanding. For additional reading, you might also look at previously published work (particularly if their interpretations rely heavily on that) and a good topical review to understand the context of the work.*

### **Format**

The class will meet in a small group format (4-5 students and one professor) to discuss one paper per class for ~1.5-2 hours. There will be a total of 4 meetings of the class scheduled between ~11/9-11/23. All meetings will occur via Zoom, and will be scheduled by the professor running the discussion section. Dr. Vierbuchen will send out a poll so that you can sign up for sessions based on your scientific interests and times that the PIs are available.

Everyone will end up assigned to 2 discussion leaders, and you will meet twice with each discussion leader, discussing one paper/session. For example, if you are in Dr. Zhao's group and Dr. Stadtfeld's group, you would meet twice with Dr. Zhao (discussing paper A and paper B), and twice with Dr. Stadtfeld (discussing paper C and paper D). Each discussion leader will be selecting the papers that you will be reading for the session.

### **Grading**

Your grade will be based upon your participation in the small group discussions. Everyone is expected to participate. With this new small group format, that will mean asking and answering multiple questions throughout the course of the 1.5-2 hour session. The goal for each session is to have an intense (in a positive way) and interesting discussion.

**Schedule:**

**Introductory lecture (~11/9-11/12)**, Tommy Vierbuchen (Zoom link forthcoming via email...)

Logic and critical analysis of scientific papers: A general overview/discussion about how to approach scientific problems and how to evaluate data in papers. We will discuss a few selected short readings, and a list of additional resources will be provided. The goal is to help prepare you for the paper discussions so that you can get the most out of the small group sessions.

Required readings for the first lecture/discussion:

- 1) "Publish houses of brick, not mansions of straw" William Kaelin Jr., *Nature* 2017
- 2) "Can a biologist fix a radio?—Or what I learned from studying apoptosis" Yuri Lazebnik, *Cancer Cell* 2002
- 3) "On Mechanism and systems biology" Arjun Raj Lab Blog  
<http://rajilaboratory.blogspot.com/2018/08/on-mechanism-and-systems-biology.html>
- 4) "Strong Inference" John Platt, *Science*, 1964

**Paper discussions:**

In early November, I will send out a Google poll to schedule meetings for the discussion sessions, but all discussion sections will be meeting between 11/13 and 11/23.

