

Biological Sciences

Discovery and Diversity

Corwin Sullivan

Associate Professor & Associate
Chair, Department of Biological
Sciences



Corwin Sullivan

- Associate Professor and Associate Chair, Department of Biological Sciences
- Curator, Philip J. Currie Dinosaur Museum (Wembley, AB)
- Vertebrate palaeontologist
- Study dinosaurs and their relatives
- Teach comparative anatomy



Department of Biological Sciences

- DBS is a large and diverse department
- Many resources and facilities
- Many undergraduate courses and opportunities

Provides an outstanding education for undergraduate students

“Our Department uniquely and fearlessly encapsulates almost all disciplines within biology and is rife with opportunity to produce challenging and integrated research.” Z. Hall

We are committed to maintaining an engaging, rigorous and inclusive learning environment

About Us:

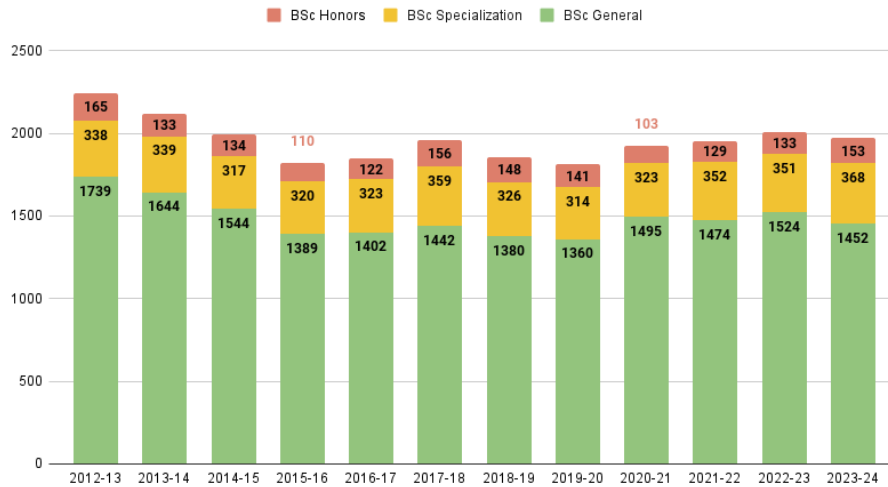
- Within the Faculty of Science
- 50+ faculty members
 - ~10 recent hires
- Research subjects range from molecules to ecosystems
- Will offer major and honours undergraduate programs in Fall 2024
- Offer graduate programs



Our Students:

500+ students in Current Honours & Specialization Programs

BSc General, BSc Specialization and BSc Honors



Undergraduate tab

The screenshot displays the website for the Department of Biological Sciences at the University of Alberta. The top navigation bar includes links for Home, About, People, Research, Undergraduate (highlighted), Graduate, and Facilities & Resources. The main content area is titled "Undergraduate Studies" and features a sidebar with a menu of options: Programs, Courses, Research Project Courses, Research Certificate in Science, Awards and Scholarships, Field School - Marine Science, Forms, Student Groups, and Contact. The main content area contains a large image of a spiny-tailed caiman lizard on a log, with a caption "Caiman Lizard by Robert Holmberg". Below the image, a paragraph states: "The Department of Biological Sciences offers more than 100 courses to undergraduate students with areas of concentration in:" followed by a bulleted list: Animal Biology, Bioinformatics, Ecology, Evolutionary Biology, and Microbiology. On the right side, there is a yellow "Apply Now" button and an "Events" section. The events section lists three seminars: 1) "Ecology & Evolution (BIOL 631) Seminar Series: Dr. Tolupe Morawo, Assistant Professor, Dept of Entomology and Nematology, University of Florida: 'Response of parasitic wasps to host-associated plant odors: A tale of two braconid species'" dated October 16, 2020 12:00 PM - 1:00 PM; 2) "Molecules, Cells and Systems Biology Seminar: Dr. Paul Shaw, Professor of Neuroscience, Washington University School of Medicine: 'How does sleep fix a broken brain?'" dated October 22, 2020 11:00 AM - 12:00 PM; and 3) "Ecology & Evolution (BIOL 631) Seminar Series/Adjunct Seminar: Dr. Murray Humphries, Associate Professor of Wildlife Biology, McGill University: 'The traditional food systems of Indigenous Peoples: biocultural diversity, replacement valuation, and knowledge co-production in wildlife research'" dated October 23, 2020 12:00 PM - 1:00 PM. A "More Events" link is located at the bottom of the events section.

