



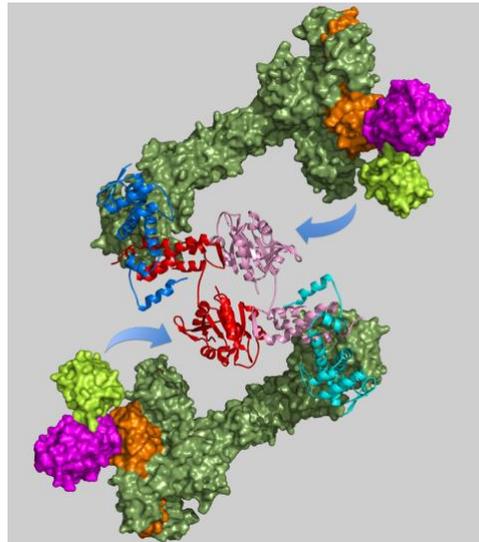
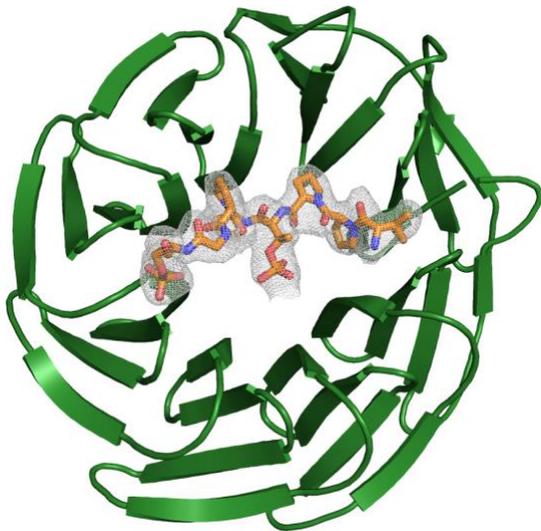
UConn Health



Graduate Program in Molecular Biology and Biochemistry Student Handbook

INDEX

<u>Page</u>	
3	Introduction
4	Names and Contact Information for Program Directors, Administrative Staff, Registrar and Associate Dean of the Graduate School (UConn Health Campus)
5	Financial Support
5	Academic Matters - Introduction
5	Thesis Research Laboratory
6	Thesis Committee
6-9	Preliminary (General) Exam
9	Thesis Prospectus (Dissertation Proposal)
9	Work in Progress Talks
9	MBB Journal Club
10	Thesis Preparation and Defense
11-12	Recommended Coursework
13-15	MBB Program Faculty Contact Information and Research Interests





Introduction

Welcome to the graduate program in Biomedical Sciences at UConn Health. This handbook is intended to inform you about the requirements and policies of the **Molecular Biology and Biochemistry** (MBB) Area of Concentration (AoC). This AoC is based in the Department of Molecular Biology and Biophysics and also includes numerous faculty from other departments within UConn Health. This handbook contains essential information about deadlines which you will have to heed as you progress through your graduate career. Consequently, please plan to consult this handbook at regular intervals. If you have questions, please contact a program director. Additional information and policies are available in the [UCONN graduate school catalog](#).



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Financial Matters

Financial Support

At present, the financial support package includes: a) full payment of tuition and fees; b) a stipend of \$32,000; c) health insurance. There are no teaching responsibilities associated with the stipend. Stipend payments are distributed biweekly. It is important to recognize that graduate study is considered a full-time endeavor and other employment or educational activities need to be approved by the advisor and thesis committee.

Academic Matters

The primary goal of the program is to educate students for a broad range of careers in the biology of the coming decades. Whether the graduate enters academic research, the biotechnology industry, a liberal arts teaching college or patent law, we expect that they will bring to that career a solid base of knowledge, an ability to learn and think independently and an enduring desire to use their full range of professional skills and experience in creative ways. We expect our graduates to have demonstrated a high degree of competence in research, as judged by publications in high quality peer-reviewed journals, and to have developed essential skills in identifying important research problems, planning research projects and scientific writing. We also expect our students to have incorporated ethical principles of scientific conduct into their professional activities and to be sensitive to such issues throughout their careers.



