

# BCMB INDEPENDENT RESEARCH PROJECTS (BCMB 4960R, BCMB 4970R, BCMB 4980R)

## Course Description for FALL, 2023

All students who major in Biochemistry & Molecular Biology are required to take **two semesters** of independent research (BCMB 4960R and BCMB 4970R, each 4 hr credit). For more than two semesters of research, BCMB 4970R can be repeated and/or students can take up to two semesters of BCMB 4980R. BCMB 4960R requires no previous lab experience. ***It is highly recommended that students consider taking these classes in their junior year or earlier. There is no formal pre-requisite for BCMB 4960R.***

**Objective:** The objective of these courses is to train students in the basic techniques used in biochemistry and molecular biology, and the application of the scientific method. Students typically become part of a dynamic research environment and gain experience in both the experimental approach and the culture of a research laboratory. Students in these courses have been co-authors of research papers published in the primary scientific literature.

**How to find a Laboratory:** These courses are unusual in that the onus is on the student to find a Faculty member that will accept the student into their laboratory. A list of BCMB faculty mentors and their research interests is given below. All are familiar with the requirements of these courses and have mentored students in the past. Prospective students should arrange for an appointment with prospective Faculty mentors to discuss research areas. Students choose laboratories based on personal research interests, their knowledge of the professor, recommendations from other students, etc. Although it is possible for students to take BCMB 4960R and BCMB 4970R courses in different laboratories, they are usually carried out in the same laboratory.

**Laboratories outside of BCMB:** Students can take the BCMB 4960R and/or 4970R courses with faculty members not affiliated with the Department and a list of non-BCMB mentors is given below. It is also possible to carry out research with faculty not on that list as long as the research is biochemically-related and it is pre-approved the prior semester by the BCMB undergraduate committee. To obtain approval, please submit to Dr. Adams (adamsm@uga.edu) a one-page abstract of the proposed research together the name and email address of the proposed mentor.

**When to find a Laboratory:** BCMB 4960R and BCMB 4970R courses must be arranged during the semester **prior** to when the student will begin the course. It is never too early to talk to prospective Faculty mentors about their research and about the possibility of taking this course with them. It is highly recommended that arrangements are made before the mid-point of the prior semester.

**Registration:** Permission of the Department is required to register for these courses. A **REGISTRATION FORM** must also be completed by the student and signed by the Faculty mentor. The form can be obtained from the Departmental web site (<https://www.bmb.uga.edu/undergraduate-research>), from the Biochemistry Advisor, Tashia Caughran (tashia.caughran@uga.edu) or from Dr. Adams (adamsm@uga.edu). Once the registration form is signed by you and by your Faculty mentor, you must provide the form to Angie Stockton in the Biochemistry Office either in person (Davison Life Sci., room B122) or by email (angie1@uga.edu) and you will be cleared to register.

**Time Requirement:** BCMB 4960R and BCMB 4970R are taken for 4 hr credit each. Students should expect to be in the laboratory for a minimum of 12 hr/ week (for 15 weeks) in the spring/fall or 24 hr/week (for 7.5 weeks) in the summer. The exact schedule is to be determined by the Faculty mentor and the student.

**Examinations and Grades:** The final grade is determined by the Faculty mentor. This is based on:  
**a) Performance in the laboratory (75%).** This does not mean the number or accuracy of the results! It reflects the aptitude, effort, reliability, dependability, perseverance and meticulousness of the student in the laboratory setting.  
**b) Written Presentation of Research (25%).** Each student must write a **Research Report**, which describes what has been accomplished in the laboratory. The report should resemble a brief scientific paper and be of at least 8 pages in length (double spaced, 1" margins). The report should be sub-divided into a) Summary, b) Introduction, c) Experimental Methods, d) Results, e) Discussion and f) References. The rubric for writing the Research Report is on the next page.

**The Research Report should be sent by email as a single word.docx or pdf file attachment to Dr. Adams (adamsm@uga.edu) by 5 pm on the last day of classes.**

**Note that Research Reports not received by 5 pm on Tuesday, December 5th will result in a C grade (no exceptions)**

(02/16/23)

## Rubric for BCMB 4960R/4970R/4980R Research Reports

This rubric will be used by your faculty mentor to evaluate your research report. This rubric is holistic, meaning that all of the criteria will be considered together to generate a final grade. We encourage you to refer to it as you do your research this semester, especially while you are writing and revising your paper.

