

University of Regina

DEPARTMENT OF BIOLOGY

ACADEMIC UNIT REVIEW SELF STUDY REPORT

2016 – 2017

1. BACKGROUND

The University of Regina began as Regina College in 1910, and hired the first Biology instructor in 1911. Regina College became a junior college of the University of Saskatchewan in 1925, and became a degree-granting institution, as the University of Saskatchewan – Regina campus, in 1961. The Biology Dept has existed as an entity since 1963, when it was organized as the Biology Committee within the Natural Sciences Division of the Regina Campus. In 1965, the members of the Biology Committee moved to the new Main Campus in the south end of the City of Regina, into the newly-constructed Laboratory Building. The Biology Committee was reorganized as the Dept of Biology in 1968, and the University of Regina became an independent institution in 1974. As of Winter 2017, the Biology Dept consists of 15 faculty members (including one located at Luther College, and one located at First Nations University of Canada), four laboratory instructors, two technicians and one administrative assistant. There are 38 graduate students, six post-doctoral fellows, three on-campus adjunct members who are research scientists affiliated with the Faculty of Science’s Institute for Environmental Change and Society, and numerous off-campus adjunct members.

The majority of the staff and facilities of the Biology Dept is distributed between two adjacent buildings: the Laboratory Building (LB) and the Research & Innovation Centre (RIC). Until the construction of the RIC approximately eight years ago, the Dept was located largely within the LB. The opening of the RIC resulted in the transfer of most (but not all) of the “molecular” researchers into that building, whereas many of the more “ecological” researchers remained in the LB. The teaching labs and lab instructor offices are in the LB. First Nations University also has a Biology teaching lab, and a lab instructor who runs Biology labs (among other courses). The shared Main Office (for the Dept of Biology and the Dept of Chemistry & Biochemistry) is located in the LB.

In addition to Biology teaching and research laboratories, the LB is also home to the Dept of Physics, and parts of the Dept of Chemistry & Chemistry and the Dept of Geology. Similarly, the RIC is home to research labs not only in Biology, but also Chemistry & Biochemistry, Engineering, Geography, the Institute for Environmental Change and Society, the new Institute for Microbial Systems and Society, and is also the home of the Faculty of Nursing.

The Biology Dept makes extensive use (for both teaching and research), and is the major user, of the University of Regina Field Station located in the Cypress Hills of southwestern Saskatchewan. Department members also conduct fieldwork in various locations in Saskatchewan, other parts of western Canada, and further afield.

The majority of Biology Dept courses are offered under the rubric of the Faculty of Science, however the Dept also works together with Luther College and the First Nations University to offer on-campus (and web-delivered BIOL 101 and 140) Biology courses, and teaches three courses for the Faculty of Nursing at three sites in Saskatchewan. The Dept coordinates with the Faculty of Education to offer Human Biology (BIOL 140) in various remote locations in Canada. Some off-campus courses are offered in conjunction with the Centre for Continuing Education (e.g. BIOL 100 and 101 in Swift Current, SK).

2. STAFFING AND RESOURCES

2.1. Staffing - faculty, instructors, lab instructors, technicians, and support staff

| Name | Position and Rank | Notes |
|----------------------------|--------------------------|-------------------------------------|
| Ashton, Neil | Professor | Retired Dec. 31/16 |
| Brigham, R. Mark | Professor | |
| Buttigieg, Josef | Associate Professor | |
| Cameron, Andrew | Assistant Professor | |
| Dietz, Heather | Lab Instructor III | |
| Dmytrow, Marie | Administrative Assistant | |
| Downing, Joanne | Technician | |
| Erhardt, Nola | Lab Instructor III | |
| Finlay, Kerri | Assistant Professor | |
| Gagnon, Daniel | Professor | former Dean of Science |
| Gendron, Fidji | Associate Professor | First Nations University of Canada |
| Hall, Britt | Associate Professor | |
| Hart, Mel | Lab Instructor II | |
| Leavitt, Peter | Professor | CRC Tier I |
| Lintott, Lauri | Lab Instructor III | |
| Lozinsky, Sharla | Technician | |
| Manzon, Richard | Professor | |
| Somers, Christopher | Associate Professor | CRC Tier II |
| Stavrinides, John | Associate Professor | |
| Vanderwel, Mark | Assistant Professor | |
| Vetter, Mary | Professor | Luther College; retiring June 30/17 |
| Weger, Harold | Associate Professor | Dept Head |
| Yost, Christopher | Professor | CRC Tier II |
| IECS¹ | | |
| Chao, Tzu-Chiao | Research Scientist | |
| Simpson, Gavin | Research Scientist | |
| Wissel, Björn | Research Scientist | |

¹ Institute for Environmental Change and Society, IECS, is located in the Research & Innovation Centre. Drs. Chao, Simpson and Wissel are Research Scientists in the IECS, and have 50% research: 50% research facilitation positions. All three are adjunct members of the Biology Dept, are on campus, and interact closely the rest of the Dept. Other adjunct members of the Biology Dept are listed at: <http://www.uregina.ca/science/biology/people/associate-adjunct/index.html>. Emeritus members of the Dept are listed at: <http://www.uregina.ca/science/biology/people/professors-emeriti/index.html>.