Department of Biological Sciences


Home About People Research **Undergraduate** Graduate Facilities & Resources

Undergraduate Studies

Undergraduate

- Programs
- Courses
- Research Project Courses
- Research Certificate in Science
- Awards and Scholarships
- Field School - Marine Science
- Forms
- Student Groups
- Contact

Undergraduate Studies



Caiman Lizard
by Robert Holmberg

The Department of Biological Sciences offers more than 100 courses to undergraduate students with areas of concentration in:

- Animal Biology,
- Bioinformatics,
- Ecology,
- Evolutionary Biology,
- Microbiology.

Apply Now

Events

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More Events

Lab Experiences

- Summer employment as lab assistants
- NSERC* and AHFMR** summer studentships
 - First class grades required
- Lab courses in every discipline
- Courses in molecular laboratory techniques
- Project courses

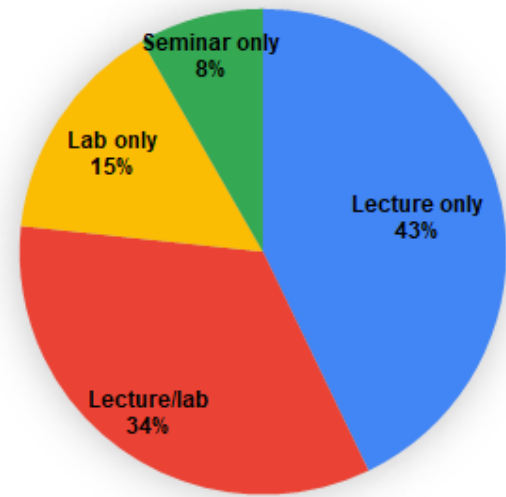
*Natural Sciences and Engineering Research Council

**Alberta Heritage Foundation for Medical Research



Hands-on Learning:

- ~½ of our courses have a laboratory component, with topics including but not limited to:
 - Conservation
 - Biodiversity (plant, microbes, animal)
 - Physiology
 - Genetics
 - Palaeontology



Museum Collections

- Key resources for teaching & research
- > 400,000 specimens of mosses, ferns and seed plants
- 200,000 fish specimens
- > 1,000,000 insect specimens
- 50,000 vertebrate fossils ranging from 450 million to 10,000 years old



Field Experiences

- Summer employment as field assistants
- NSERC summer studentships
 - First class grades required
- Field courses in plant & animal ecology
- Field courses in freshwater and marine ecology
- Field course in mountain studies (INTD)
- Project courses



Bamfield Marine Sciences Station

- Shared facility with other universities
- West coast of Vancouver Island
- Wide variety of summer courses
- Full-term Fall program
 - Marine Science
 - Biology of Fishes
 - Marine Invertebrate Zoology
 - Other topics!
- Field, lab, discussions, seminars



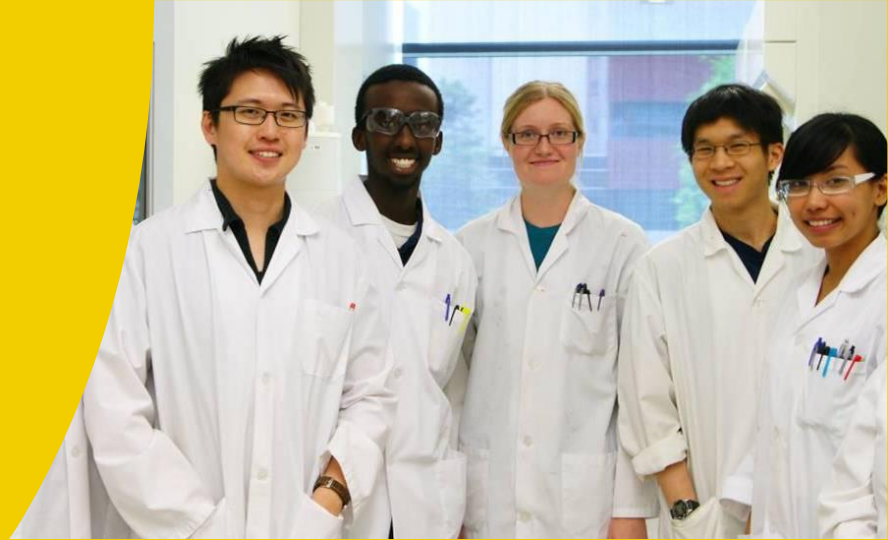
Online Learning:



- Hybrid courses
- **MOOCs** designed for Online learning
 - Entomology 101 (Bugs 101)
 - PALEO 200 (Dino 101)
+ additional PALEO courses
 - INTD 280 (Mountains 101)