Criteria	Definition
<b>Introduction</b>	
Context	Demonstrates a clear understanding of the big picture; Why is this question important/interesting in the field of biochemistry and molecular biology?
Accuracy	Content knowledge is accurate, relevant and provides appropriate background including defining critical terms.
<b>Hypotheses / Research Directions</b>	
Testable	For hypothesis-driven research, hypotheses are clearly stated, testable and consider plausible alternative explanations.
Scientific Merit	The hypotheses or research directions are novel, insightful, and have the potential to contribute useful knowledge to the field.
<b>Methods</b>	
Controls and replication	Appropriate controls (including appropriate replication) are present and explained.
Study design	The study design is likely to produce salient and fruitful results (actually tests the hypotheses posed and/or directly addresses the research direction).
<b>Results</b>	
Data selection	Data chosen are comprehensive, accurate and relevant.
Data presentation	Data are summarized in a logical format. Table or graph types are appropriate. Data are properly labelled including units. Graph axes are appropriately labelled and scaled and captions are informative and complete.
Statistical analysis	Any statistical analysis is appropriate for hypotheses tested and appears correctly performed and interpreted with relevant values reported and explained.
<b>Discussion</b>	
Conclusions based on data	Conclusion is clearly and logically drawn from data provided. A logical chain of reasoning from hypothesis to data to conclusions is clearly and persuasively explained. Conflicting data, if present, are adequately addressed.
Alternative explanations	Alternative explanations (hypotheses) are considered and clearly eliminated by data in a persuasive discussion.
Limitations of design	Limitations of the data and/or study design and corresponding implications for data interpretation are discussed.
Significance of research	Paper gives a clear indication of the significance and direction of the research in the future.
<b>Primary literature</b>	Writer provides a relevant and reasonably complete discussion of how this research project relates to others' work in the field (scientific context provided) using primary literature.
<b>Writing quality</b>	Grammar, word usage, and organization facilitate the reader's understanding of the paper.

Adapted from the Rubric for Science Writing, Timmerman, Strickland, Johnson, & Payne. (2011) Development of a 'Universal' Rubric for Assessing Undergraduates' Scientific Reasoning Skills Using Scientific Writing. *Assessment & Evaluation in Higher Education* 36, 509–47. <https://doi.org/10.1080/02602930903540991>.

**BMB FACULTY MENTORS FOR INDEPENDENT RESEARCH PROJECTS**  
**(BCMB 4960R, BCMB 4970R, BCMB 4980R)**  
**Potential Projects for FALL, 2023**

**Dr. Michael W.W. Adams** (Life Sciences, Rm. B218. Tel: 706 542-2060. adamsm@uga.edu). 1. Physiology, metabolism and enzymology of microorganisms growing near 100°C from marine volcanic vents. 2. Microbial metabolic engineering for conversion of plant biomass to biofuels at extreme temperatures. 3. Characterization of human gut microbes that utilize the metal tungsten. All three projects involve biochemical, genetic and genomic based approaches

**Dr. Tessa Andrews** (Life Sciences, Rm C208A, Tel: 706-542-3340, tandrews@uga.edu) 1. Teacher expertise for active-learning instruction in large undergraduate courses; 2. Sources of support and barriers to investing in improving teaching among college science faculty; 3. How beliefs, attitudes, and identity shape college teachers. Research methods include interviews, surveys, video analysis and classroom observation.

**Dr. Adam Barb** (Life Sciences, abarb@uga.edu). 1) Linking structure and function in immune system glycoproteins 2) Characterizing the composition of immune receptors from primary human tissue

**Dr. Maor Bar-Peled** (Complex Carbohydrate Research Center, 315 Riverbend Road; Tel: 706 542-4496. peled@ccrc.uga.edu). 1. Characterization of recombinant enzymes that control synthesis of glycan in plant and human fungal pathogens and in pathogenic bacteria that impact animals. 2. Molecular mechanism for localization of membrane bound proteins to ER and Golgi. 3. Analyses of mutants affecting polysaccharide synthesis in fungi and in bacteria, 4. Study of biofilm formation and bacteria colonization.