CVs for Biology Dept laboratory instructors and faculty are in Appendix I.

2.2. Resources

2.2.1. Teaching Space

| Room | Capacity | Function |
|------------------|----------|--|
| LB 320 | 20 | Lab for BIOL 288 in Winter semester; lab is shared with Dept of Chemistry & Biochemistry |
| LB 411 | 36 | Lab for BIOL 100, 140, 150 |
| LB 411.1 | | Prep area |
| LB 411.2 | 36 | Lab for BIOL 101, 140, 150 |
| LB 416 | 10 | Bioinformatics Lab |
| LB 419 | 18 | Lab for BIOL 266, 366, 378 |
| LB 425 | 24 | Lab for BIOL 275, 380, 385 |
| LB 425.1 | | Prep area |
| LB 427 | 24 | Lab for BIOL 335, 365, 367 Lecture room for BIOL 365, 367, 376 |
| LB 428 | 24 | Lab for BIOL 205, 305 |
| LB 428.1 & 428.2 | | Prep areas |
| LB 432 | 20 | Lab for BIOL 302, 310 (Level I microbiology lab) |
| LB 432.1.1 | | Microbiology prep area |

LB = Laboratory Building

2.2.2. Research Space

| Room | Function | Principal Investigators |
|-------------------------|--------------|-------------------------|
| LB 109 | Research lab | Brigham |
| LB 109.1 | Research lab | Leavitt |
| LB 150 | Research lab | Finlay |
| LB 266 | Research Lab | EQAL |
| LB 318 | Research lab | Hall |
| LB 406 | Research lab | Stavrinides |
| LB 410 ² | Research lab | Yost |
| LB 417 | Research lab | Weger |
| LB 420.3 | Research lab | Vanderwel |
| LB 421 ³ | Research lab | Ashton |
| LB 422 ³ | Research lab | Ashton |
| RI 230 | Research lab | Somers |
| RI 241 | Research lab | Buttigieg |
| RI 241 | Research lab | Manzon |
| RI 241 | Research lab | Yost |
| RI 333 | Research lab | Cameron |
| RI 342 ⁴ | Research lab | IMSS |
| RI 533/535 ⁵ | Research lab | IECS |

LB = Laboratory Building; RI = Research & Innovation Centre

¹ Environmental Quality Analysis Laboratory (EQAL)

² Formerly the research laboratory of Dr. Rod Kelln (emeritus professor, Dept. of Chemistry & Biochemistry), now shared between Kelln and Yost labs. Scheduled to undergo renovations starting in February 2017.

³ Supervised by Dr. Dae-Yeon Suh of the Dept. of Chemistry & Biochemistry, starting 1 January, 2017.

⁴ Formerly the Yost research laboratory, recently re-assigned to the Institute for Microbial Systems and Society (IMSS).

⁵ IECS research laboratory; space is used by many on-campus scientists, including the Biology Dept.

2.2.3. Specialized equipment, rooms, other

| Equipment/Instrumentation | Location | Notes |
|--|------------|---|
| Plant Growth Chambers | LB 107 | Yost facility |
| Chest Freezer | LB 113.1 | Used for both teaching and research |
| Freeze Drier | LB 113.1 | EQAL ¹ |
| Aquatics Facility | LB 147 | Mainly for research |
| Walk-In Cold Room & Freezer | LB 148 | Mainly for research |
| Freeze Drier Room | LB 149 | EQAL ¹ |
| Plant Growth Facility | LB 151 | Used for both teaching and research |
| Ledingham Herbarium | LB 152 | This facility does not currently have a curator |
| BUGS room | LB 153 | Biology Undergraduate & Graduate Society |
| Liquid Chromatography | LB 250 | EQAL ¹ |
| Moss Culture Room² | LB 418 | Ashton facility |
| ARE Facility³ | LB 424 | Animal care facility |
| -80 Freezer | LB 425.1 | Teaching & research |
| Autoclaves & 15 MΩ water | LB 432.1.1 | Teaching and research |
| Walk-in cold rooms & freezers | LB 426 | Teaching and research |
| -80 Freezers (4) | RI 238 | Research |
| Autoclaves (2) | RI 240 | Mainly research |
| PCR Room | RI 241.4 | Research |

¹ Environmental Quality Analysis Laboratory

² Supervised by Dr. Dae-Yeon Suh of the Dept. of Chemistry & Biochemistry, starting 1 January, 2017.