In addition, to earning the PhD degree, it is also possible for students to enroll in other degree-granting programs within the university (such as the UConn Business School MBA program) contemporaneously. This requires the approval of the student's advisor, the thesis advisory committee and the Associate Dean of the Graduate School (UConn Health Campus).

All the necessary forms for the General Exam, Dissertation, Plan of Study, etc are available on-line at the [UConn Current Students directory](#) and [UConn Health Biomedical Science Ph.D. Program Milestones](#). It should be noted that all official paperwork should be filed through Registrar's Office on the UConn Health campus, regardless of the address on the forms.

Thesis Research Laboratory

Typically, a student will perform three (3) rotations in the first year. This is to allow them the opportunity to try a variety of research projects, environments and mentors. After performing laboratory rotations, the student will pick a laboratory in which to perform

their thesis research. This will be done in consultation with the proposed mentor. A student may petition to the Graduate Programs Committee to waive the requirement for the third rotation. Upon selection of a thesis laboratory, a Change of Major Advisor form must be completed.

Thesis Committee

The student's thesis committee will oversee the research. The committee consists of the major advisor plus at least three (3) additional members of the faculty who should be picked by the student in consultation with the major advisor. The committee should be formed by **December of the 2nd year**, if not earlier. It is important to inform the MBB Program Director(s) when this is done. The Plan of Study should be filed at the same time.

It is expected that this committee will meet a minimum of once per year (under certain circumstances more frequent meetings may be necessary) and will also discuss progress with the student following the presentation of their annual work-in-progress talk (see below).

Preliminary (General) Exam

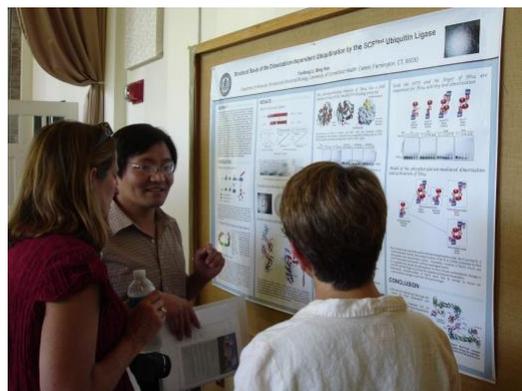
The examination consists of two parts: a written proposal and an oral defense. Students will present a work-in-progress talk in January/February of the second year so they can have a meeting with their thesis committee prior to the preliminary exam. The deadline for this pre-meeting is **March 28th**. Students should prepare a draft outline/specific aims page so that they can discuss it with their committee at this meeting. Based on this, a final specific aims page must be approved by the committee by **April 15th**. Students will prepare the written portion of the exam (see below for details) and provide it to their exam committee (see below) **four weeks** after the date of approval of their Specific Aims. The examination can be arranged two weeks after the completion of the written portion but must be completed by **May 31st** of the second year. The exam committee will consist of the advisor, three other members of the thesis committee plus one other, therefore must be at least five members. One member of the committee must be either the director, associate director or assistant director of the MBB program who will chair the meeting. The major advisor remains silent during the examination unless specifically requested to clarify an issue by the chair.

At the start of the meeting, the student will be asked to excuse themselves while the committee discusses the written proposal and identifies any deficiencies to the chair. The student will then return when requested and proceed with their presentation. At the General Exam meeting, the members of the General Exam Committee will have the opportunity to ask questions as the presentation proceeds. The discussion may focus on the theory behind the proposal, the methods used to address the problem, the

interpretation of preliminary data and alternative approaches to the experimental problem.

