School of MCB Undergraduate Research Information Session

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SCHOOL OF
MOLECULAR &
CELLULAR BIOLOGY

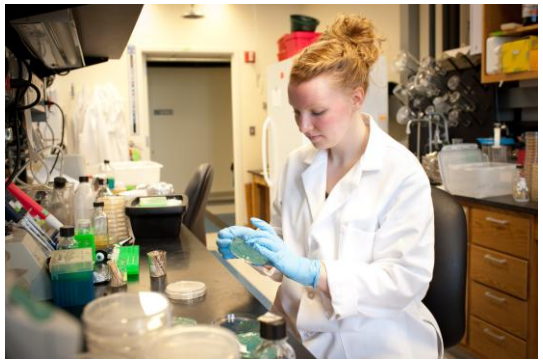
Instructional Program

Agenda

- What is undergraduate research?
- How to find a lab
- How to enroll in MCB 290/BIOC 290
- Student panel with research experience

What Is Undergraduate Research?

- A mentored investigation conducted by undergraduates that seeks to make a scholarly contribution to knowledge.
- Performed under the direction of a UIUC faculty member (P.I.), post-doc or graduate student.
- Earn course credit (MCB 290 or BIOC 290)
  - ➢ Letter grade that counts towards GPA
- Some paid positions exist (Campus Job Board)
  - ➢ Cannot earn money if earning credit



Is Research Required?

- For PhD programs, YES!
- For most MD and DO programs, no, but helpful
- For MD/PhD program, YES!
- Research can help make you more competitive.
- Depends on mission of institution.

What will I be doing in the lab?

- Assisting graduate students and postdocs with experiments
- Work on independent project
- Lab maintenance (washing dishes, making buffers/reagents, growing cells, maintaining mouse colonies)
- Attend lab meetings
- Present work at undergraduate research symposia
- Help prepare research manuscripts for publication

Expectations

- Show dedication to the project. This should be a priority.
- Be reliable, be present, and ask questions
- Ask for help when you need it
- Communicate with your mentors
- May need to come in at odd hours, including nights and weekends.
- May be expected to attend lab meetings and present your data.
- May be expected to write a senior thesis.

Campus Resources

- Office of Undergraduate Research
- SMCB undergraduate research website
- Departmental websites
  - SMCB seminar calendar
- MCB RoadMAP newsletter
- Academic advisors
- Faculty/professors
- Graduate teaching assistants

How to Find a Lab

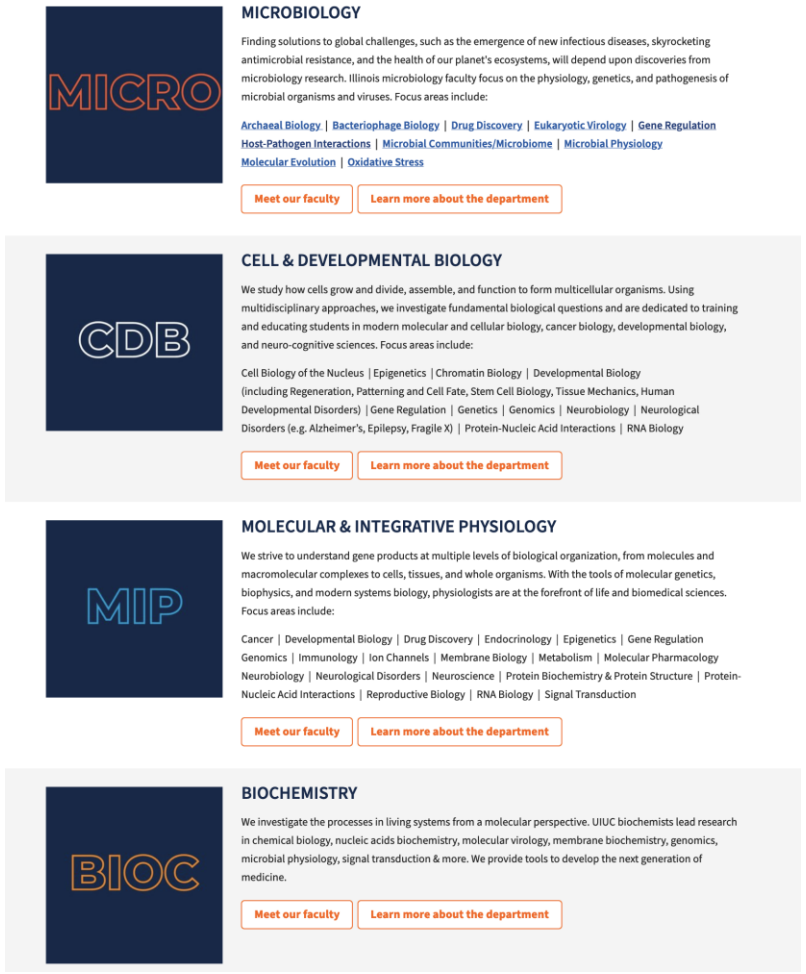
1. Determine when you want to start research and begin looking the semester prior
2. Make a list of faculty with whom you are interested in working.
3. Create a resume/CV.
4. Contact faculty via email: Be professional and concise; follow up, if necessary