³ Animal Research & Education Facility

2.2.4. Research institutes, clusters, or specialized labs

Institutes at the University of Regina are either “Institutional” or “Faculty-Based”, see <http://www.uregina.ca/research/research-expertise/centres-institutes.html>, and <http://www.uregina.ca/policy/browse-policy/policy-RCH-010-005.html>

The Faculty of Science hosts the Institute for Environmental Change and Society (IECS), which has its major facilities on the 5th floor of the RIC. The Director of the IECS is Biology faculty member Peter Leavitt, and the three Research Scientists at the IECS (Chao, Simpson, Wissel [Associate Director]) are all adjunct members of the Biology Dept. Equipment in the IECS includes:

- Three continuous flow Thermo Finnigan IRMS
- Two Costech ECS 4010 elemental analysers
- Thermo Quest TC/EA
- Two Thermo Scientific Gas Benches II
- Thermo Scientific GC Combustion II enabling analyses of solid, liquid and gas samples.
- Two cavity ring-down spectrometers
- Lachat QuickChem 8500 Series 2 Flow Injection analyses system
- Unity Scientific SmartChem 200 Discrete Analyzer
- Shimadzu AA-7000 Atomic Adsorption Spectrophotometer
- Shimadzu GC 2014 Greenhouse Gas analyser coupled to a Teledyne Tekmar HT3 head-space sampler
- Shimadzu UV-VIS 1800 spectrophotometer
- Thermo Scientific Barnstead Nanopure Water Purification system
- Q-TOF MS - Waters Synapt G2 HDMS
- Zeiss LSM 780 inverted confocal microscope with a tunable Coherent Chameleon laser
- Zeiss Axio Observer Z1 inverted microscope
- Illumina MiSeq

Biology faculty members Andrew Cameron and Chris Yost have recently received substantial funds from the Canada Foundation for Innovation, and have received approval to commission the Institute for Microbial Systems and Society (IMSS), based in RI 342. This institute, like IECS, reports to Science. Equipment in the IMSS includes:

- Illumina MiniSeq
- Ion Torrent with Ion Chef
- Bioinformatics work stations
- Applied Biosystems Step One Real Time PCR instruments (2)
- Supporting bacterial culturing equipment- shaking incubators
- Nanopore MinIon DNA sequencer

3. SCHOLARLY OUTPUT

3.1.1. Summary

On Jan 26, 2017, a Web of Science query was run, looking for articles published by researchers affiliated with the University of Regina’s Dept of Biology for the period 2006-present; the list contained 327 articles. The search encompassed only regular faculty members in the Biology Dept, and did not include adjunct members (many of whom have extensive research records). To be included on the list, the author’s address must be Regina, SK (ci=(Regina) in the Web of Science syntax). These identified articles were cited a total of 5548 times; 4929 times without including self-citations.

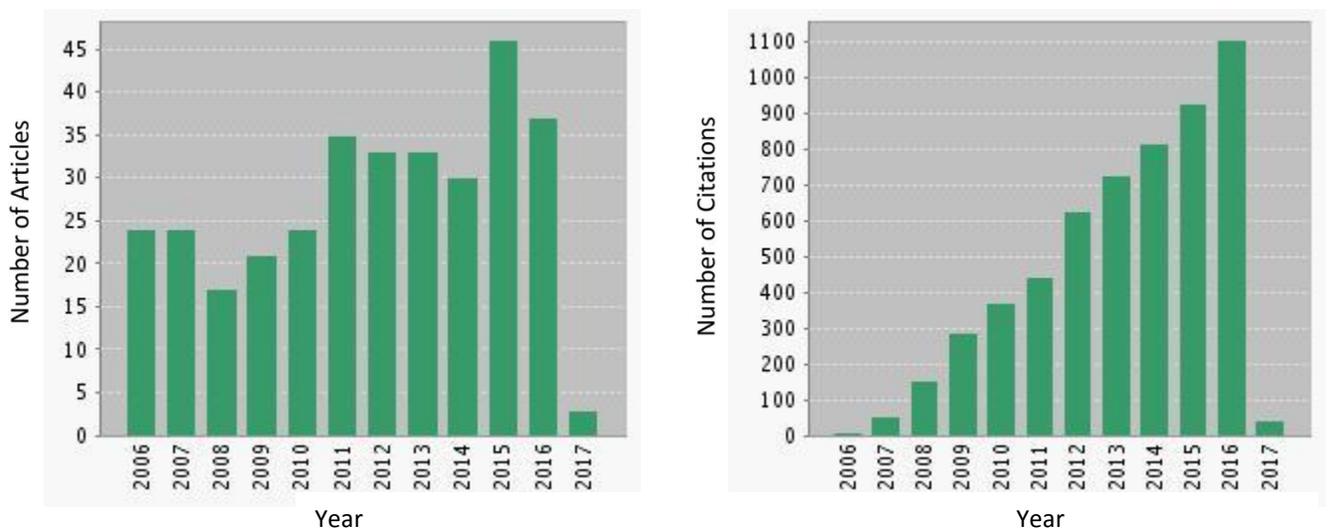


Figure: Refereed journal articles from 2006 onwards (left) and citation rates for articles *from 2006 and later* (right) for the period 2006 to Jan 26, 2017. Both figures are from Web of Science.

The list of Biology Dept publications is in Appendix II.