The student will then be asked to leave the room, and the General Exam Committee will evaluate: 1) the written proposal, 2) the student's performance during the oral defense, and 3) the student's prior performance in the program (course work, rotations, etc.; the MBB Director or Associate Director will be responsible for providing the student's records). All members of the examination committee will participate in this discussion and recommend an outcome for the exam. The exam committee must be unanimous in their decision. The committee will choose among the following outcomes:

- ◆ Unconditional pass.
- ◆ Pass with specific remediation.
- ◆ A satisfactory rewrite of all or part of the proposal as a condition to passing the exam.
- ◆ A satisfactory retake of the oral defense as a condition to passing the exam.
- ◆ Retake of the entire exam.
- ◆ Fail.



The student will be immediately informed of the committee's decision by the major advisor and the Program Director. The Report on the General Examination for the Doctoral Degree form should be submitted to the Office of the Registrar IMMEDIATELY following the final decision of the examination. The report must be submitted whether the final examination has been passed or failed. The student is responsible for preparing the report and collecting the signatures from your committee members, but not submitting the report. The original report should be submitted to the Office of the Register by a faculty member, which can be your major advisor or the director of the MBB program. A copy of the report is to be retained by the major advisor. This report must be submitted within thirty days of the examination for you to be eligible for retroactive Graduate Assistantship pay. The student should also inform Shanaz Mohamadin the MBB Departmental office to update the student record.

Format for the Written Research Proposal and Other Details

The General Exam will consist of a research proposal based on the student's work in their major advisor's lab and an oral defense of the proposal. The proposal should be prepared using the NIH grant format (Arial, 11 point). The proposal will be limited to a total of 12 pages and consists of Project Summary (limited to 30 lines of text and should be able to stand on its own), a one-page Specific Aims statement and a 10-page Research Proposal with the following sections:

**Significance
Innovation
Approach (Includes Experimental Design and Preliminary Results)
Cited Literature (not counted as part of the 12 pages)**

The following is from the new NIH guidelines:

Project Summary. (limited to 30 lines of text)

States the application's broad, long-term objectives and specific aims, making reference to the health relatedness of the project. Describe the research design and methods for achieving the stated goals. The project summary should be able to stand on its own (separate from the application) and be informative to other persons working in the same or related fields and understandable to a scientifically literate reader.

Specific Aims. (One page)

State concisely the goals of the proposed research and summarize the expected outcome(s), including the impact that the results of the proposed research will exert on the research field(s) involved.

List succinctly the specific objectives of the research proposed, e.g., to test a stated hypothesis, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop new technology.

Research Strategy. (10 pages)

Organize the Research Strategy in the specified order and using the instructions provided below. Start each section with the appropriate section heading – Significance, Innovation, Approach. Cite published experimental details in the Research Strategy section and provide the full reference in the Bibliography and References Cited section (References are not part of the 12-page limit).

(a) Significance

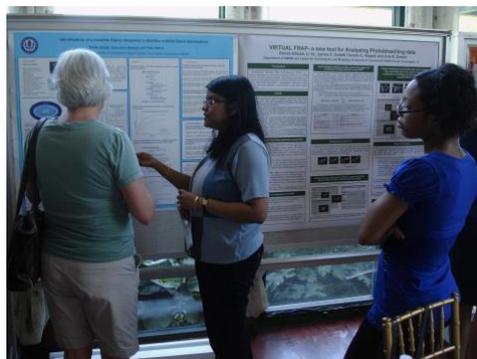
- *Explain the importance of the problem or critical barrier to progress in the field that the proposed project addresses.*
- *Explain how the proposed project will improve scientific knowledge, technical capability, and/or clinical practice in one or more broad fields.*
- *Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field will be changed if the proposed aims are achieved.*

(b) Innovation

- *Explain how the application challenges and seeks to shift current research or clinical practice paradigms.*
- *Describe any novel theoretical concepts, approaches or methodologies, instrumentation or interventions to be developed or used, and any advantage over existing methodologies, instrumentation, or interventions.*
- *Explain any refinements, improvements, or new applications of theoretical concepts, approaches or methodologies, instrumentation, or interventions.*