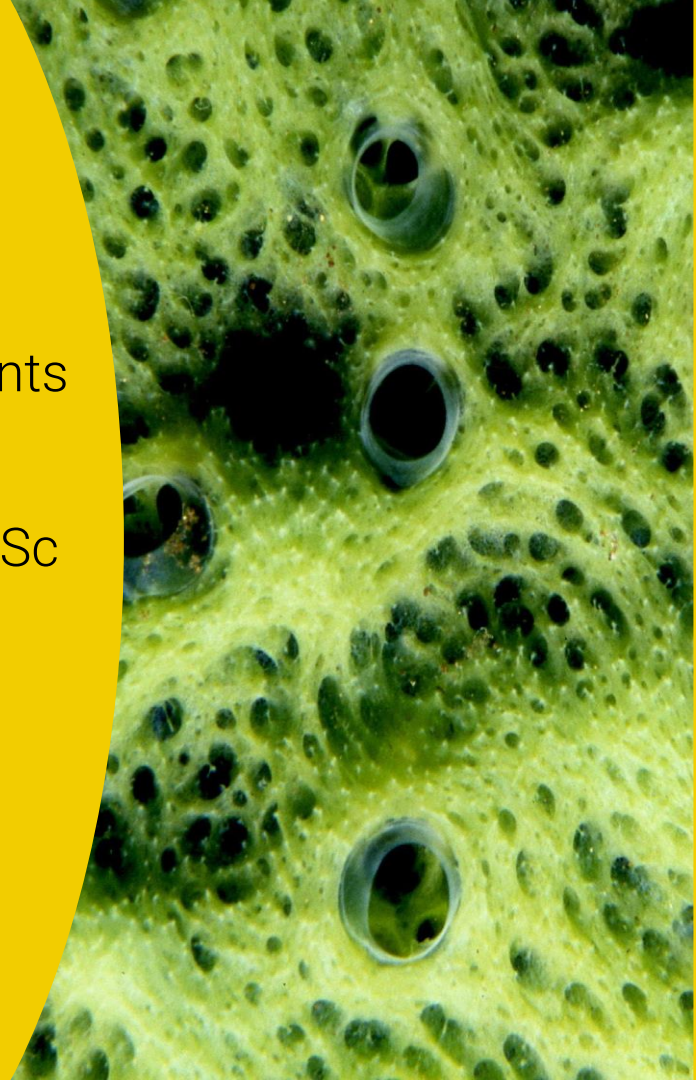
Research Certificate in Science (Biological Sciences)

- First of its kind in Canada!
- Unparalleled opportunity to engage in authentic research
- Gain practical lab/field experience
- Increase skill levels in:
 - Problem solving
 - Communication
 - Specialized research techniques



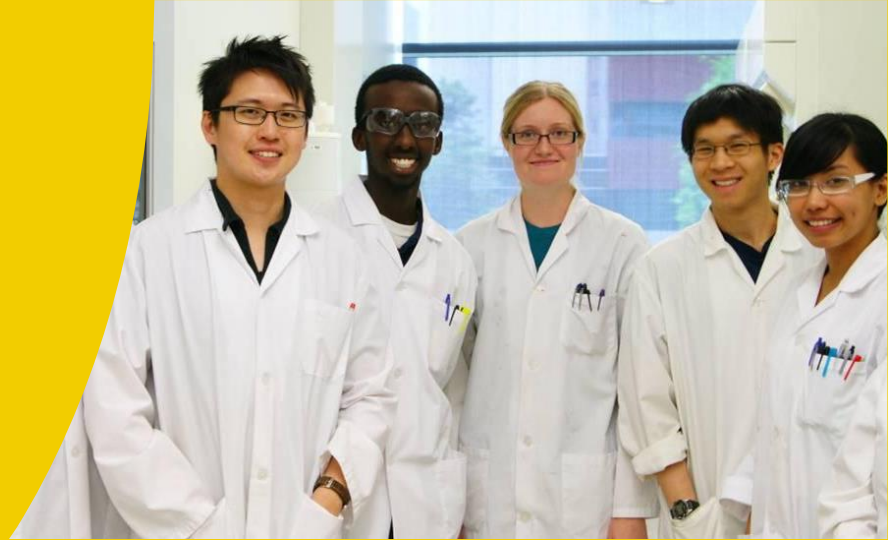
Research Certificate in Science (Biological Sciences)

- Open to Faculty of Science undergraduate students
- Certificate given on transcript at completion of BSc to students who have given a research presentation (on or off campus) and taken:
 - BIOL 298 (Understanding Biological Research)
 - Two or three advanced research project courses
 - Advanced technical skills course
 - Advanced data analysis courses



Advanced Research Project Courses

- Design project, generate data, analyse data, communicate findings
- Third year:
 - BIOL 398 (1 term)
 - BIOL 399 (2 terms)
- Fourth year:
 - BIOL 498 (1 term)
 - BIOL 499 (2 terms), required for Honours programs



Undergraduate Research



Undergraduate research is successful:
many publications with undergraduate co-authors

Undergraduate students play a key role in many professors' research programs.