**Dr. David L. Blum** (Life Sciences, Rm A414A. Tel: 706 542-1035. blum@uga.edu). 1. Improving expression of recombinant proteins in microbial and mammalian cell culture. 2. Discovery monoclonal antibodies against novel targets

**Dr. Belen Cassera** (Life Sciences, maria.cassera@uga.edu). 1. Characterization of isoprenoid biosynthesis (metabolites and proteins) in eukaryotic pathogens. 2. Antimalarial drug discovery from natural products and synthetic sources.

**Dr. Erin Dolan** (Life Sciences, B210B. Tel: 706-713-2324. eldolan@uga.edu) 1. Key features and outcomes of scalable ways of involving undergraduates in research. 2. Structures and functions of undergraduate research mentoring and how they relate to student outcomes. 3. Applying theories and methods from industrial, organizational, and social psychology to improve undergraduate teaching and learning. Research methods include surveys, classroom observations, interviews, focus groups, and qualitative content analysis as well as statistical analyses such as linear regression and multi-level modeling.

**Dr. Diana M. Downs** (361A Biological Sciences, 706-542-9573. dmdowns@uga.edu). 1. Biochemical and genetic analysis of metabolic integration in bacteria. 2. Enzyme purification and analysis.

**Dr. Art Edison** (Complex Carbohydrate Research Center, 315 Riverbend Road, Rm. 1040, aedison@uga.edu). 1. NMR metabolomics applications, metabolomics technology development, NMR probe development. 2. Nematode chemical ecology, Caenorhabditis elegans metabolomics and chemical signaling, C. elegans systems biology.

**Dr. Kosuke Funato** (Center for Molecular Medicine, 325 Riverbend Rd., Rm 2210 Tel: 706-542-0814. kosuke.funato@uga.edu). 1. Modeling malignant brain tumors using human pluripotent stem cells. 2. Developing tailor-made therapies for malignant brain tumors. 3. Dissecting the role of human specific genes in malignant brain tumors.

**Dr. David J. Garfinkel** (Life Sciences, Rm. A130. Tel: 706 542-9403. djgarf@uga.edu). 1. Understanding the mechanism of Ty1 retrotransposon copy number control in Saccharomyces cerevisiae and closely related species. 2. Understanding the variation and evolution of Ty1 copy number control. 3. Generating and characterizing Ty1 elimination strains using Cas9 editing.

**Dr. Michael G. Hahn** (Complex Carbohydrate Research Center, 315 Riverbend Road; Tel: 706 542-4457. hahn@ccrc.uga.edu). 1. Characterization of monoclonal antibodies against plant cell wall polysaccharides. 2. Characterization of proteins encoded by a gene family involved in the biosynthesis of pectic polysaccharides in plant walls. 3. Studies of plant signal transduction pathways.

**Dr. Robert S. Haltiwanger** (Complex Carbohydrate Research Center, 315 Riverbend Road, Tel: 706 542-4151, rhalti@uga.edu). 1. Regulation of the Notch signaling pathway by glycosylation. 2. Effects of glycosylation on protein folding. 3. Involvement of glycosylation in development and disease.

**Dr. Gerald W. Hart** (Complex Carbohydrate Research Center, 315 Riverbend Road, Rm. 3034, Tel: 706-583-5550. gerald.hart@uga.edu). 1. Nutrient Regulation of Signaling & Transcription. 2. O-GlcNAc & diabetes. 3. O-GlcNAc & Alzheimer's disease. 4. O-GlcNAc regulation of RNA Polymerase II. 5. O-GlcNAc regulation of translation.

**Dr. Natarajan Kannan** (Life Sciences, A318. Tel: 706 542-7326. nkannan@uga.edu). 1. Cell signaling and kinase-substrate interactions in normal and disease states. 2. Cancer genomics and bioinformatics. 3. Glycoinformatics and proteomics.

**Dr. Eileen J. Kennedy** (Pharmacy South, Rm 342. Tel: 706 542-6497. ekennedy@rx.uga.edu). Chemical biology projects focusing on kinase signal transduction and regulation in breast, prostate, and lung cancer.

**Dr. William N. Lanzilotta** (Life Sciences, A130. Tel: 706 542-1573. wlanzilo@bmb.uga.edu). 1. Structure/function investigation into the mechanism of heme uptake and transport by enteric pathogens. 2. The role of iron-sulfur clusters in radical chemistry: biochemical and structural analysis of the 1,3-propanediol pathway from *Clostridium acetobutylicum*.