(c) Approach

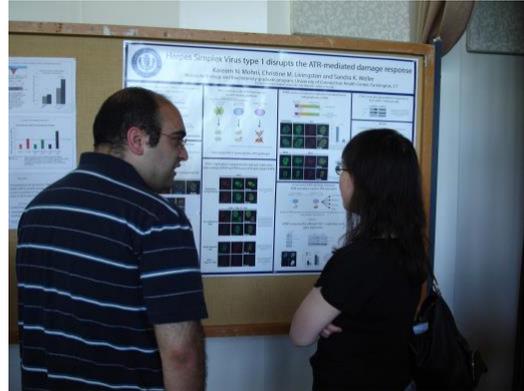
- *Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of*



the project. Include how the data will be collected, analyzed, and interpreted.

- *Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the aims.*
- *Describe any strategy to establish feasibility, and address the management of any high-risk aspects of the proposed work.*
- **Include** information on Preliminary Studies as part of the Approach section. *Discuss preliminary studies, data, and or experience pertinent to this application.*

Bibliography & References Cited (not included in the 12-page limit): Provide a bibliography of any references cited in the Project Narrative. Each reference must include the names of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication. Include only bibliographic citations. Applicants should be especially careful to follow scholarly practices in providing citations for source materials relied upon when preparing any section of the proposal.



In preparing the proposal, the student may consult any faculty member, including the thesis advisor, and other sources, regarding experimental methods and approaches. However, the student is solely responsible for the written proposal; the major advisor and committee members are not allowed to read or critique the written proposal during the preparation period. Copies (**PDF files only**) of the finished proposal must be emailed to the General Exam Committee at least two (2) weeks prior to the scheduled exam date. After submitting the written proposal, the student is allowed to prepare and practice his/her oral presentation with fellow graduate students, but not the major advisor or any other faculty member within or outside the MBB department. On the exam date, the student will present their proposal to the exam committee. Typically students use PowerPoint, but other more direct media are also encouraged.

Thesis Prospectus (Dissertation Proposal)

The Dissertation Proposal form is a requirement of the University of Connecticut graduate school and must be submitted through the Registrar's Office on the UConn Health campus **at least 6 months prior to** the expected degree completion date. To ensure that this requirement is met in a timely manner, the MBB program requires that this form be submitted to Storrs by **the beginning of the third year (August 31st)**. It is most common and expeditious for a student to



rework their general exam proposal to fit the required format. It is essential to inform Shanaz Mohamad when this form has been filed.

Work-In-Progress Talks

All students in their second year and beyond are required to present their research work-in-progress to the program. This talk will be in the form of a chalk-talk combined with a limited number of slides to show experimental data only (preferably 5-7 slides maximum). Students who are likely one year or less from graduating (as determined by student and mentor) will no longer perform a chalk-talk, but rather present a formal seminar with slides.

MBB Journal Club

All students in all years are required to attend the weekly MBB Journal Club. Students will be required to present at least once per year. Attendance and active participation at all journal club sessions is expected.



Thesis Preparation and Defense

The thesis and its defense is an essential step to earning the PhD degree. The written thesis should provide a detailed exposition of the student's research work and include both an introduction that places the work in perspective and a concluding section which highlights the impact of the student's research and identifies future avenues that could be explored. The thesis will be prepared by the student in consultation with their mentor and other faculty as appropriate after the advisory committee has decided that the student is ready to defend. It is important to note that there are strict formatting requirements for the dissertation which must be adhered to.