Science Internship Program

4-16 months of paid full-time work for an employer based in Canada

Enrich your education
Obtain practical experience
Prepare for your future





Our Programs:

- Provide students with exemplary education
- Prepare students for successful careers in the Biological Sciences
- Cultivate soft skills desired by employers
 - Creativity, persuasion, collaboration, adaptability, time management

Where to find our > 150 courses in the calendar

Topic	Description	Abbreviation
Biology	Subjects basic to all subdisciplines	BIOL
Bioinformatics	Manipulation of molecular data (with Computing Science)	BIOIN
Botany	Study of plants	BOT
Entomology	Study of insects	ENT
Genetics	Study of heredity and its molecular basis	GENET
Immunology and Infection	Biology of disease and resistance (with Medical Microbiology and Immunology)	IMIN
Marine Science	Biology of the ocean (with Bamfield Marine Station)	MA SC
Microbiology	Study of microbes and cells	MICRB
Palaeontology	Study of fossils (with Earth and Atmospheric Sciences)	PALEO
Zoology	Study of animals	ZOOL

Major and Honours Programs

- Honours requires higher grades, completion of BIOL 499
- Subject areas:
 - Biological Sciences
 - Ecology, Evolution & Environmental Biology
 - Immunology and Infection (with MMI)
 - Integrative Physiology
 - Molecular, Cellular & Developmental Biology
 - Palaeontology (with EAS)
- 120 units (=40 one-term classes) including:
 - 6 units in English and/or Writing Studies
 - 6 additional units from outside Science
 - 72 units within Science



General Program: Faculty of Science

- **Minor (optional; 24-30 units)**
 - Another Science discipline
 - Arts (e.g. Anthropology)
 - Agriculture, Life and Environmental Sciences (e.g. Forestry)
 - Business
 - Native Studies
- **Combined BSc/BEd Degree Program**
 - Both BSc and BEd degrees in 5 years



Ecology, Evolution and Environmental Biology (EEEB)

- Biodiversity, interactions between organisms and their environment, and evolutionary change.
- **Course offerings**
 - Biological Diversity
 - Biological Processes
 - Ecology and Environmental Biology
 - Evolution and Systematics
 - Scientific Methodology



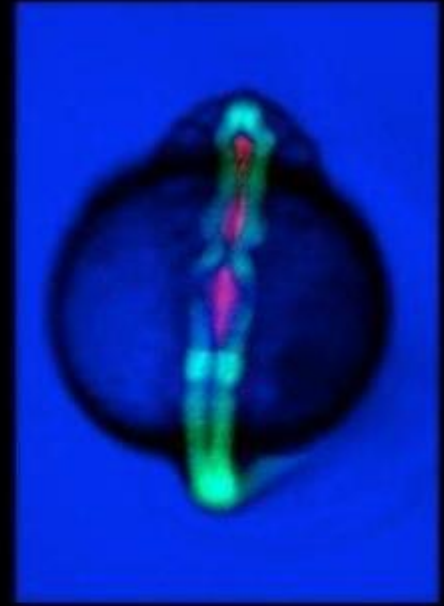
Career Options: Ecology, Evolution & Environmental Biology

- Aquatic technician
- Environmental consultant
- Eco-tourism
- Pest management
- Field or curatorial technologist
- Laboratory technologist
- Environmental law enforcement
- Naturalist
- Forensic biologist
- Park interpreter
- Science writer
- Professional school (health, law, veterinary, graduate studies)