3.1.2. Grants and Contracts

Data from the University of Regina Research Office (Nov. 15/16). The entries with no dollar value are for research agreements or contracts that don't involve the transfer of funds. These include material transfer agreements, data sharing agreements, or research contracts related to industry partnerships that are funded through NSERC or other grants.

| Researcher | Agency | Program | Amount | Date Awarded |
|------------------|--|---|--------------|--------------|
| Ashton, Neil | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$125,900.00 | 28-Mar-08 |
| Brigham, Mark | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$250,000.00 | 31-Mar-12 |
| Brigham, Mark | National Geographic | Unspecified | \$3,000.00 | 13-Feb-14 |
| Brigham, Mark | Environment Canada | | \$7,500.00 | 17-Feb-14 |
| Brigham, Mark | United States Fish and Wildlife Service | NeoTropical Grant | \$14,896.00 | 01-Jun-16 |
| Brigham, Mark | Saskatchewan Environment | | \$13,750.00 | 01-Apr-14 |
| Brigham, Mark | Environment Canada | | \$30,000.00 | |
| Brigham, Mark | TD Friends of the Environment Foundation | Unspecified | \$3,500.00 | 05-Jun-13 |
| Brigham, Mark | Mitacs | Accelerate | \$30,000.00 | 01-Jun-16 |
| Brigham, Mark | Mitacs | Accelerate | \$15,000.00 | 01-Jun-16 |
| Brigham, Mark | Colleges and Institutes Canada Clean Tech Internship Program | | \$12,000.00 | 02-May-16 |
| Brigham, Mark | Penn West Petroleum Ltd. | Unspecified | \$1,000.00 | 06-Sep-13 |
| Brigham, Mark | Wildlife Conservation Society (WCS) Canada | | \$5,000.00 | 01-Apr-15 |
| Brigham, R. Mark | Environment Canada | | \$21,400.00 | 01-Dec-06 |
| Brigham, R. Mark | Mitacs | Accelerate | \$7,500.00 | 28-May-10 |
| Brigham, R. Mark | Ducks Unlimited Canada | | \$17,000.00 | 06-Mar-07 |
| Brigham, R. Mark | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$185,250.00 | 29-Mar-07 |
| Brigham, R. Mark | Environment Canada | | \$9,000.00 | 16-May-10 |
| Brigham, R. Mark | Natural Sciences and Engineering Research Council (NSERC) | Research Tools and Instruments (RTI) | \$10,452.00 | 29-Mar-07 |
| Brigham, R. Mark | Ducks Unlimited Canada | | \$17,000.00 | 01-Mar-06 |
| Brigham, R. Mark | Antelope Creek Habitat Development Area | | \$7,500.00 | 01-May-10 |
| Brigham, R. Mark | TetrES Consultants Inc. | | \$7,548.00 | 01-Aug-09 |
| Brigham, R. Mark | World Wildlife Fund Canada (WWF) | | \$10,800.00 | 12-Apr-07 |
| Brigham, R. Mark | TetrES Consultants Inc. | | \$7,340.00 | 01-Aug-08 |
| Brigham, R. Mark | Mitacs | Accelerate | \$7,500.00 | 07-Jun-10 |
| Brigham, R. Mark | Mitacs | Saskatchewan Graduate Research Internship | \$7,500.00 | 19-Nov-09 |
| Brigham, R. Mark | Ducks Unlimited Canada | | \$25,000.00 | 01-May-06 |
| Brigham, R. Mark | Mitacs | Accelerate | \$15,000.00 | 17-May-11 |

