

VIP Vertically Integrated Projects

This fall, the University of Georgia will pilot test a novel approach to involving undergraduates in research: **Vertically Integrated Projects** or VIP@UGA. **VIP@UGA** merges undergraduate education and faculty research in a team-based context by enabling undergraduates to earn academic credits while working in teams alongside faculty, graduate students, postdoctoral researchers, and other scientists on cutting-edge research projects.

Creates long-term research experiences

VIP@UGA extends research experiences beyond one or two semesters, with students participating for up to three years. As a result, students have more time and context to learn and practice professional skills, make substantial contributions to research, and experience different roles on research teams. In addition, students can try out research early in their undergraduate careers so they can decide whether they like it and plan their academic trajectories accordingly.

Cultivates leadership and mentorship

The long-term, team-based nature of VIP@UGA offers a tiered mentoring structure, with faculty, graduate students, postdoctoral researchers, and other scientists mentoring teams, experienced undergraduate researchers mentoring new undergraduate researchers, and undergraduates moving into leadership and mentoring roles as others graduate.

Advances research

VIP teams bring together teams of students with different experiences from different disciplines, which helps to drive research forward. Teams work projects that require many minds and hands, including high risk projects that can lead research in new directions.

How does VIP@UGA work?

- **Two VIP@UGA teams** will launch in Biochemistry & Molecular Biology (BMB) in Fall 2017 (described below). Teams in other disciplines and majors will launch in future semesters.
- Students participating in a VIP@UGA team register for **1 or 2 credits** of **BCMB 3150 Special Topics in Biochemistry & Molecular Biology** (prerequisite is BIOL 1107). BMB majors are required to take 8 credits of independent research (as BCMB 4960 and BCMB 4970, 4 credits each). BCMB 3150 will allow some students to spread their research experiences over more semesters as an alternative to the more intensive yet time-limited BCMB 4960 and 4970. During this pilot year, students will have the option of registering for 4960/4970 (4 credits per semester, ~12 hours/week) or registering for 1 or 2 credits of 3150 and participating for less time each week (~3-6 hours).
- Starting in Spring 2018, BCMB 3150 will be **repeatable up to 8 credits total**. For BMB majors, this will meet the required 8 credits of research (currently satisfied by BCMB 4960 and BCMB 4970), with the first 4 credits of BCMB 3150 being equivalent to BCMB 4960 and the second 4 credits being equivalent to BCMB 4970. Students taking BCMB 3150 must write a research paper at the end of each 4-credits of research they complete. See this site for details: <http://www.bmb.uga.edu/students/undergrad-research-report>
- If students complete one semester of BCMB 3150 and decide not to pursue further research, this credit counts as an **upper division elective** and they would need to complete BCMB 4960 and BCMB 4970 (4 credits each).
- **Interested students can apply at:** <https://goo.gl/forms/GzVM6OA1lAdqYLB92> Students will be accepted on a rolling basis until the end of the first week of classes.

Please direct any questions about VIP@UGA to Erin Dolan (eldolan@uga.edu)

VIP@UGA Team: Big Data of Small Things

- **Goals:** The Big Data of Small Things team will conduct a systems biology analysis of the model organism, *Caenorhabditis elegans*. This small nematode has been extensively studied for decades, but not much is known about its metabolic pathways or its life in natural settings. The team will design experiments, make samples, collect metabolomics and other omics data, and analyze the data using sophisticated computational methods. We will also explore ways of studying *C. elegans* in controlled environments that mimic natural settings.
- **Methods & Technologies:** General lab sterile techniques, study design, culturing *C. elegans*, making CRISPR mutants, sample preparation, fluorescence-based biosorting, nuclear magnetic resonance and mass spectrometry data collection and analysis, statistical analysis and data mining, unknown compound identification, RNAseq, glycomics, establishing natural growth chambers with natural food sources and pathogens.
- **Research/Design Issues:** Training and experience in laboratory methods, microinjections, PCR, hands on experience with state-of-the art NMR and MS instrumentation, computer programming, computations involving large clusters, data integration techniques, chemical separation isolation, 2D NMR methods for unknown identification, development of training materials and videos for education, team skills.
- **Meeting Time:** TBD
- **Principal Investigator:** Professor Art Edison (Biochemistry & Molecular Biology, Complex Carbohydrate Research Center, Genetics, Institute of Bioinformatics)
<http://edison.ccrcc.uga.edu/>

VIP@UGA Team: Social Psychology of Undergraduate STEM Research

- **Goals:** The Social Psychology of Undergraduate STEM Research will conduct analyses of scalable ways of involving undergraduates in STEM research, including the impacts of embedding research into courses and expanding the pool of research mentors to include graduate students and postdoctoral researchers. Although there are national calls for all undergraduate STEM majors to participate in research, little is known about who gets access to these experiences and what makes them effective for students. This VIP team will design and conduct qualitative and quantitative studies to understand how different forms of research experiences influence students' educational and career trajectories, for example, by affecting their interest in STEM fields or research careers or connecting them with key resources that can help them be successful in college and in STEM.
- **Methods & Technologies:** Human subjects research, mixed methods / educational study design, survey design and data collection, interviews and focus group design and conduct, qualitative content analyses of audio and video data, classroom and field observations, descriptive statistics, regression analysis.
- **Research/Design Issues:** What are the roles of human, cultural, and social capital in students' access to research experiences? Are there key features of undergraduate research experiences that promote or hinder student success? How are undergraduate research experiences functioning to influence students' academic and career trajectories?
- **Meeting Time:** TBD
- **Principal Investigator:** Professor Erin Dolan (Biochemistry & Molecular Biology, Math & Science Education) <http://research.franklin.uga.edu/erindolan/>