The defense of the thesis takes place in two presentations: 1) a private defense before members of the exam committee and 2) a public defense open to all. Once the thesis is submitted to the exam committee, **a minimum of two weeks** must be allowed before the private defense is held. Once the thesis is defended successfully at the private defense, the Doctor of Philosophy Dissertation Tentative Approval form and an approved DRAFT of the thesis must be submitted electronically. This must be done **at least two weeks prior to** the public defense. This requirement is to provide a minimum time in which alterations to either the thesis content or the presentation can be made. At least

five (5) members of the graduate faculty (including a program director) **must** be present at the public defense. It is important to note that even though a student may pass the private defense, they can still be in jeopardy if they do not perform well at the public defense. Upon successful completion of the public defense, the Report on the Final Examination must be submitted and an application for graduation must be completed on PeopleSoft. The student is still permitted to make additional edits to the draft thesis before final submission. For students on a visa, the final thesis must be submitted within three weeks of the public defense.

Recommended Coursework

Apart from attendance at journal club and the course on the *Responsible Conduct of Science* that is mandatory for all students, the MBB program does not have a specific list of courses that are required to be taken during the first two years. Rather, MBB students take a variety of didactic coursework that is dependent on their interests and background, and is chosen in consultation with their first year mentors and/or research mentors. Our students commonly select from the following list, although many other courses are offered within UCONN HEALTH and can be taken for credit by interested students. The MBB program does strongly encourage students to register for both *Foundations of Biomedical Science* and *Molecular Basis of Disease* courses (although not necessarily in the same semester) as these focuses specifically on the molecular underpinnings of biomedical science.

Course Number

Course Name and Description

[MEDS 6496](#)

Laboratory Rotation

[GRAD 6950](#)

Continuing registration for doctoral students after obtaining a thesis advisor and turning in Change of Major Advisor form.

[MEDS 6497](#)

Molecular Biology and Biochemistry Journal Club

[MEDS 6448](#)

Foundations of Biomedical Science (4 credits)

[MEDS 5418](#)

Stem Cells and Regenerative Biology (3 credits)

[MEDS 6450](#)

Optical Microscopy and Bio-Imaging (3 credits)

[MEDS 5309](#)

Molecular Basis of Disease (2 credits)

[MEDS 5380](#)

Cell Biology (4 credits)

[MEDS 5369](#)

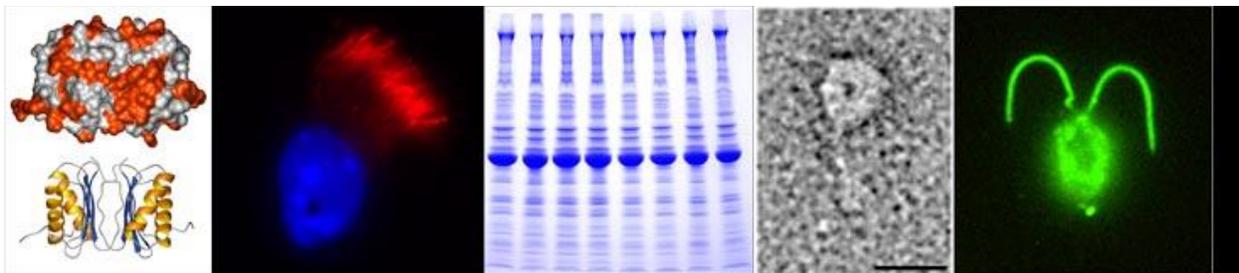
Advanced Genetics and Molecular Biology (3 credits)

MEDS 5351	Biochemistry II (3 credits)
MEDS 6444	Medical Microbiology (3 credits)
MEDS 6413	Cancer Biology (2 credits)
MEDS 5310	Responsible Conduct in Research (1 credit; Attendance is Mandatory)

Services available to UConn Health graduate students

Students experiencing personal difficulties or professional issues during the time in graduate school may utilize the following services. Please familiarize yourself with these offices and the services they provide.