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|------------------|---|--------------------------------------|--------------|-----------|
| Brigham, R. Mark | Mitacs | Accelerate | \$15,000.00 | 01-May-11 |
| Brigham, R. Mark | Environment Canada | | \$10,000.00 | 01-Aug-06 |
| Brigham, R. Mark | Ducks Unlimited Canada | | \$17,000.00 | 31-Mar-08 |
| Brigham, R. Mark | Environment Canada | UNSPECIFIED | \$7,500.00 | 15-Jun-09 |
| Brigham, R. Mark | Alberta Conservation Association | | \$23,000.00 | 01-Apr-11 |
| Brigham, R. Mark | Saskatchewan Environment | | \$58,675.00 | 01-Jun-06 |
| Brigham, R. Mark | Petroleum Technology Alliance Canada | | \$50,000.00 | 25-Feb-11 |
| Brigham, R. Mark | TetrES Consultants Inc. | | \$1,375.00 | 01-Oct-08 |
| Buttigieg, Josef | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$150,000.00 | 31-Mar-12 |
| Buttigieg, Josef | Saskatchewan Advanced Education and Employment | Innovation and Science Fund | \$79,808.00 | 03-Sep-13 |
| Buttigieg, Josef | Canada Foundation for Innovation (CFI) | Leaders Opportunity Fund (LOF) | \$79,808.00 | 18-Jun-13 |
| Buttigieg, Josef | Saskatchewan Health Research Foundation (SHRF) | Spinal Cord Injury (SCI) Research | \$100,000.00 | 09-Dec-13 |
| Buttigieg, Josef | iProgen Biotech Inc. | | \$5,000.00 | 01-Sep-16 |
| Buttigieg, Josef | Natural Sciences and Engineering Research Council (NSERC) | Research Tools and Instruments (RTI) | \$51,938.00 | 31-Mar-12 |
| Buttigieg, Josef | Saskatchewan Health Research Foundation (SHRF) | Collaborative Innovation Development | \$21,650.00 | 01-Mar-15 |
| Buttigieg, Josef | Natural Sciences and Engineering Research Council (NSERC) | Engage Grants | \$25,000.00 | 01-Aug-16 |
| Buttigieg, Josef | Saskatchewan Health Research Foundation (SHRF) | Research Connections Grant | \$420.00 | 16-May-14 |
| Buttigieg, Josef | Saskatchewan Health Research Foundation (SHRF) | Establishment Grant | \$119,926.00 | 26-Jun-14 |
| Buttigieg, Josef | Saskatchewan Health Research Foundation (SHRF) | Spinal Cord Injury (SCI) Research | \$69,000.00 | 07-Dec-15 |
| Buttigieg, Josef | iProgen Biotech Inc. | | \$0.00 | 26-Nov-15 |
| Cameron, Andrew | Saskatchewan Health Research Foundation (SHRF) | Establishment Grant | \$120,000.00 | 25-Jun-13 |
| Cameron, Andrew | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$160,000.00 | 31-Mar-13 |
| Cameron, Andrew | Saskatchewan Health Research Foundation (SHRF) | Research Connections Grant | \$10,000.00 | 02-Apr-15 |
| Cameron, Andrew | BEI Resources | | \$0.00 | 31-Aug-15 |
| Cameron, Andrew | Canada Foundation for Innovation (CFI) | Leaders Opportunity Fund (LOF) | \$75,501.00 | 18-Jun-13 |
| Cameron, Andrew | Saskatchewan Health Research Foundation (SHRF) | Collaborative Innovation Development | \$40,000.00 | 01-Mar-15 |
| Cameron, Andrew | Saskatchewan Advanced Education and Employment | Innovation and Science Fund | \$75,501.00 | 03-Sep-13 |
| Cameron, Andrew | Natural Sciences and Engineering Research Council (NSERC) | Engage Grants | \$25,000.00 | 11-Mar-14 |
| Cameron, Andrew | Natural Sciences and Engineering Research Council (NSERC) | Research Tools and Instruments (RTI) | \$49,046.00 | 08-Apr-15 |
| Chapco, William | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$83,725.00 | 28-Mar-08 |
| Finlay, Kerri | Ministry of Parks, Culture and Sport | | \$14,000.00 | 16-Jun-14 |

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|----------------|---|--------------------------------------|----------------|-----------|
| Hall, Britt | Natural Sciences and Engineering Research Council (NSERC) | Engage Grants | \$25,000.00 | 01-Jun-16 |
| Hall, Britt | Saskatchewan Environment | | \$19,776.00 | 01-Jun-13 |
| Hall, Britt | Saskatchewan, University of | | \$0.00 | 15-Sep-13 |
| Hall, Britt | Saskatchewan Environment | Fish and Wildlife Development | \$23,225.00 | 01-Apr-07 |
| Hall, Britt | Ducks Unlimited Canada | | \$12,565.00 | 01-Oct-13 |
| Hall, Britt | Saskatchewan Environment | | \$44,520.00 | 01-Apr-14 |
| Hall, Britt | Environment Canada | | \$11,000.00 | 29-Dec-11 |
| Hall, Britt | Natural Sciences and Engineering Research Council (NSERC) | Engage Grants | \$25,000.00 | 04-Aug-15 |
| Hall, Britt | Saskatchewan Environment | Fish and Wildlife Development | \$5,000.00 | 01-Apr-16 |
| Hall, Britt | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$106,000.00 | 01-Jul-06 |
| Hall, Britt | Saskatchewan Environment | Fish and Wildlife Development | \$12,700.00 | 01-Apr-15 |
| Hall, Britt | Saskatchewan Environment | Fish and Wildlife Development | \$25,000.00 | 01-Apr-15 |
| Hall, Britt | Natural Sciences and Engineering Research Council (NSERC) | Research Tools and Instruments (RTI) | \$21,039.00 | 01-Jul-06 |
| Hall, Britt | Natural Sciences and Engineering Research Council (NSERC) | Research Tools and Instruments (RTI) | \$13,205.00 | 01-Apr-10 |
| Hall, Britt | Ducks Unlimited Canada | | \$5,400.00 | 01-Sep-11 |
| Hart, Mel | Indigenous Advisory Circle | | \$2,000.00 | 01-Dec-15 |
| Leavitt, Peter | Canada Foundation for Innovation (CFI) | | \$662,873.00 | 20-Nov-12 |
| Leavitt, Peter | Saskatchewan Advanced Education and Employment | | \$662,873.00 | 20-Feb-13 |
| Leavitt, Peter | Science Museum of Minnesota | | \$9,000.00 | 01-Sep-11 |
| Leavitt, Peter | Manitoba Water Stewardship | Research Contract | \$100,000.00 | 18-Dec-10 |
| Leavitt, Peter | New York State Department of Environmental Conservation | | \$0.00 | 01-Nov-12 |
| Leavitt, Peter | Saskatchewan Advanced Education and Employment | Innovation and Science Fund | \$2,800,000.00 | 25-Jan-10 |
| Leavitt, Peter | Michigan State University | | \$0.00 | |
| Leavitt, Peter | Canada Research Chair (CRC) | Tier 1 Nomination | \$1,400,000.00 | 01-May-10 |
| Leavitt, Peter | Natural Sciences and Engineering Research Council (NSERC) | Special Research Opportunity | \$31,427.00 | 01-Sep-09 |
| Leavitt, Peter | Department of Fisheries and Oceans | | \$13,990.00 | 11-Dec-08 |
| Leavitt, Peter | Environment Canada | Lake Winnipeg Basin Stewardship Fund | \$100,000.00 | 22-Apr-10 |
| Leavitt, Peter | Utah, State of | | \$55,104.00 | 01-Jul-09 |
| Leavitt, Peter | Manitoba Water Stewardship | | \$75,000.00 | 01-Jan-09 |
| Leavitt, Peter | Canada Foundation for Innovation (CFI) | Leading Edge Fund (LEF) | \$2,799,999.00 | 16-Jun-09 |
| Leavitt, Peter | University of Washington | | \$51,350.00 | 11-Jun-09 |
| Leavitt, Peter | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$313,750.00 | 18-Apr-07 |
| Leavitt, Peter | Department of Fisheries and Oceans | | \$12,600.00 | 11-Dec-08 |
| Leavitt, Peter | Natural Sciences and Engineering Research | Special Research | \$30,800.00 | 10-Sep-08 |