BCMB Program, Weill Cornell Graduate School of Medical Sciences				TAs:	Katharine Carter kac4008@med.cornell.edu	Tzippora Chwat-Edelstein tzc4001@med.cornell.edu	Kevan Chu kec4008@med.cornell.edu
Core course 2022 - 2023				9.00 AM - 11.00 AM	Zoom link:	<a href="https://weillcornell.zoom.us/j/93113879273">https://weillcornell.zoom.us/j/93113879273</a>	
Part I. From Genes to Cells				Student presenter	TA	room	email
<b>1. DNA replication, Repair, and Recombination</b>							
28-Nov	M	Jayanta Chaudhuri	lecture: Recombination		Tzippora Chwat-Edelstein	BB 302-C/D	chaudhu@mskcc.org
29-Nov	T	Jayanta Chaudhuri	paper discussion	Zerina Balic		BB 302-C/D	
30-Nov	W	John Maciejowski	lecture: Nuclear Envelope		Tzippora Chwat-Edelstein	WGC-A/B	maciejoi@mskcc.org
1-Dec	Th	John Maciejowski	paper discussion	Yu-Hui Chiu		BB 302-C/D	
2-Dec	F	Dirk Remus	lecture: DNA replication		Kevan Chu	BB 302-C/D	remusd@mskcc.org
<b>2.Recombination, Telomeres, Synthetic lethalties</b>							
5-Dec	M	Dirk Remus	paper discussion	Ruobing Cui		BB 302-C/D	
6-Dec	T	Neal Lue	Telomeres		Kevan Chu	BB 302-C/D	nflue@med.cornell.edu
7-Dec	W	Neal Lue	paper discussion	Alyssa Duren-Lubanski		BB 204-A/B	
8-Dec	Th	Agnel Sfeir	lecture: Synthetic lethalties		Kevan Chu	BB 204-A/B	sfeirA@mskcc.org
9-Dec	F	Agnel Sfeir	paper discussion	Vigneshwari Easwar		WGC-A/B	
<b>3. Chromatin, Transcription</b>							
New Year	2-Jan	M	NO CLASS				
	3-Jan	T	Yicheng Long - lecture + paper discussion: chromatin / epigenetics 9:00 AM - 12:00 PM	Emily Goetzler	Kati Carter	BB 302-C/D	yi4011@med.cornell.edu
	4-Jan	W	NO CLASS				
	5-Jan	Th	NO CLASS				whitehoi@mskcc.org
	6-Jan	F	Iestyn Whitehouse - lecture + paper discussion: transcription; 9:00 AM - 12:00 PM	Hailey Goldberg	Kati Carter	BB 204-A/B	
<b>4. Gene regulation, RNA splicing</b>							
	9-Jan	M	Alexandros Pertsinidis - lecture: gene regulation		Tzippora Chwat-Edelstein	BB 302-C/D	pertsina@mskcc.org
	10-Jan	T	Alexandros Pertsinidis - paper discussion	Emma Johnsson		BB 302-C/D	
	11-Jan	W	Beate Schwer - lecture: RNA splicing		Kati Carter	BB 302-C/D	bschwer@med.cornell.edu
	12-Jan	Th	Beate Schwer - paper discussion	Max Kops		BB 302-C/D	
	13-Jan	F	NO CLASS				
<b>5. RNA turnover and regulation</b>							
MLK day	16-Jan	M	NO CLASS				
	17-Jan	T	Chris Lima - lecture: RNA turnover		Tzippora Chwat-Edelstein	BB 302-C/D	LimaC@MSKCC.ORG
	18-Jan	W	Chris Lima - paper discussion	Rebecca Londoner		BB 302-C/D	
	19-Jan	Th	Christine Mayr - lecture: RNA 3' end processing		Tzippora Chwat-Edelstein	BB 302-C/D	mayrc@mskcc.org
	20-Jan	F	Christine Mayr - paper discussion	Cassandra Manrique		BB 302-C/D	
<b>5. Regulatory RNAs, Translation</b>							
	23-Jan	M	Benjamin Kleaveland - lecture: Regulatory RNAs		Kevan Chu	BB 302-C/D	bek9059@med.cornell.edu
	24-Jan	T	Benjamin Kleaveland - paper discussion	Angela Montero		BB 302-C/D	
	25-Jan	W	Heeseon An - lecture: Ribosomes		Tzippora Chwat-Edelstein	BB 302-C/D	anh@mskcc.org
	26-Jan	Th	Heeseon An - paper discussion	Gabrielle Peterson		BB 302-C/D	
	27-Jan	F	NO CLASS				
<b>6. Ubiquitin-mediated protein control, Cell division</b>							
	30-Jan	M	Alban Ordureau - lecture: Ubiquitin-mediated protein control		Tzippora Chwat-Edelstein	BB 302-C/D	ordureaa@mskcc.org
	31-Jan	T	Alban Ordureau - paper discussion	Shakti Ramsamooj		BB 302-C/D	
	1-Feb	W	Prasad Jallepalli - lecture: Mitosis		Kati Carter	BB 302-C/D	jallepap@mskcc.org
	2-Feb	Th	Prasad Jallepalli - paper discussion	Monica Selvaraj		BB 302-C/D	
	3-Feb	F	NO CLASS				
<b>7. Centrosomes, Cytoskeleton and Ion channels</b>							
	6-Feb	M	Bryan Tsou - lecture: Centrosomes		Kevan Chu	WGC-A/B	tsoum@mskcc.org
	7-Feb	T	Bryan Tsou - paper discussion	Hang Yin		WGC-A/B	
	8-Feb	W	Phillip Niethammer - lecture: Actin		Tzippora Chwat-Edelstein	WGC-A/B	niethamp@mskcc.org
	9-Feb	Th	Phillip Niethammer - paper discussion	Jian Zheng		WGC-A	
	10-Feb	F	Richard Hite - lecture: Ion channels		Kevan Chu	WGC-A/B	hiter@mskcc.org
<b>8. Ion chanel, Membranes and Membrane Traffic</b>							
	13-Feb	M	Richard Hite -paper discussion	Yaofeng Zhong		BB 302-C/D	
	14-Feb	T	Jeremy Dittman - lecture: Endocytosis		Kevan Chu	BB 302-C/D	jed2019@med.cornell.edu
	15-Feb	W	Jeremy Dittman - paper discussion	Xin Yu Zhu Jiang		BB 302-C/D	
	16-Feb	Th	Tim McGraw - lecture: Membrane traffic		Kati Carter	BB 302-C/D	temcgraw@med.cornell.edu
	17-Feb	F	Tim McGraw - paper discussion	Mengyang Zou		BB 302-C/D	
<b>9. Nuclear envelope, Mitochondrial metabolism</b>							
Presidents' Day	20-Feb	M	NO CLASS				
	21-Feb	T	John Petrini - lecture: DNA repair		Kevan Chu	BB 302-C/D	petrinij@mskcc.org
	22-Feb	W	John Petrini - paper discussion	Qianqian Lin		BB 302-C/D	
	23-Feb	Th	Giovanni Manfredi - lecture: Mitochondrial metabolism		Kati Carter	BB 302-C/D	gim2004@med.cornell.edu
	24-Feb	F	Giovanni Manfredi - paper discussion	Zerina Balic		BB 302-C/D	
<b>SPRING BREAK</b>							
	27-Feb	M	NO CLASS Spring Break				
	28-Feb	T	NO CLASS Spring Break				
	1-Mar	W	NO CLASS Spring Break				
	2-Mar	Th	NO CLASS Spring Break				
	3-Mar	F	NO CLASS Spring Break				
<b>10. Metabolism and Autophagy</b>							
	6-Mar	M	Craig Thompson - lecture: Metabolism		Kati Carter	BB 302-C/D	jiangx@mskcc.org
	7-Mar	T	Craig Thompson - paper discussion	Yu-Hui Chiu		BB 302-C/D	
	8-Mar	W	Xuejun Jiang - lecture: Autophagy		Kati Carter	BB 302-C/D	ThompsonC@mskcc.org
	9-Mar	Th	Xuejun Jiang - paper discussion	Ruobing Cui		BB 302-C/D	Viktoria Gabor (Craig Thompson)
	10-Mar	F	NO CLASS				
<b>EXAM I</b>							
	13-Mar	M	NO CLASS				
	14-Mar	T	NO CLASS				
	15-Mar	W	NO CLASS				
	16-Mar	Th	NO CLASS				
	17-Mar	F	EXAM I				