- [Student Behavioral Health Service \(SBHS\)](#). SBHS provides mental health evaluation and treatment to graduate students at UConn Health. Students can request an appointment with counselors for a wide variety of health concerns, such as stress, crisis, anxiety, depression, eating disorder, substance usage, transitional issues, grief and relationship issues. SBHS is completely separate from the academic side of the university and what you talk there is kept confidential from the faculty and others unless the student gives written permission. The SBHS services are free. There is no co-pay and you do not need to use your insurance.
- [Office of Institutional Equity \(OIE\)](#). OIE ensures the University's commitment and responsibility to foster equitable and inclusive working and learning environments. Their work focuses on administering the University's non-discrimination policies, as well as ensuring compliance with state and federal laws and regulations related to equal opportunity and affirmative action.
- [UConn Ombuds Office](#). The UConn Ombuds office was established to provide a confidential, neutral resource for staff, faculty, Professional and graduate students and trainees to express concerns, identify options to address workplace conflicts, facilitate productive communication, and surface responsible concerns regarding university policies and practices.



MBB Program Faculty Contact Information and Research Interests

Irina Bezsonova, Associate Professor of Molecular Biology and Biophysics, B.S. Lomonosov Moscow State University, Ph.D., University of Toronto. (Room E2032, Tel: 860-679-2769, Email: bezsonova@uchc.edu). *Protein structure-function relationship, NMR spectroscopy, X-ray crystallography, protein folding, epigenetics. [Bezsonova Lab website](#)*

Christine R. Beck, Assistant Professor of the Jackson Laboratory for Genomic Medicine, B.S. Iowa State University, Ph.D., University of Michigan. (Room 3306 at the Jackson Laboratory, Tel: 860-837-2173, Email: cbeck@uchc.edu or Christine.beck@jax.org). *Mechanisms of structural variation and repetitive elements.*

Melissa J. Caimano, Associate Professor of Medicine, B.S. University of Rhode Island, Ph.D., University of Alabama at Birmingham (Room E2013 or L4-103, Tel: 860-679-7312, Email: mcaima@uchc.edu). *Molecular biology and pathogenesis of spirochetal infections. [Caimano Lab website](#)*

Ann E. Cowan, Professor of Molecular Biology and Biophysics, Deputy Director, Center for Biomedical Imaging Technology; B.Sc., Queen's University, M.S., Yale University, Ph.D., University of Colorado (400 FARM Room 1602, Tel: 860-679-1449, Email: acowan@uchc.edu). *Plasma membrane proteins in sperm.*

Kimberly Dodge-Kafka, Professor of Cell Biology/Center for Cardiology and Cardiovascular Research; B.S. Texas A&M University, Ph.D., University of Texas Health Science Center-Houston (Room EG029, Tel: 860-679-2452, Email: dodge@uchc.edu). *Molecular mechanism of signaling pathways in the heart.*

Hamid Eghbalnia, Associate Professor of Molecular Biology and Biophysics, (Email: hghbalnia@uchc.edu). *Computational and probabilistic modeling; small molecule characterization.*

Michael Gryk, Associate Professor of Molecular Biology and Biophysics, B.S., M.S., University of Connecticut, Ph.D., Stanford University (Room L2051, Tel: 860-679-4785, Email: gryk@uchc.edu). *Three-dimensional structure and function of proteins involved in DNA repair.*

Bing Hao, Associate Professor of Molecular Biology and Biophysics, B.Sc., Xiamen University, Ph.D., the Ohio State University (Room L2005, Tel: 860-679-8364, Email: bhao@uchc.edu). *Structural and functional studies of proteins involved in ubiquitin-proteasome pathway and bacterial spore germination.*

Christopher Heinen, Professor of Medicine, B.Sc., Northwestern University, Ph.D., University of Cincinnati (Room E1032, Tel: 860-679-8859, Email: cheinen@uchc.edu). *Biochemical and cellular defects of the DNA mismatch repair pathway during tumorigenesis.*

Jeffrey Hoch, Professor of Molecular Biology and Biophysics, Director of Gregory P. Mullen NMR Structural Biology Facility; Ph.D., Harvard (Room L2007, Tel: 860-679-3566, Email: hoch@uchc.edu). *Biophysical chemistry of proteins.*