Integrative Physiology

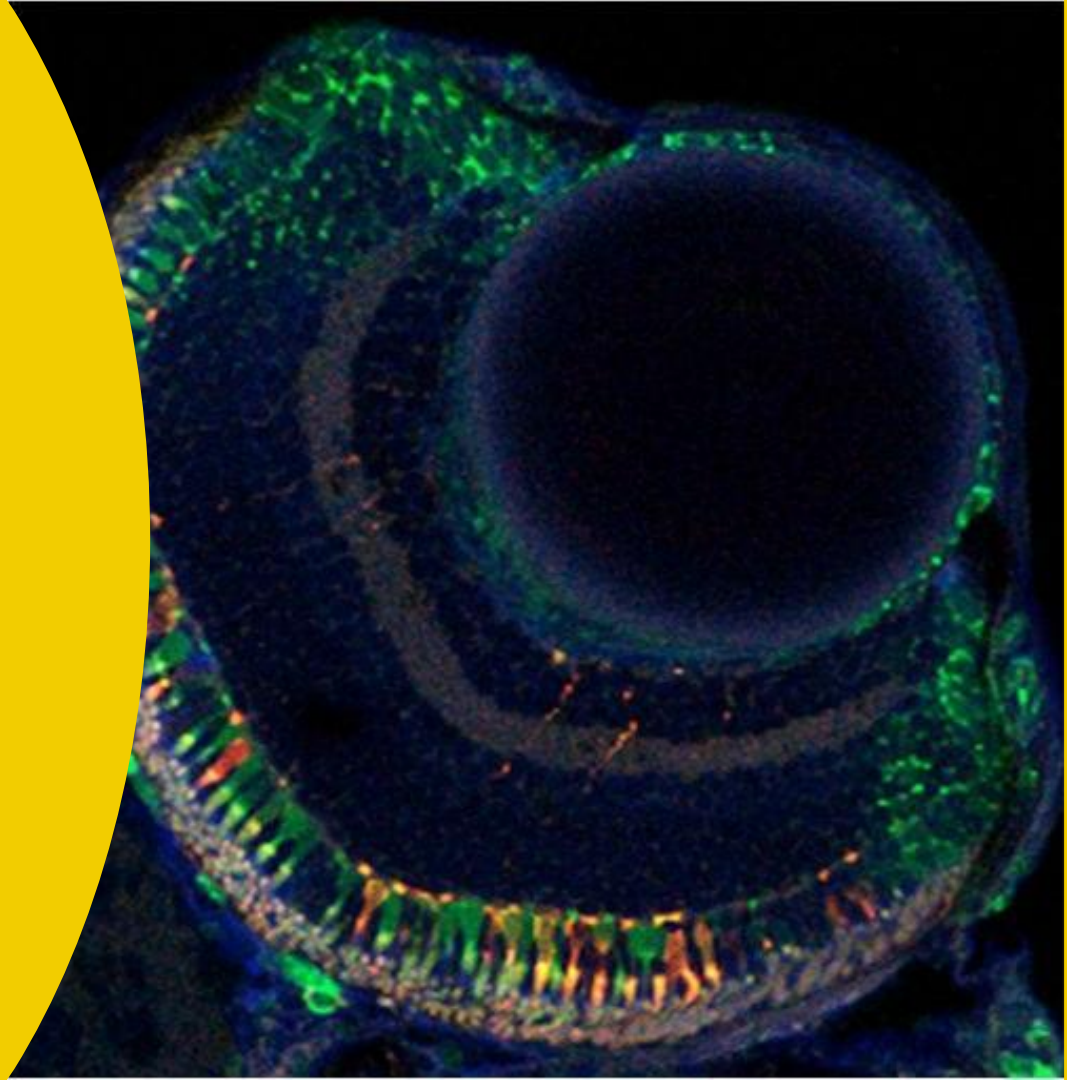
- Processes that occur within living organisms, and how these processes interact.
- **Course offerings**
 - Endocrinology
 - Neurophysiology
 - Developmental Biology
 - Immunology
 - Cell Signalling
 - Toxicology
 - Environmental Physiology



Career Options:

