Biochemistry and Molecular Biology Concentration

Undeclared, Declared, and Fast-Track Students

Entering first-year students who are recruited by BMB but who plan to rotate with faculty in both BMB as well as other concentrations, will enroll in the GMS 6001 core course during the Fall semester of their first year. This will allow “undeclared students” to select either a BMB faculty mentor or a mentor in a different concentration after completing their three first-year rotation projects.

Entering first-year students who “declare” BMB as their Advanced Concentration, will have the option of taking a menu of BMB graduate courses instead of GMS 6001 during the Fall semester of their first year. This option will also apply to “declared BMB students” who are committed to work with a specific BMB faculty mentor (e.g., Fast Track students).
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First Year

Fall – “Undeclared” students
• “Core Course” (GMS 6001) – 5 credits
• Lab Rotation (GMS 6090) – 2 credits
• Essentials of Graduate Research & Professional Development (GMS 6003) – 1 credit
• Journal Club (BCH 6936) – 1 credit

Fall – “Declared” BMB students
• Eukaryotic Molecular Biology and Genetics (BCH 5413) – 3 credits
• Graduate Course (Elective) – 3 credits
• Essentials of Graduate Research & Professional Development (GMS 6003) – 1 credit
• Lab Rotations (GMS 6090) – 1 credit
• Journal Club (BCH 6936) – 1 credit

Spring – All BMB Students
• Advanced Courses – 6 credits
• Lab Rotations (GMS 6090) – 1 credit
• Responsible Conduct of Biomedical Research (GMS 7003) – 1 credit
• Journal Club (BCH 6936) – 1 credit

https://biomed.med.ufl.edu/about/biochemistry-and-molecular-biology/
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Requirements After the First Year:

Formal coursework:
1. After completing the courses required in the Fall semester of the first year, a total of 12 credits of graduate courses at the 6000 level and above must be taken.
2. Typically, 6 of those 12 credits are taken in the Spring semester of the first year, and the remaining 6 credits are taken in the second year.
3. At least 4 of the 12 credits must be BMB Advanced Courses (BCH prefix), and at least 3 credits must be from another concentration.

BMB Journal Club (BCH 6936) – 1 credit each Fall and Spring semester
Biochemistry Research Discussion (BCH 6040) – 1 credit each Fall and Spring semester

Qualifying Exam will be taken by November 1st of the third year.

Supervised Research – Successful completion of a Ph.D. degree requires students to carry out an independent research project, write a dissertation describing this work and defend the work in a public presentation.

Supervisory Committee – By the end of the first year, students must form a supervisory committee composed of 5 faculty members including the research mentor who serves as chair of the committee. In addition to the chair/research mentor, the committee must include 2 faculty members from the BMB concentration and an external member from outside the BMB concentration.

Supervisory Committee Meetings – After passing the qualifying exam, students have regular meetings (twice a year) with members of their supervisory committees.
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Three Curriculum Tracks:

1. Metabolism and Metabolomics
2. Molecular Biology
3. Structural Biology

You can design your own course of study by mixing courses from the different tracks
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Metabolism Labs

Dr. Tim Garrett – Clinical applications in mass spectrometry
Dr. Michael Kilberg – Nutrient stress response
Dr. Joanna Long – Membrane structure and function
Dr. Jianrong Lu – Hypoxia and Warburg effect in cancer
Dr. Matthew Merritt – Metabolism, stable isotope tracing, magnetic resonance, and hyperpolarization
Dr. Charlie Khemtong – Characterization of cellular metabolism

May take students depending on funding situation
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Metabolism Labs
Metabolism Courses offered within the BMB Concentration

**BCH6206**  Metabolic Control Analysis, *Fall semester*

**BCH6207**  Adv. Metabolism: Role of Membranes in Signal Transduction and Metabolic Control

**BCH6208**  Adv. Metabolism: Regulation of Key Reactions in Carbohydrate and Lipid Metabolism

**BCH6209**  Adv. Metabolism: Regulation of Key Reactions in Amino Acid and Nucleotide Metabolism

**Others:**

**BCH6107**  Biophysical Techniques in Proteomics, *Spring semester*  
EM(cryo), Metabolomics etc
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Molecular Biology Labs