| | Council (NSERC) | Opportunity | | |
|-----------------|---|--|--------------|-----------|
| Leavitt, Peter | University of Washington | | \$144,345.00 | 01-Jan-09 |
| Leavitt, Peter | Fisheries & Oceans Canada | | \$20,000.00 | 02-Dec-14 |
| Leavitt, Peter | Saskatchewan Environment | | \$9,000.00 | 26-Jul-10 |
| Leavitt, Peter | Iowa State University | Research Contract | \$0.00 | |
| Leavitt, Peter | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$165,000.00 | 31-Mar-12 |
| Leavitt, Peter | Natural Sciences and Engineering Research Council (NSERC) | Strategic Project Grant | \$37,620.00 | 30-Sep-14 |
| Leavitt, Peter | Natural Sciences and Engineering Research Council (NSERC) | Strategic Project Grant | \$15,120.00 | 30-Sep-15 |
| Leavitt, Peter | Manitoba Water Stewardship | Research Contract | \$50,000.00 | 27-Mar-12 |
| Leavitt, Peter | Environment Canada | Lake Winnipeg Basin Stewardship Fund | \$26,163.00 | 26-Sep-11 |
| Leavitt, Peter | University of Washington | NSF | \$145,031.00 | 15-Nov-07 |
| Leavitt, Peter | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$300,000.00 | 31-Mar-13 |
| Leavitt, Peter | Natural Sciences and Engineering Research Council (NSERC) | Accelerator Supplement | \$120,000.00 | 03-Apr-13 |
| Leavitt, Peter | Natural Sciences and Engineering Research Council (NSERC) | Strategic Project Grant | \$60,900.00 | 10-Jun-15 |
| Leavitt, Peter | Natural Sciences and Engineering Research Council (NSERC) | Strategic Project Grant | \$64,020.00 | 10-Jan-14 |
| Leavitt, Peter | Saskatchewan Advanced Education and Employment | Innovation and Science Fund | \$202,026.00 | 13-Jul-11 |
| Leavitt, Peter | Natural Sciences and Engineering Research Council (NSERC) | Strategic Project Grant | \$45,600.00 | 16-Dec-13 |
| Leavitt, Peter | Canada Foundation for Innovation (CFI) | Leaders Opportunity Fund (LOF) | \$202,026.00 | 13-Jul-11 |
| Leavitt, Peter | University of Washington | | \$281,062.00 | 01-Mar-06 |
| Lund, Susan | Natural Sciences and Engineering Research Council (NSERC) | Research Tools and Instruments (RTI) | \$20,481.00 | 01-Mar-06 |
| Lund, Susan | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$48,000.00 | 01-Mar-06 |
| Manzon, Richard | Natural Sciences and Engineering Research Council (NSERC) | Collaborative Research & Development (CRD) | \$24,534.00 | 01-Feb-15 |
| Manzon, Richard | Natural Sciences and Engineering Research Council (NSERC) | Collaborative Research & Development (CRD) | \$24,416.00 | 08-Oct-14 |
| Manzon, Richard | Bruce Power L.P. | NSERC CRD Industrial Matching Funds | \$101,831.00 | 07-Mar-13 |
| Manzon, Richard | Natural Sciences and Engineering Research Council (NSERC) | Collaborative Research & Development (CRD) | \$24,416.00 | 18-Sep-13 |
| Manzon, Richard | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$130,000.00 | 01-Apr-14 |
| Manzon, Richard | Bruce Power L.P. | NSERC CRD Industrial Matching Funds | \$62,977.00 | 07-Aug-15 |
| Manzon, Richard | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$81,984.00 | 29-Mar-07 |
| Manzon, Richard | Natural Sciences and Engineering Research | Collaborative | \$24,534.00 | 10-Feb-16 |