How to Find a Lab

Read about faculty research interests in MCB and beyond

- https://mcb.illinois.edu/directory/faculty
- **Google UIUC _____ research**

Make a list of faculty you want to contact



MICRO

MICROBIOLOGY

Finding solutions to global challenges, such as the emergence of new infectious diseases, skyrocketing antimicrobial resistance, and the health of our planet's ecosystems, will depend upon discoveries from microbiology research. Illinois microbiology faculty focus on the physiology, genetics, and pathogenesis of microbial organisms and viruses. Focus areas include:

Archaeal Biology | Bacteriophage Biology | Drug Discovery | Eukaryotic Virology | Gene Regulation | Host-Pathogen Interactions | Microbial Communities/Microbiome | Microbial Physiology | Molecular Evolution | Oxidative Stress

Meet our faculty | Learn more about the department

CDB

CELL & DEVELOPMENTAL BIOLOGY

We study how cells grow and divide, assemble, and function to form multicellular organisms. Using multidisciplinary approaches, we investigate fundamental biological questions and are dedicated to training and educating students in modern molecular and cellular biology, cancer biology, developmental biology, and neuro-cognitive sciences. Focus areas include:

Cell Biology of the Nucleus | Epigenetics | Chromatin Biology | Developmental Biology (including Regeneration, Patterning and Cell Fate, Stem Cell Biology, Tissue Mechanics, Human Developmental Disorders) | Gene Regulation | Genetics | Genomics | Neurobiology | Neurological Disorders (e.g. Alzheimer's, Epilepsy, Fragile X) | Protein-Nucleic Acid Interactions | RNA Biology

Meet our faculty | Learn more about the department

MIP

MOLECULAR & INTEGRATIVE PHYSIOLOGY

We strive to understand gene products at multiple levels of biological organization, from molecules and macromolecular complexes to cells, tissues, and whole organisms. With the tools of molecular genetics, biophysics, and modern systems biology, physiologists are at the forefront of life and biomedical sciences. Focus areas include:

Cancer | Developmental Biology | Drug Discovery | Endocrinology | Epigenetics | Gene Regulation Genomics | Immunology | Ion Channels | Membrane Biology | Metabolism | Molecular Pharmacology Neurobiology | Neurological Disorders | Neuroscience | Protein Biochemistry & Protein Structure | Protein-Nucleic Acid Interactions | Reproductive Biology | RNA Biology | Signal Transduction

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BIOC

BIOCHEMISTRY

We investigate the processes in living systems from a molecular perspective. UIUC biochemists lead research in chemical biology, nucleic acids biochemistry, molecular virology, membrane biochemistry, genomics, microbial physiology, signal transduction & more. We provide tools to develop the next generation of medicine.

Meet our faculty | Learn more about the department

SCHOOL OF MOLECULAR & CELLULAR BIOLOGY

Instructional Program

Interdisciplinary Centers

- Institute for Genomic Biology
- UIUC Beckmann Institute
- Cancer Center at Illinois
- The Microbial Systems Initiative

ILLINOIS IGB

Cancer Center at Illinois

Beckman Institute

Non-MCB Labs to Consider

Integrative Biology	Chemistry
Psychology Neuroscience program	Kinesiology
Bioengineering Physics	Veterinary Medicine Pathobiology Comparative Biosciences
Crop Sciences	Animal Sciences
Beckman Institute	Institute for Genomic Biology (IGB)

Other ways to find a lab

- Read the MCB Road MAP newsletter for advertised positions
- Talk to your teaching assistants and professors that engage in research
- Talk to friends with undergrad research positions
- Learn more about current research by attending departmental seminars and research symposia on campus

Resume prep

- Full name and preferred name, if different
- Illinois email address
- List your major(s) and declared minor(s)
- Expected graduation date (which semester and year)
- What is your overall GPA? Major GPA?
- Relevant courses taken, including class titles and grade earned (eg. MCB, IB, CHEM, PHYS, STAT, MATH, CS, etc.)
- Relevant skills (prior lab experience, knowledge of data processing software, animal handling experience, etc.)
- Past research experience
- Extracurricular affiliations and leadership experiences

https://www.careercenter.illinois.edu/howtoresume

Contacting faculty

- ✓ Reach out the semester before you would like to start research
- ✓ Send introductory email – preferred method
- ✓ Be professional (use greeting and signature)
- ✓ Be specific to each lab – why are you interested in their research?
- ✓ Be patient and persistent
- ✓ Work in batches, contact 4 or 5 labs at a time

Email example

Reach out!

