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• The Benefits of a Research-Based Learning Experience

• The Available Directed Research & Supervised Study Courses

• The Application Process and Finding a Supervisor

• Recognition and Awards

• Biological Sciences Certificate

• Q & A
WHY TAKE A DIRECTED RESEARCH and SUPERVISED STUDY COURSE?

- Undergraduate Research Experience is a High Impact Practice
- Enrich your undergraduate experience
- For those pursuing a career in academia, a background in research is vital
- Research can expand your career and academic horizons in new and unexpected directions
- Gain confidence in your ability to contribute to science by learning how to think and work like a scientist
### Directed Research Courses

#### Biological Science Program

<table>
<thead>
<tr>
<th>Course Code and Title</th>
<th>Credit Value</th>
<th>Available Term</th>
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<tbody>
<tr>
<td>BIOB98H3/BIOB99H3 - Supervised Introductory Research in Biology</td>
<td>0.5 Half Credit</td>
<td>Any term</td>
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<tr>
<td>BIOC99H3 - Biology Team Research</td>
<td>0.5 Half Credit</td>
<td>Any term</td>
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<tr>
<td>BIOD95H3 - Supervised Study in Biology</td>
<td>0.5 Half Credit</td>
<td>Any term</td>
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<tr>
<td>BIOD98Y3/BIOD99Y3 - Directed Research in Biology</td>
<td>1.0 Credit</td>
<td>Fall/Winter or Summer Alone</td>
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#### Paramedicine (Joint with Centennial College)

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<tr>
<th>Course Code and Title</th>
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<th>Available Term</th>
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<tbody>
<tr>
<td>BIOD96Y3 - Directed Research in Paramedicine</td>
<td>1.0</td>
<td>Fall/Winter</td>
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• BIOB98/BIOB99 are supervised introductory research experience courses.

• Both BIOB98 and BIOB99 are offered with a credit/no credit grading scheme. No letter or percentage grades are given.

• There is a minimum time commitment of 72 hours over a given term to complete a BIOB98 or BIOB99 course. It is up to you and your potential supervisor to decide on an exact schedule (or to commit to more hours than this).

Faculty Coordinator: Dr. Kenneth Welch

Examples of BIOB98 Research in the past
--Phenotypic analysis of transgenic plant lines with Dr. Zhao
This course is meant to provide an introduction to directed research.

A group of 3-5 students work together to develop a research proposal and/or implement a research project under the general guidance of a faculty researcher.

Components of assessment are determined prior to project commencement, but may be based on student contribution over the term and a final written product.

Faculty Coordinator: Dr. Mark Fitzpatrick
BIOD95H3
SUPERVISED STUDY IN BIOLOGY

• Students taking this course engage in intensive examination of a primary literature around a selected topic.

• Extensive independent research is required as well as frequent consultation with a Supervisor

• Students will end the course with a written report modeled on a scientific review article.

Notes: This is not a research lab or field based course
Faculty Coordinator: Dr. Aarthi Ashok
This course is designed to permit critical analysis of current topics relevant to the field of Paramedicine.

Students will work independently but under the supervision of an industry leader, practitioner and/or researcher involved in Paramedicine, who will guide the in-depth study/research. Students must also report to the course instructor and Paramedicine Program Supervisor Dr. Shelley Brunt.
BIOD98

• is designed to provide laboratory or field research under the guidance of a faculty member in the Biological Sciences Department.

• Research topics are arranged during initial meetings with the supervisor.

• 10 sessions of group instruction tutorials will form part of the coursework.

BIOD99

• is intended as a second research experience.

• In order to be eligible for BIOD99Y3, with the same supervisor, the student and the supervisor will have to provide a plan of study that goes beyond the work of BIOD98Y3.

• You must have satisfactorily completed BIOD98 before you are eligible to take BIOD99.
TIPS ON FINDING A SUPERVISOR

• Start by browsing the Biological Sciences Faculty Directory to access individual faculty research labs. This will give you a sense of the type research being done.

• Attend office hours and demonstrate interest in your professors research by familiarizing yourself with their recent publications.

• Speak to your TA and ask if their lab is in need of extra assistance.

• Check the Career Learning Network.

• Check the Departmental Website, Twitter (@UtscBiology) and Instagram (@biosci_utsc).

• Note: students interested in D95, D98 and D99 are permitted to have an off campus supervisor with permission from Professor Ashok. In such a case, a UTSC Biological Sciences co-supervisor is a requirement.
Faculty Currently Accepting Research Students

- Professor Yan Wang is open to supervise students in the Fall and Winter terms. Possible research topic students can include: "Genomic investigation into Ontario mosquito gut-dwelling fungi" (BIOB98 or BIOD98) and "Horizontal gene transfers and microbial fungal evolution“ (BIOB98, BIOD95 or BIOD98).