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|---------------------|---|--|--------------|-----------|
| | Council (NSERC) | Research & Development (CRD) | | |
| Manzon, Richard | Natural Sciences and Engineering Research Council (NSERC) | Collaborative Research & Development (CRD) | \$52,115.00 | 13-Sep-16 |
| Manzon, Richard | Bruce Power L.P. | | \$20,000.00 | 24-Sep-12 |
| Manzon, Richard | Saskatchewan Environment | Fish and Wildlife Development | \$14,300.00 | 01-Apr-16 |
| Somers, Christopher | Saskatchewan Environment | | \$38,410.00 | 01-Apr-10 |
| Somers, Christopher | Natural Sciences and Engineering Research Council (NSERC) | Collaborative Research & Development (CRD) | \$72,015.00 | 13-Sep-16 |
| Somers, Christopher | Bruce Power L.P. | | \$600,000.00 | 01-Apr-11 |
| Somers, Christopher | Environment Canada | | \$9,000.00 | 05-Oct-11 |
| Somers, Christopher | Natural Sciences and Engineering Research Council (NSERC) | Collaborative Research & Development (CRD) | \$30,399.00 | 08-Oct-14 |
| Somers, Christopher | Environment Canada | | \$6,000.00 | 09-Mar-07 |
| Somers, Christopher | Bruce Power L.P. | | \$30,000.00 | 01-Aug-15 |
| Somers, Christopher | Saskatchewan Environment | | \$47,040.00 | 01-Apr-14 |
| Somers, Christopher | Natural Sciences and Engineering Research Council (NSERC) | Collaborative Research & Development (CRD) | \$30,532.00 | 10-Feb-16 |
| Somers, Christopher | Bruce Power L.P. | NSERC CRD Industrial Matching Funds | \$87,023.00 | 07-Aug-15 |
| Somers, Christopher | Friends of the Royal Saskatchewan Museum Inc. | | \$12,107.00 | 01-May-11 |
| Somers, Christopher | Saskatchewan Environment | Fish and Wildlife Development | \$39,200.00 | 01-Apr-15 |
| Somers, Christopher | Natural Sciences and Engineering Research Council (NSERC) | Collaborative Research & Development (CRD) | \$30,531.00 | 01-Feb-15 |
| Somers, Christopher | Saskatchewan Environment | Fish and Wildlife Development | \$2,000.00 | 01-Apr-16 |
| Somers, Christopher | Environment Canada | | \$5,700.00 | 01-Oct-06 |
| Somers, Christopher | Saskatchewan Environment | Fish and Wildlife Development | \$41,000.00 | 01-Apr-16 |
| Somers, Christopher | Environment Canada | | \$12,000.00 | 12-Aug-10 |
| Somers, Christopher | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$75,000.00 | 28-Mar-08 |
| Somers, Christopher | Royal Saskatchewan Museum | MITACS Accelerate | \$7,500.00 | 21-Mar-11 |
| Somers, Christopher | Saskatchewan Environment | | \$43,200.00 | 01-Apr-08 |
| Somers, Christopher | Saskatchewan Environment | Fish and Wildlife Development | \$14,880.00 | 01-Apr-11 |
| Somers, Christopher | Saskatchewan Advanced Education and Employment | Innovation and Science Fund | \$252,585.00 | 26-Nov-08 |
| Somers, Christopher | Mitacs | Accelerate | \$15,000.00 | 24-Jan-12 |
| Somers, Christopher | Canadian Wildlife Foundation (Federation) | Grant | \$7,500.00 | 20-Jun-08 |
| Somers, Christopher | Saskatchewan Environment | Fish and Wildlife Development | \$13,200.00 | 16-Apr-12 |
| Somers, Christopher | Canada Foundation for Innovation (CFI) | Leaders Opportunity | \$252,586.00 | 19-Jun-08 |