Stephen M. King, Professor of Molecular Biology and Biophysics, B.Sc., University of Kent, Ph.D., University College London (Room L2001, Tel: 860-679-3347, Email: sking@uchc.edu). *Structure and function of microtubule-based molecular motor proteins; cilia and flagella.* King Lab website

Dmitry Korzhnev, Associate Professor of Molecular Biology and Biophysics, B.S., Ph.D., Moscow Institute of Physics and Technology. (Room E2035, Tel: 860 679 2849, Email: korzhnev@uchc.edu). *Folding and conformational dynamics of proteins using NMR spectroscopy.*

Mark Maciejewski, Assistant Professor of Molecular Biology and Biophysics, Ph.D., the Ohio State University (Room L2021, Tel: 860-679-1943, Email: markm@uchc.edu). *Utilizing NMR to characterize the three-dimensional structure, function and dynamics of proteins from a wide range of important biological systems.*

Wing Ki (Wendy) Mok, Assistant Professor of Molecular Biology and Biophysics, B.Sc., Ph.D., McMaster University (Room L2017, Tel: 860-679-2203, Email: mok@uchc.edu). *Investigating how bacteria respond to and survive treatment with antibiotics that target distinct cellular components under different growth niches.* Mok Lab website

Julia Oh, Associate Professor of the Jackson Laboratory for Genomic Medicine, B.A., Harvard University, Ph.D., Stanford University (Tel: 207-288-6000, Email: julia.oh@jax.org). *The Oh Lab studies the human microbiome for its potential to deliver treatments for infectious and other diseases.*

Rebecca Page, Professor of Cell Biology, B.S. and B.A., University of Arizona, Ph.D., Princeton University (Room L5087, Tel: 860-679-6045, Email: rpage@uchc.edu). *Page lab studies cell signaling, focusing on the chemical language that directs how extracellular and intracellular signals are communicated to and within the cell in both space and time.* Page Lab website

Wolfgang Peti, Professor and Chair of Molecular Biology and Biophysics, M.S., University of Vienna, Ph.D., University of Frankfurt (Room L5077, Tel: 860-679-3874, Email: peti@uchc.edu). *Molecular and cellular understanding of eukaryotic and prokaryotic signaling pathways.* Peti lab website

Justin D. Radolf, Professor of Medicine, B.S., Yale University, M.D., University of California San Francisco (Room E2018, Tel: 860-679-8480, Email: jradolf@uchc.edu). *Molecular pathogenesis and immunobiology of spirochetal infections.* Radolf Lab website

Jianbin Ruan, Assistant Professor of Immunology, Ph.D., University of Science and Technology of China (Tel: 860-679-7979, Email: ruan@uchc.edu). *Innate Immunity; Inflammasome; Pore-forming Proteins/Toxins; Host-pathogen Interactions.*

Adam Schuyler, Assistant Professor of Molecular Biology and Biophysics. B.S., Williams College, Ph.D., Johns Hopkins University (Room L2019, Tel: 860-679-1496, Email: schuyler@uchc.edu) *Computational modeling; allosteric activation; optimizing multidimensional NMR.*

Peter Setlow, Professor of Molecular Biology and Biophysics, B.A., Swarthmore College, Ph.D., Brandeis University (Room L2003, Tel: 860-679-2607, Email: setlow@uchc.edu). *Biochemistry of bacterial spore germination.*

Suzy V. Torti, Professor of Molecular Biology and Biophysics, B.A., Reed College, Ph.D., Tufts University (Room EM032, Tel: 860-679-6503, Email: storti@uchc.edu). *Iron regulation and tumorigenesis.*

Sandra K. Weller, Professor of Molecular Biology and Biophysics, B.S., Stanford University, Ph.D., University of Wisconsin (Room E2056, Tel: 860-679-2310, Email: weller@uchc.edu). *Molecular genetics and biochemistry of herpes simplex virus DNA replication.*