**Dr. Paula Lemons** (Life Sciences, Rm. C116. Tel: 706 542-9616. plemons@uga.edu). (1) Undergraduate problem solving about biochemistry, particularly in the area of molecular structure and function and metabolic pathway dynamics and regulation; (2) College science faculty teaching attitudes and practices and how to support faculty through professional development. Data collection methods include tests, interviews, classroom observations, focus groups. Data analysis methods include qualitative content analysis and statistics.

**Dr. Amy E. Medlock** (Coverdell Building. Tel: 706 542-7843. medlock@uga.edu) . 1. Heme synthesis and intracellular trafficking. 2. Organismal heme homeostasis.

**Dr. Debra Mohnen** (Complex Carbohydrate Research Center, 315 Riverbend Road. Tel: 706 542-4458. dmohnen@ccrc.uga.edu). 1. Characterization of glycosyltransferases involved in pectin biosynthesis, a plant cell wall polysaccharide required for plant growth with beneficial effects on human health and importance in the food, biofuel, agricultural and materials industries. 2. Structure/function relationships and mechanisms of biosynthesis of cell wall matrix polysaccharides and novel cell wall proteoglycans/polymers with emphasis on the *GAUT1*-related gene family. 3. Modification of plants to improve plant growth and cell wall polymer synthesis, to enhance biomass for biofuel, biopolymer and materials production, and to provide a knowledgebase for sustainable development.

**Dr. Kelley Moremen** (Complex Carbohydrate Research Center, 315 Riverbend Rd., Rm 3055; Tel: 706 542-1705. moremen@uga.edu). 1. Expression and characterization of mammalian enzymes and lectins involved in glycoprotein biosynthesis and degradation. 2. Structure-function studies on glycoprotein processing enzymes. 3. Transcript analysis and gene regulation of glycan-related genes.

**Dr. Artur Muszynski** (Complex Carbohydrate Research Center, 315 Riverbend Rd, Rm 2029; Tel: 706 542-4479. muszynski@ccrc.uga.edu). Structure of lipopolysaccharides, glycolipids and cell surface polysaccharides of human pathogenic and plant symbiotic bacteria and their biological role in host interaction. a) introduction to cultivation of bacteria and basic microbial techniques in glycobiology; b) techniques for characterization of microbial polysaccharides and glycolipids including extraction of biologically significant microbial cell polysaccharides and lipids, methods of purification, size exclusion, liquid and gas chromatography, glycosyl and fatty acid composition, gel electrophoresis, mass spectroscopy and spectrometry, colorimetry.

**Dr. Ron Orlando** (Complex Carbohydrate Research Center, 315 Riverbend Road. Tel: 706 542-4429. orlando@ccrc.uga.edu). 1. Proteomics. 2. Mass Spectrometry. 3. Identifying post-translational modifications on proteins

**Dr. Robert Phillips** (Chemistry, Room 313. Tel: 706 542-1996. rsphillips@chem.uga.edu). 1. Isolation of wild-type and mutant enzymes and comparison of kinetic properties, and site-directed mutagenesis to prepare new mutant enzymes.

**Dr. James Prestegard** (Complex Carbohydrate Research Center, 315 Riverbend Rd., Rm 1077 Tel: 706 542-6281. jpresteg@ccrc.uga.edu). 1. Expression and structural characterization of proteins using nuclear magnetic resonance (NMR). 2. Structural characterization of carbohydrates using NMR. 3. Enzyme kinetics using NMR. 4. Preparation of isotopically labeled substrates and ligands for biochemical studies.

**Dr. John Rose** (Life Sciences, Rm. B204B. Tel: 706 542-1750. rose@bcl4.bmb.uga.edu). Structural biology, structure function studies of the augments of liver regeneration and its cellular partners; structure function studies of the oxytocin receptor; structure function studies of HIV/host protein complexes; soft x-ray phasing of macromolecular structures

**Dr. Robert Sabatini** (Life Sciences, Rm A128B. Tel: 706 542-9806. rsabatini@bmb.uga.edu). 1. Characterization of enzymes involved in the glucosylation of telomeric DNA in kinetoplastids. 2. Investigate the biological role of DNA glucosylation in telomeric gene expression/recombination in African trypanosomes.

**Dr. Walter K. Schmidt** (Life Sciences, Rm. A416. Tel : 706 583-8241. wschmidt@bmb.uga.edu). Characterization of Rce1p, a regulatory protease in cellular transformation/cancer and of Ste23p, the yeast ortholog of a protease involved in Alzheimer's.