- Professor Jason Weir is also open to supervising a few BIOD98 students this upcoming academic year in regards to working with whole genome datasets from birds addressing questions of speciation.

- Professor Kenneth Welch is open to supervising a couple BIOD98 students in the areas of hummingbird energetics, hummingbird torpor, and bat metabolic biochemistry.
• Professor Rongmin Zhao will be supervising students for BIOB98 and BIOD98 with the topic of “Mechanisms of protein folding and degradation in plant and baking yeast cells”.

• Professor Rachel Sturge is taking on BIOD95 students in the areas of ecology, conservation and biodiversity.

• Professor Cosima Porteus is taking on one BIOD95 student to do a literature search on “Olfaction in crabs” and one BIOD98/99 student to look at the effects of environmental stressors on crab behaviour for the winter term.

• Professor Peter Molnar may be accepting some students, but is not able to confirm yet. If he is, the topics will be "Parasites of urban canids in the GTA“ or "Modelling future impacts of climate change on host-parasite dynamics“.

• Reach out to other faculty members, as well!
Registration Steps

1. Download and complete the Biological Sciences Departmental Permission form and Registrar’s Supervised Study Form on our [website](#).

2. Print your unofficial transcript and academic history off of ACORN and have your supervisor initial it and sign all the necessary portions of your transcript and both documents (BIO Permission Form + Registrar’s Office Form).

3. Add the course on Acorn like any other course. Your status will be INTERIM (INT).

4. Email me your completed forms at: [laura.shelly@utoronto.ca](mailto:laura.shelly@utoronto.ca). I will then submit your forms to the Registrar’s Office where your status in Acorn will be adjusted to APPROVED (APP).
Recognizes two or three students with exceptional presentations of their independent research work on BIOD98/99 Presentation day, with a monetary prize.

Due to the pandemic, this has been put on pause, but hopefully come 2022, we will be back to hosting in-person presentations.

2019 Winners: Rebekah Kim (Mason Lab) for her presentation entitled "Time-course of Metabolomic Signature of Stress in the Monster Haglid, (Cyphoderris monstrosa), Myuran Yoganathan (Treanor Lab) for his presentation entitled Investigating the Mechanism of B Cell Anergy Through Super-Resolution Imaging, and Thiviya Rajasekar (Harrison Lab) for her presentation titled "Isolation and Culture of Primary Osteocytes from Long Murine Bones."
WHAT IS IT?

• The Biological Sciences Certificate is a designation on your transcript
• It’s a way to plan for and develop your research skills
• It’s a way to map out what you need to do to get a solid research background
WHAT IS REQUIRED?

• Enrolment in a Biology or Neuroscience program (major or specialist)
• Consultation with Biology’s liaison librarian (to enhance your information literacy skills)
• Completion with an A- or better in BIOD98 and at least one other Biology research course (BIOB98, BIOB99, BIOC99, BIOD99)
• Creation of a final report of your research experience
HOW DO YOU ACCESS OUR RESEARCH COURSES & CERTIFICATE?

For course registration (with or without being in the certificate program):

- Find a Biology faculty member willing to supervise your activity in the course
- Request the course in Acorn
- Acquire the correct forms from The Biology Department and/or Registrar’s Office
- Complete forms; this includes faculty and biology staff signatures!
- Submit completed forms to myself

For the certificate:

- Register in a Biology or Neuroscience major or specialist degree
- Request the certificate subject post
CONTENT OF FINAL RESEARCH REPORT:

- List name, student number and the program(s) you intend to graduate in.
- List the research courses you have taken and for each, indicate who was the supervising faculty.
- For any BIOB98/99 experiences provide a ~200 word description of the research project that you contributed to and indicate the role(s) you had. Indicate what skills you developed during this time.
- For BIOC99 or BIOD98/99 provide a 500-1000 word summary of the nature of the project, including your role and the conclusions you made in your final report. Also indicate what skills you developed during this time.
- Write a critical reflection of your experiences (200-400 words). What did you learn about yourself, your academic strengths and weaknesses, the kind of work you enjoy most, and any direction this may have given you towards future careers. There are no right/wrong answers here, but it allows you to assess your own growth and development.
- Lastly, if you have any suggestions for general training we could provide to students that would make their research experience better, I would be grateful to receive your ideas.
Thank You!

Laura Shelly
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