Dr. Bert Flanegan – RNA virus replication
Dr. Mingyi Xie – Gene expression regulation by non-coding RNAs; microRNA biogenesis
Dr. Melike Caglayan – Genome integrity, DNA damage repair
Dr. Linda Bloom – DNA replication, DNA damage repair
Dr. Michael Kilberg – Nutrient stress response
Dr. Jorg Bungert – Transcriptional regulation during erythropoiesis
Dr. Michael Kladde – Regulation of transcription by chromatin
Dr. Jianrong Lu – Transcriptional and epigenetic control of EMT
Dr. Michelle Gumz – Circadian clock function (kidney)
Dr. Jon Licht – Aberrant gene regulation during hematopoiesis
Dr. Zhijian Qian – Cancer Epigenetics

May take students depending on funding situation
Molecular Biology Courses offered within the BMB Concentration

BCH5413  Eukaryotic Molecular Biology and Genetics
BCH6415  Advanced Molecular and Cell Biology
BCH7410  Advanced Gene Regulation
BCH7412  Epigenetics of Human Disease and Development
BCH7414  Advanced Chromatin Structure
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Structural Biology Labs

Dr. Mavis Agbandje-McKenna – ssDNA viruses
Dr. Linda Bloom – DNA repair/replication
Dr. Joanna Long – Membrane proteins
Dr. Thomas Mareci – Mapping central nervous system
Dr. Robert McKenna – Proteins/enzyme structures

Collaborative studies

May take students depending on funding situation
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Structural Biology Labs
X-ray, EM, CRYO-EM, NMR, BIC, and National Facilities:
Structural Biology Courses offered within the BMB Concentration

BCH6740  Structural Biochemistry, *Spring semester*
BCH6744  Molecular Structure Determination by X-Ray Crystallography
BCH6741  Magnetic Resonance Imaging in Living Systems
BCH6745  Molecular Structure and Dynamics by NMR Spectroscopy

Others:
BCH6749  Numerical Methods in Structural Biology, *Summer semester*
BCH6107  Biophysical Techniques in Proteomics, *Spring semester*
          EM(cryo), Metabolomics etc

Center of Structural Biology Seminar Series

Crystallography and cryo-electron microscopy Journal Club
Biochemistry Journal Club
(Tues 11:45am) – research and current literature – student invited speaker

Faculty Research Presentations
(Wed 4:00pm) – B&MB and invited Faculty

Qualifying exam

Proposal – in the form of an NRSA predoctoral fellowship application (6 pages).

Several of our students have successfully obtained competitive external fellowships (NIH, NSF, AHA and private foundations). Proposal writing course – Dr. Bloom.
Dicer cleaves 5'-extended microRNA precursors originating from RNA polymerase II transcription start sites.
Oxidized nucleotide insertion by pol β confounds ligation during base excision repair.
Çağlayan M, Horton JK, Dai DP, Stefanick DF, Wilson SH.
Nat Commun. 2017 Jan 9;8:14045. doi: 10.1038/ncomms14045
A novel inhibitor of pyruvate dehydrogenase kinase stimulates myocardial carbohydrate oxidation in diet-induced obesity.


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BMB faculty who might take students next year

Linda Bloom, PhD
Professor and Associate Chair

Mechanism of opening a sliding clamp.
Biochemistry and Molecular Biology Concentration

BMB faculty who might take students next year

Robert McKenna, PhD
Professor

"To Be or Not to Be" Protonated: Atomic Details of Human Carbonic Anhydrase-Clinical Drug Complexes by Neutron Crystallography and Simulation
(March 2018) Structure 26, 383–390
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BMB faculty who might take students next year

Joanna Long, PhD
Professor

Entropic Anomaly Observed in Lipid Polymorphisms Induced by Surfactant Peptide SP-B(1–25)
Tran, N., Kurian, J., Bhatt, A., McKenna, R. and Long, J.R.
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Previous Students

Kristen Solocinski, Post-doctoral Fellow at the National Cancer Institute

Brian Mahon, Post-doctoral Fellow at Princeton University

Shweta Kailasan, Integrated Biotherapeutics
Biochemistry and Molecular Biology Concentration

Previous Students

Mayank Agarwal, Research Scientist at Oak Ridge National Laboratories

Joeva Barrow, Assistant Professor, College of Human Ecology
Cornell University, Ithaca, NY

Karen Vieira, CEO of The Med Writers