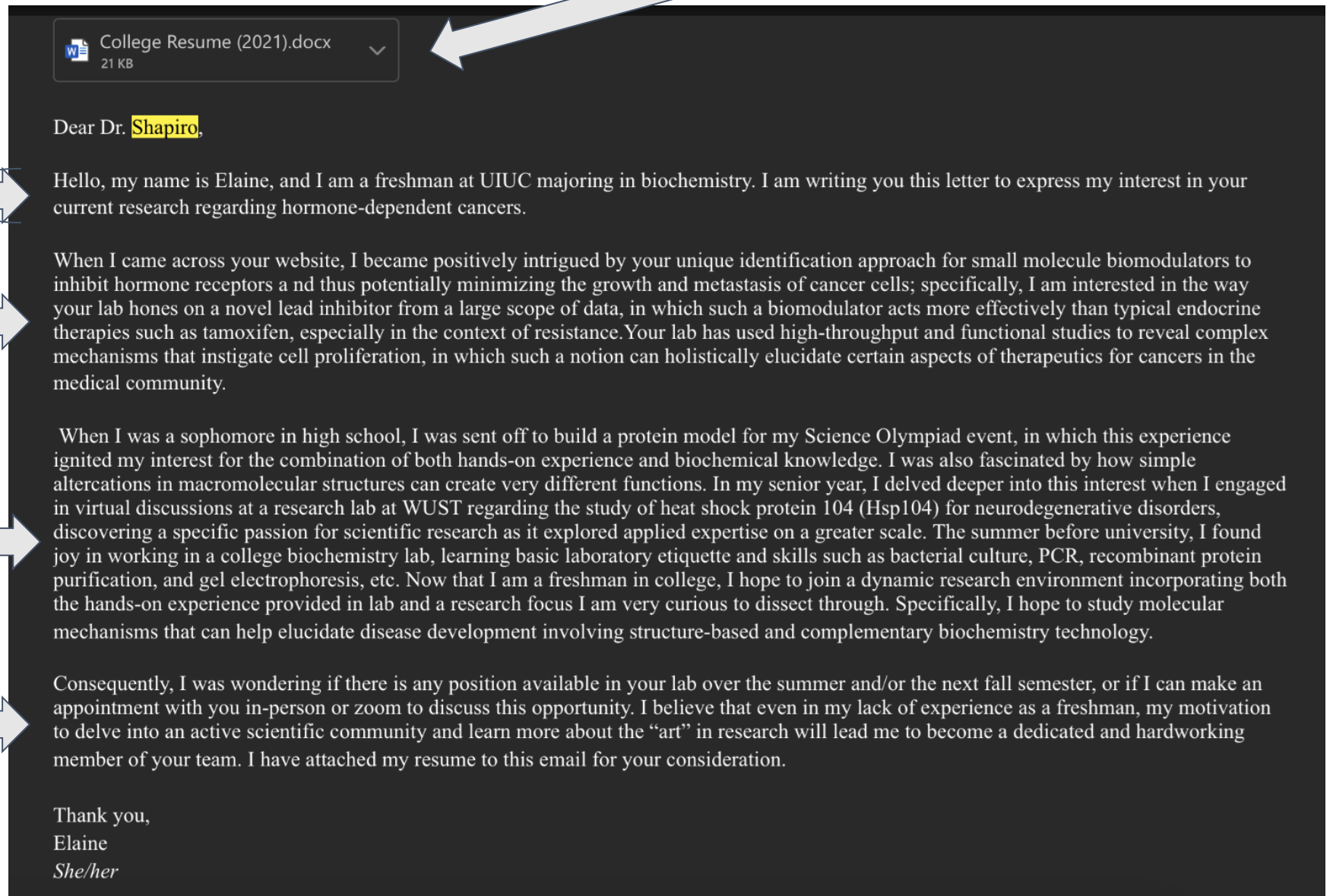
Small introduction + statement of intent

Motivation behind interest

Brief overview of past experiences/future goals (+ how it links to the lab's research)

Strong conclusion

Attach resume or cv!



College Resume (2021).docx
21 KB

Dear Dr. Shapiro,

Hello, my name is Elaine, and I am a freshman at UIUC majoring in biochemistry. I am writing you this letter to express my interest in your current research regarding hormone-dependent cancers.