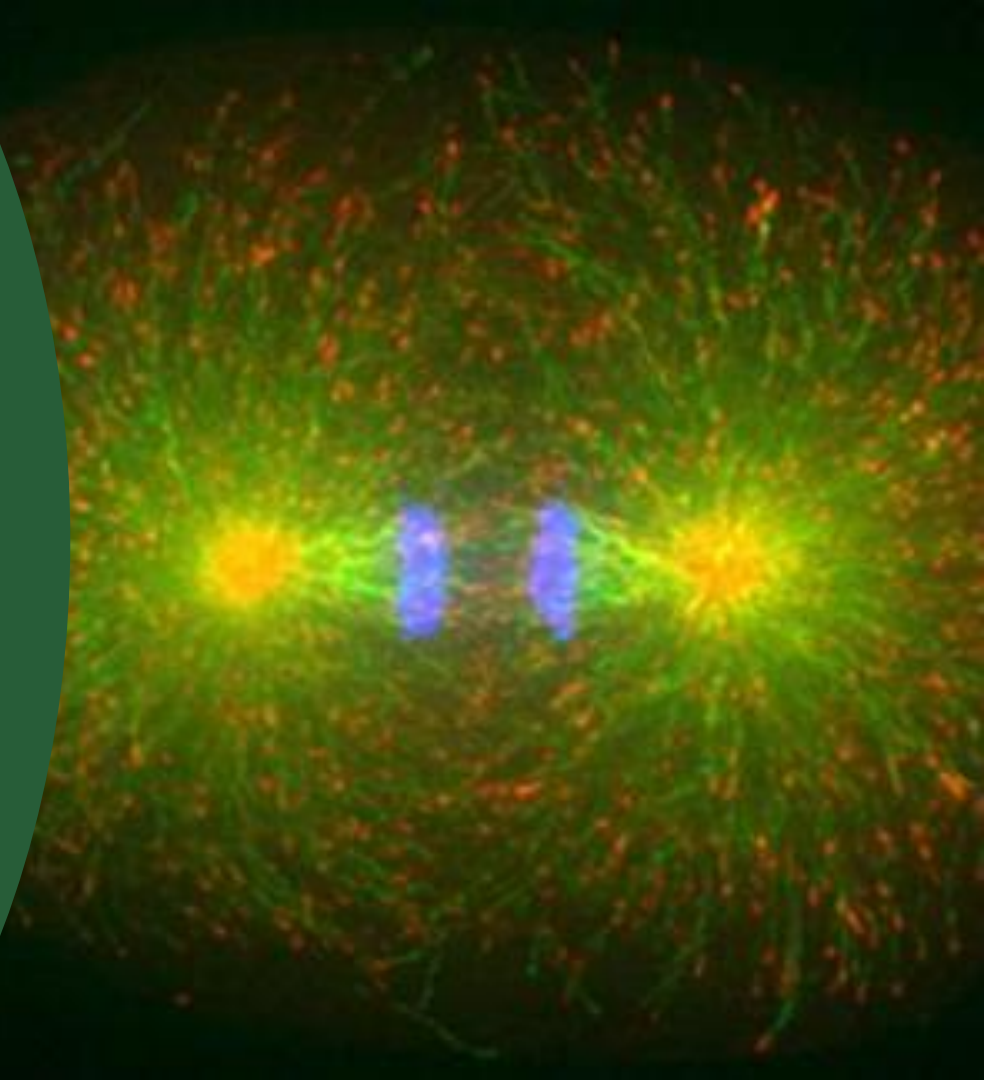
Integrative Physiology

- Agriculture and food industry
- Biomedical technologist
- Biotechnology
- Brewing industry
- Government or industrial consultant
- Laboratory technologist
- Medicine and health science
 - Neuroscience
 - Pharmaceutical industry
 - Veterinary medicine
- Science writer
- Professional school (health, law, veterinary, graduate studies)



Molecular, Cellular and Developmental Biology (MCDB)

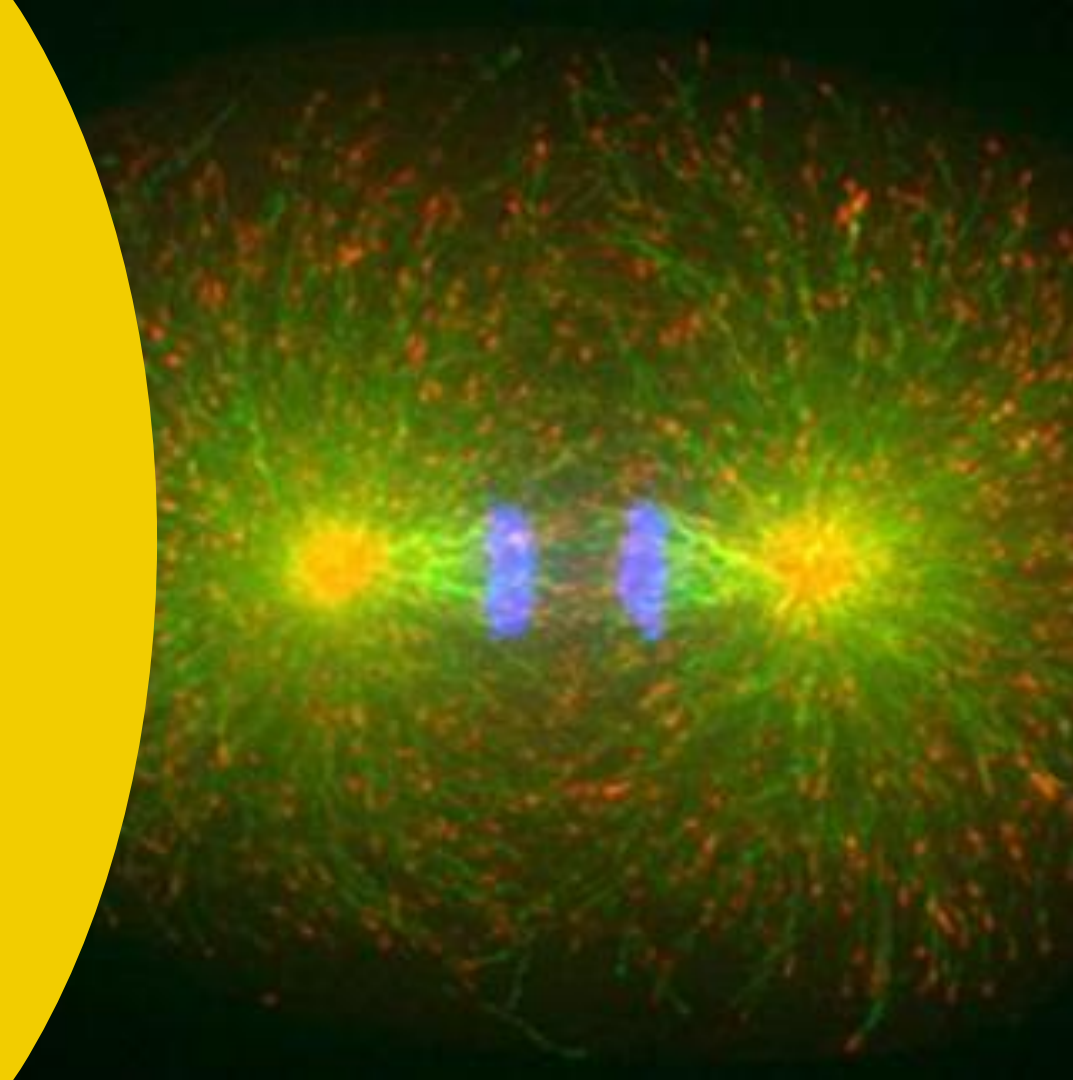
- The roles of cells and molecules in the function, reproduction and development of living organisms.
- **Course offerings**
 - Molecular Biology
 - Genetics
 - Genomics
 - Bioinformatics
 - Cell Biology
 - Developmental Biology
 - Microbiology
 - Molecular Plant Genetics