**Dr. Michael Terns** (Life Sciences, Rm. A326. Tel: 706 542-1896. mterns@uga.edu). CRISPR-based prokaryotic immune systems, host-viral interactions and development of biotechnological tools.

**Dr. Michael Tiemeyer** (Complex Carbohydrate Research Center, 315 Riverbend Road, 706 542-2740, mtiemeyer@ccrc.uga.edu) 1. Structure and function of carbohydrates that direct cell-cell interactions during nervous system development in *Drosophila*. 2. Genetic control of tissue-specific glycan expression, 3. Comparative glycomics and proteomics of model organisms.

**Dr. Breeanna Urbanowicz** (Complex Carbohydrate Research Center, 315 Riverbend Road, Rm. 2029. Tel: 706 542 4479. breeanna@uga.edu). 1) Structure and function of carbohydrate active enzymes. 2) Production of renewable, biobased plastics from plant biomass. 3) Developing tools for pectin analysis.

**Dr. Bi-Cheng (B.C.) Wang** (Life Sciences, Rm. B204A. Tel: 706-542-1747. wang@bcl1.bmb.uga.edu). 1. New approach for the characterization of metal oxidation state in macromolecules by a novel extended wavelength 4D crystallography. 2. Se-DNA as a tool for phasing DNA/RNA and their protein complexes. 3. Sulfur-SAD approach in direct determination of protein structures. 4. Structure-function revisits of selected metalloproteins.

**Dr. Ryan Weiss** (Complex Carbohydrate Research Center, 315 Riverbend Road, Rm. 3005. Tel: 706 542 6445. ryan.weiss@uga.edu). 1) Investigating the regulatory mechanisms of glycosylation using functional genomics. 2) Epigenetic and transcriptional regulation of glycosaminoglycan biosynthesis. 3) Drug discovery for rare human genetic disorders.

**Dr. Lance Wells** (Complex Carbohydrate Research Center, 315 Riverbend Road, Rm 3018, Tel: 706 542 7806) 1. Role of glycoproteins/glycoenzymes in Congenital Muscular Dystrophy, 2. Role of Intracellular protein O-glycans in X-linked intellectual disability. 3. N-linked glycosylation synthesis and role in viral entry.

**Dr. Chris West** (Life Sciences, Rm. A310. Tel: 706 542-8486/4259. westcm@uga.edu). 1. Cellular mechanisms of O<sub>2</sub> sensing in protists including the social amoeba *Dictyostelium* and the agent for human toxoplasmosis *Toxoplasma gondii*. 2. Structural biology of E3(SCF)ubiquitin ligase complexes. 3. Glycogene editing in eukaryotic pathogens *Trypanosoma cruzi* and *Toxoplasma gondii*. 4. Structure/function studies on non-heme dioxygenases and glycosyltransferases.

**Dr. Zachary Wood** (Life Sciences, RM A428, Tel: 706 583-0304, zac@bmb.uga.edu). 1. Structural and biochemical studies of enzymes involved in nucleotide sugar metabolism. 2. Allosteric control of enzyme activity.

**Dr. Robert J. Woods** (Complex Carbohydrate Research Center, 220 Riverbend Road, 706 542-4454. rwoods@ccrc.uga.edu). Molecular simulations of proteins and carbohydrate-protein complexes of immunological relevance.

**Dr. Ying Xu** (Life Sciences, Rm A110, Tel: 706 542-9779, xyn@bmb.uga.edu). 1. Cancer systems biology, 2. Cancer evolution, and 3. Microbial systems biology.

**Dr. Hang Yin** (Complex Carbohydrate Research Center, 220 Riverbend Road, Rm. 2058, Tel: 706 583-0655. hyin@uga.edu). 1. Muscle stem cell biology, the self-renewal, differentiation and lineage determination of skeletal muscle stem cells and applications in curing muscle atrophy and sarcopenia. 2. Biology of brown adipose tissue, determination of adipose stem/progenitor cells, regulation of adipose functions and applications in preventing disease. 3. Metabolic controls of stem cell and cancer cell behaviors.