When I came across your website, I became positively intrigued by your unique identification approach for small molecule biomodulators to inhibit hormone receptors a nd thus potentially minimizing the growth and metastasis of cancer cells; specifically, I am interested in the way your lab hones on a novel lead inhibitor from a large scope of data, in which such a biomodulator acts more effectively than typical endocrine therapies such as tamoxifen, especially in the context of resistance.Your lab has used high-throughput and functional studies to reveal complex mechanisms that instigate cell proliferation, in which such a notion can holistically elucidate certain aspects of therapeutics for cancers in the medical community.

When I was a sophomore in high school, I was sent off to build a protein model for my Science Olympiad event, in which this experience ignited my interest for the combination of both hands-on experience and biochemical knowledge. I was also fascinated by how simple altercations in macromolecular structures can create very different functions. In my senior year, I delved deeper into this interest when I engaged in virtual discussions at a research lab at WUST regarding the study of heat shock protein 104 (Hsp104) for neurodegenerative disorders, discovering a specific passion for scientific research as it explored applied expertise on a greater scale. The summer before university, I found joy in working in a college biochemistry lab, learning basic laboratory etiquette and skills such as bacterial culture, PCR, recombinant protein purification, and gel electrophoresis, etc. Now that I am a freshman in college, I hope to join a dynamic research environment incorporating both the hands-on experience provided in lab and a research focus I am very curious to dissect through. Specifically, I hope to study molecular mechanisms that can help elucidate disease development involving structure-based and complementary biochemistry technology.

Consequently, I was wondering if there is any position available in your lab over the summer and/or the next fall semester, or if I can make an appointment with you in-person or zoom to discuss this opportunity. I believe that even in my lack of experience as a freshman, my motivation to delve into an active scientific community and learn more about the "art" in research will lead me to become a dedicated and hardworking member of your team. I have attached my resume to this email for your consideration.

Thank you,
Elaine
She/her

Waiting is the hardest part…

- "Yes, I would be happy to meet with you!"
- "No, I am sorry, but we do not currently have the _____" (space, funding, etc.)
  - Don’t be discouraged, you can always try again next semester
- No response
  - Send a follow-up email 1-2 weeks after your initial email
  - Be persistent!!!

Interview Tips

- Casual dress, but professional
- Come prepared to talk generally about lab projects and why you are interested
- Ask about expectations!!!!
  - When/how often are you expected to be in lab?
  - How will your grade be determined?
- Be honest about your availability
  - Academics should come first
- Send a brief thank you email

MCB/BIOC 290: Research for course credit

- 1 credit MCB/BIOC 290 = approximately 5 hrs/week in lab/over a 16-week term (8-week summer sessions, 1 credit = 10 hrs/week)
- Keep in mind this is an average. You need to plan to stay until your work is done. Each lab will have their own policies.
- Make sure you have a clear understanding of the faculty expectations for credit and how your grade will be assessed.

Eligibility for MCB 290/BIOC 290

- Must be a *declared* major in Biology, MCB, Neuroscience, or Biochemistry
- Conduct research in an *approved* laboratory **at UIUC**
- Good academic standing, recommended GPA of 2.75 or higher
- Cannot receive monetary payment, or any other form of academic credit, based on the research for which MCB 290 or BIOC 290 credit is earned.
- Must enroll in the course by the university deadline to add a semester course using the appropriate forms.

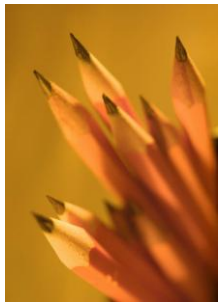
  https://mcb.illinois.edu/academics/undergraduate-programs/undergraduate-research

Limits ?

- A limit of 10 credit hours of MCB 290/BIOC 290 can be applied towards the 120 hours needed for graduation

- **However, you are encouraged to continue your research for as many terms as you wish.**

- All MCB 290/BIOC 290 semesters and the assigned letter grades will appear on your transcript and count in your GPA.



How to Enroll in MCB 290/BIOC 290

- MCB 290 (for MCB, MCB + DS, and NEUR majors)
  - Online form: MCB 290 Undergraduate research request

- BIOC 290 (for BIOC majors)
  - Online form: BIOC 290 request/renewal form

Academic Deadlines
Last Day to Add a Course

- 10th day of fall/spring semester at 5:00 PM
- 7th day of summer session II at 5:00 PM
- Must renew every semester by the deadline using online form.

Making the most of your undergraduate research

- Present your work!
  - MCB Research Symposium, Undergraduate Research Symposium, and American Chemical Society Symposium
  - Society national and regional meetings
- Apply for a Summer Undergraduate Research Fellowship (SURF)
  - Get paid to do research over the summer!
- Write a senior thesis (MCB 492/BIOC 492)
- Help prepare research manuscripts for publication

Undergraduate Researcher Panel

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Questions

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