Career Options:

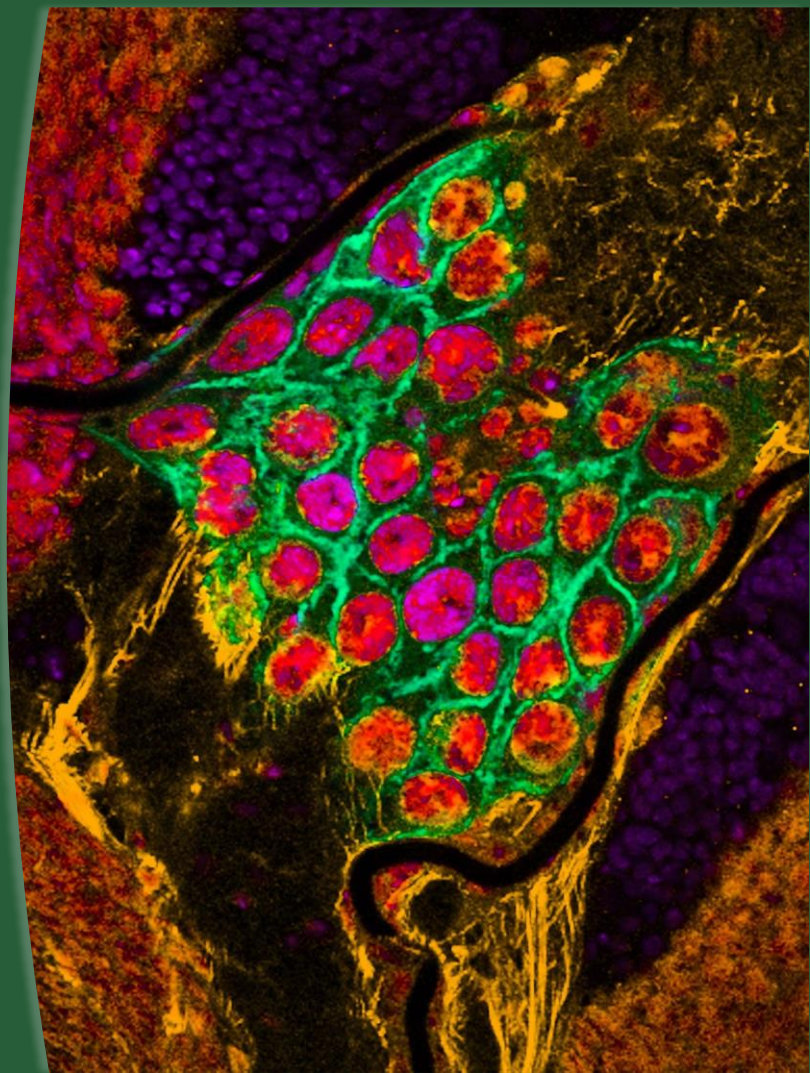
Molecular, Cellular, and Developmental Biology

- Biotechnologist
- Scientific writer
- Biotechnology manufacturing/sales
- Medical research
- Consultant
- Laboratory technologist
- Pharmaceutical industry
- Food and water quality technician
- Environmental/bioremediation
- Government laboratories
- Professional schools (health, law, graduate studies)