**Dr. Nadja Zeltner** (Center for Molecular Medicine, Riverbend Road, Room 2212, nadja.zeltner@uga.edu). 1. Generation of various cell types of the peripheral nervous system from human pluripotent stem cells. 2. Disease modeling of Familial Dysautonomia. 3. Generation of adrenal gland tissues from human pluripotent stem cells.

**Dr. Shaying Zhao** (Life Sciences, Rm. B316. Tel: 706 542-9147. szhao@bmb.uga.edu). 1. Microsatellite instability detection in cancer samples. 2. Gene expression alternation in cancer development and progression. 3. Gene expression alternation due to genomic rearrangements during evolution.

(02/16/23)

## NON-BMB FACULTY MENTORS FOR INDEPENDENT RESEARCH PROJECTS (BCMB 4960R, BCMB 4970R, BCMB 4980R)

### Potential Mentors for FALL, 2023

The following faculty members are outside of the Department of Biochemistry & Molecular Biology but have served as mentors for BCMB 4960R courses in the past. Please see their respective laboratory or Departmental web sites for further information on their research. For these faculty members, pre-approval of proposed research projects is NOT required.

<b>Faculty Member</b>	<b>Email</b>	<b>Department/College</b>
Honxiang Liu	lhx@uga.edu	Animal & Dairy Science
John Peroni	jperoni@uga.edu	Animal & Dairy Science
Lohitash Karumbaiah	lohitash@uga.edu	Animal & Dairy Science
Edward Kipreos	ekipreos@uga.edu	Cellular Biology
Ping Shen	pshen@uga.edu	Cellular Biology
Vasant Muralidharan	vasant@uga.edu	Cellular Biology
Ramaraja Ramasamy	rama@uga.edu	Chemistry
Richard Morrison	rwm@uga.edu	Chemistry
Vladimir Popik	vpopik@uga.edu	Chemistry
Eric Freeman	ecfreema@uga.edu	Engineering
Hitesh Handa	hhanda@uga.edu	Engineering
Kerry Oliver	kmoliver@uga.edu	Entomology
Charles Easley	cae25@uga.edu	Environmental Health Science
Derek Dee	ddee@uga.edu	Food Science
Chung-Jui Tsai	cjtsai@uga.edu	Genetics
Jessica Kissinger	jkissing@uga.edu	Genetics
Jill Anderson	jta24@uga.edu	Genetics
Jonathan Eggenschwiler	jeggensc@uga.edu	Genetics
Sidney Kushner	skushner@uga.edu	Genetics
Anish Malladi	malladi@uga.edu	Horticulture
David Peterson	dspete@uga.edu	Infectious Disease
Donald Harn	dharn@uga.edu	Infectious Disease
Melinda Brindley	mbrindle@uga.edu	Infectious Disease
Ralph Tripp	ratripp@uga.edu	Infectious Disease
Mandy Joye	mjoye@uga.edu	Marine Sciences
Ellen Neidle	eneidle@uga.edu	Microbiology
Mike Adang	adang@uga.edu	Microbiology
Vincent Starai	vjstarai@uga.edu	Microbiology
Brian Cummings	bsc@rx.uga.edu	Pharmaceutical & Biomedical Sciences
Cory Momany	comomany@rx.uga.edu	Pharmaceutical & Biomedical Sciences
George Zheng	yzheng@uga.edu	Pharmaceutical & Biomedical Sciences
Houjian Cai	caihj@uga.edu	Pharmaceutical & Biomedical Sciences
Shelley Hooks	shooks@rx.uga.edu	Pharmaceutical & Biomedical Sciences
Yiping Zhao	zhaoy@uga.edu	Physics
Jae-Kyung Lee	jamlee@uga.edu	Physiology & Pharmacology
Lisa Donovan	ldonovan@uga.edu	Plant Biology
Alexander Bucksch	bucksch@uga.edu	Plant Biology

<b>Faculty Member</b>	<b>Email</b>	<b>Department/College</b>
Elizabeth Howerth	howerth@uga.edu	Veterinary Medicine
Jesse Shank	jschank@uga.edu	Veterinary Medicine
Kyrstoff Czaja	czajak@uga.edu	Veterinary Medicine
Naola Ferguson-Noel	naolaf@uga.edu	Veterinary Medicine
Balázs Rada	radab@uga.edu	Veterinary Medicine
Jaroslava Halper	jhalper@uga.edu	Veterinary Medicine
Sheba MohanKumar	shebamk@uga.edu	Veterinary Medicine

(02/16/23)