**BCMB Program, Weill Cornell Graduate School of Medical Sciences**

**Core course Spring 2023**

9.30 am - 11.00 pm

**Part II. From cells to organisms and disease**

**TAs**

Kritika Kasliwal

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Hina Shah

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Ashley Tucewicz

ast4009@med.cornell.edu

Google Drive

<https://docs.google.com/spreadsheets/d/1x3llaFUpvil1mOcbqCa>

Zoom for all Meetings

Box for All Recordings

				Student presenter	TA	Room for Classes	Faculty Email
1. Cell division, senescence and cell death	20-Mar	M				WGC-A 1305 York	
	21-Mar	T				WGC-A	
	22-Mar	W				WGC-A	
	23-Mar	Th				WGC-A	
	24-Mar	F	NO CLASS				
2. Cell adhesion	27-Mar	M				WGC-A	
	28-Mar	T				WGC-A	
	29-Mar	W				WGC-A	
	30-Mar	Th				WGC-A	
	31-Mar	F	NO CLASS				
3. Development 1	3-Apr	M				WGC-A	
	4-Apr	T				WGC-A	
	5-Apr	W				WGC-A	
	6-Apr	Th				WGC-A	
	7-Apr	F	NO CLASS				
4. Development 2	10-Apr	M				WGC-A	
	11-Apr	T				WGC-A	
	12-Apr	W				WGC-A	
	13-Apr	Th				WGC-A	
	14-Apr	F	NO CLASS				
5. Stem cells	17-Apr	M				WGC-A	
	18-Apr	T				WGC-A	
	19-Apr	W				WGC-A	
	20-Apr	Th				WGC-A	
	21-Apr	F	NO CLASS				
6. Signaling 1	24-Apr	M				WGC-A	
	25-Apr	T				WGC-A	
	26-Apr	W				WGC-A	
	27-Apr	Th				WGC-A	
	28-Apr	F	NO CLASS				
7. Signaling 2	1-May	M				WGC-A	
	2-May	T				WGC-A	
	3-May	W				WGC-A	
	4-May	Th				WGC-A	
	5-May	F	NO CLASS				
8. Cancer / Signaling	8-May	M				WGC-A	
	9-May	T				WGC-A	
	10-May	W				WGC-A	
	11-May	Th				WGC-A	
	12-May	F	NO CLASS				
9. Cancer	15-May	M				WGC-A	
	16-May	T				WGC-A	
	17-May	W				WGC-A	
	18-May	Th				WGC-A	
	19-May	F	NO CLASS				
10. Aging	22-May	M				WGC-A	
	23-May	T				WGC-A	
	24-May	W				WGC-A	
	25-May	Th				WGC-A	
	26-May	F	NO CLASS				
11. Infection	29-May	M	<b>MEMORIAL DAY</b>				
	30-May	T				WGC-A	
	31-May	W				WGC-A	
	1-Jun	Th				WGC-A	
	2-Jun	F				WGC-A	



# Lab Rotation Research Progress Report

*BCMB Allied Graduate Program*

Rotation Period:  Summer  Fall  Winter  Spring

Project Title:

**Student's Name:** \_\_\_\_\_

**Lab Rotation Mentor:** \_\_\_\_\_

Signature: \_\_\_\_\_

**1<sup>st</sup> Year Advisor:** \_\_\_\_\_

Signature: \_\_\_\_\_