Immunology and Infection

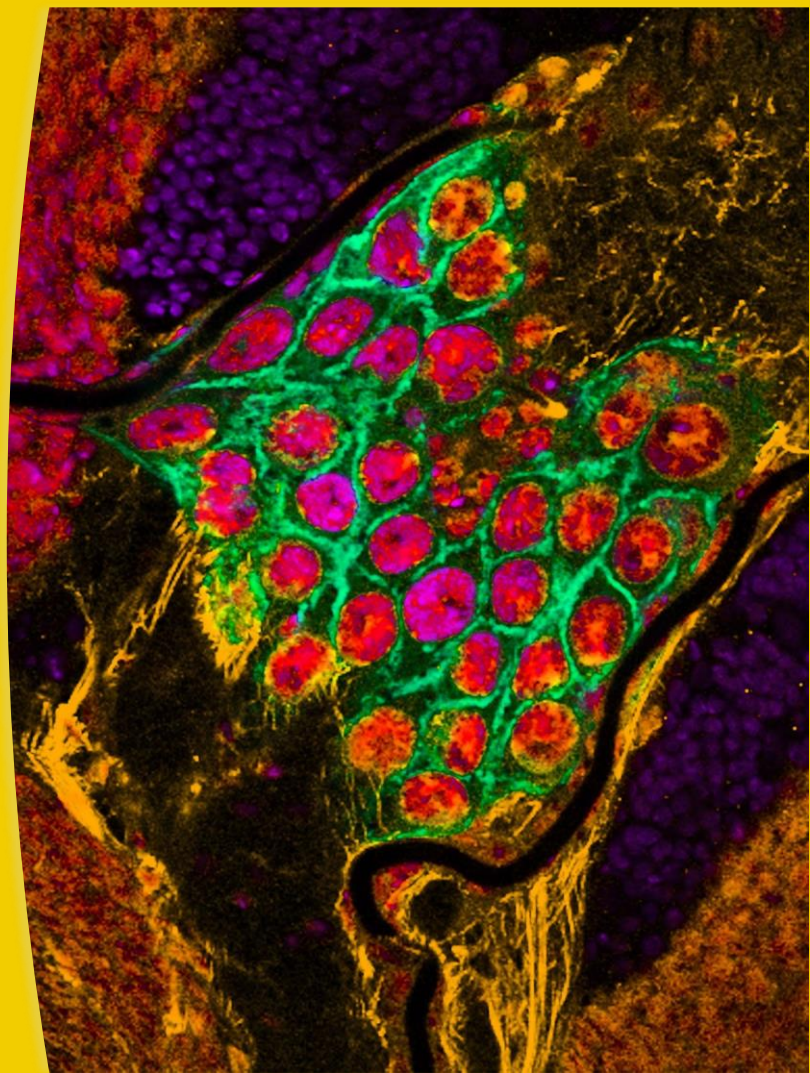
- Collaborative program offered by Biological Sciences and Medical Microbiology and Immunology.
- Broadly based program that considers how organisms respond to pathogens.
- **Overlapping themes**
 - Function of innate and adaptive immune system in diverse organisms
 - Biology of prokaryotic, eukaryotic and viral pathogens
 - Biology of host-pathogen interactions



Career Options:

Immunology and Infection

- Bacteriologist
- Epidemiologist
- Forensic pathologist
- Geneticist
- Immunologist
- Laboratory technologist
- Medical librarian
- Molecular biologist
- Parasitologist
- Research scientist
- Respiratory specialist
- Virologist
- Professional schools (health, law, graduate studies)



Palaeontology

- Collaborative program offered by Biological Sciences and Earth and Atmospheric Sciences.
- History of life through geological time, as seen in the fossil record.
- **Course offerings**
 - Vertebrate palaeobiology
 - Invertebrate palaeobiology
 - Palaeobotany
 - Evolutionary biology
 - Systematics
 - Functional morphology
 - Sedimentology



Career Options: Palaeontology

- Consultant
- Curatorial technologist
- Fossil preparation technician
- Environmental law enforcement
- Naturalist
- Micropalaeontologist
 - Petroleum
- Museum or science centre interpreter
- Science education/outreach
- Science illustrator
- Science writer
- Professional school (graduate studies)



Common First Year BioSci Course Selections

Course Title	Course Number	Credits	Lab
Introduction to Cell Biology	BIOL 107	3	✓
Introduction to Biological Diversity	BIOL 108	3	✓
Introductory Chemistry	CHEM 101	3	✓
Organic Chemistry	CHEM 261	3	✓
Calculus for the Life Sciences	MATH 134 (or 114 or 117 or 144 or 125)	3	X
Introduction to Applied Statistics	STAT 151	3	X
Two Arts Options	ENG or junior WRS	6	X
Two Science Options	Various	6	?



Undergraduate Student Associations

- Can participate in activities, build community, and form lasting friendships
 - See links on BioSci website
- Biology Students' Departmental Association
- Molecular Biology Student Association
- Zoomaniacs
- Organization of Botany Students
- University of Alberta Palaeontology Society
- Wildlife Society UAlberta Chapter



Thank you for your
attention!

biougrad@ualberta.ca



**UNIVERSITY
OF ALBERTA**