| | | Fund (LOF) | | |
|---------------------|---|---|--------------|-----------|
| Somers, Christopher | Natural Sciences and Engineering Research Council (NSERC) | Collaborative Research & Development (CRD) | \$64,156.00 | 18-Sep-13 |
| Somers, Christopher | Bruce Power L.P. | NSERC CRD Industrial Matching Funds | \$83,169.00 | 07-Mar-13 |
| Somers, Christopher | Natural Sciences and Engineering Research Council (NSERC) | Research Tools and Instruments (RTI) | \$9,470.00 | 28-Mar-08 |
| Somers, Christopher | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$135,000.00 | 31-Mar-13 |
| Somers, Christopher | Environment Canada | | \$12,000.00 | 03-Oct-07 |
| Somers, Christopher | Environment Canada | | \$5,700.00 | 04-Sep-07 |
| Somers, Christopher | Saskatchewan Advanced Education and Employment | Innovation and Science Fund | \$200,000.00 | 26-Nov-08 |
| Somers, Christopher | Natural Sciences and Engineering Research Council (NSERC) | UNSPECIFIED | \$11,970.00 | 29-Mar-07 |
| Somers, Christopher | Saskatchewan Environment | | \$38,410.00 | 01-Apr-09 |
| Somers, Christopher | Canada Research Chair (CRC) | Tier 2 Nomination | \$500,000.00 | 29-Apr-13 |
| Somers, Christopher | Canada Research Chair (CRC) | Nomination of NSERC Tier 2 | \$500,000.00 | 27-May-08 |
| Somers, Christopher | Saskatchewan Environment | Fish and Wildlife Development | \$13,200.00 | 15-May-13 |
| Somers, Christopher | Saskatchewan Environment | Fish and Wildlife Development | \$15,120.00 | 15-May-13 |
| Somers, Christopher | Mitacs | Accelerate | \$7,500.00 | 21-Mar-11 |
| Stavrinides, John | Rx&D Health Research Foundation | Sponsorship Program | \$10,000.00 | 01-May-12 |
| Stavrinides, John | Canada Foundation for Innovation (CFI) | Leaders Opportunity Fund (LOF) | \$94,961.00 | 15-Mar-11 |
| Stavrinides, John | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$135,000.00 | 01-Apr-10 |
| Stavrinides, John | Saskatchewan Advanced Education and Employment | Innovation and Science Fund | \$94,961.00 | 13-Jul-11 |
| Stavrinides, John | Natural Sciences and Engineering Research Council (NSERC) | Additional Funding for Early Career Researchers | \$5,000.00 | 06-Jan-12 |
| Stavrinides, John | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$170,000.00 | 08-Apr-15 |
| Vanderwel, Mark | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$125,000.00 | 08-Apr-15 |
| Weger, Harold | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$135,240.00 | 01-Mar-06 |
| Wilson, Scott | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$130,000.00 | 08-Apr-15 |
| Wilson, Scott | Natural Sciences and Engineering Research Council (NSERC) | Strategic Project Grant | \$103,495.00 | 16-Nov-06 |
| Wilson, Scott | Natural Sciences and Engineering Research Council (NSERC) | Strategic Project Grant | \$14,860.00 | 30-Sep-09 |
| Wilson, Scott | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$250,000.00 | 01-Apr-09 |
| Yost, Christopher | Saskatchewan Agriculture and Food | Agriculture Development Fund - Full Proposal | \$150,000.00 | 31-Mar-15 |
| Yost, Christopher | Natural Sciences and Engineering Research Council (NSERC) | Partnership Workshops Program | \$11,425.00 | 27-Apr-15 |

| | | | | |
|-------------------|---|--|--------------|-----------|
| Yost, Christopher | Agriculture and Agri-Foods Canada | | \$42,000.00 | 01-Aug-06 |
| Yost, Christopher | Saskatchewan Advanced Education and Employment | Innovation and Science Fund | \$61,000.00 | 20-Feb-13 |
| Yost, Christopher | Natural Sciences and Engineering Research Council (NSERC) | Engage Grants | \$25,000.00 | 01-Jul-16 |
| Yost, Christopher | CSWESP | | \$47,000.00 | 22-Feb-07 |
| Yost, Christopher | Canada Foundation for Innovation (CFI) | Infrastructure Operating Fund (IOF) | \$61,000.00 | 20-Nov-12 |
| Yost, Christopher | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$210,000.00 | 01-Apr-16 |
| Yost, Christopher | Natural Sciences and Engineering Research Council (NSERC) | Strategic Project Grant | \$584,975.00 | 15-Oct-14 |
| Yost, Christopher | Saskatchewan Agriculture and Food | Agriculture Development Fund LOI | \$135,000.00 | 30-Apr-08 |
| Yost, Christopher | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$193,500.00 | 01-Mar-06 |
| Yost, Christopher | Alberta Environment | | \$13,000.00 | 08-Jun-09 |
| Yost, Christopher | Alberta Environment | | \$12,000.00 | 03-Nov-08 |
| Yost, Christopher | Canada Foundation for Innovation (CFI) | Leaders Opportunity Fund (LOF) | \$137,044.00 | 29-Jun-07 |
| Yost, Christopher | Saskatchewan Agriculture and Food | Agriculture Development Fund - Full Proposal | \$135,000.00 | 08-Dec-11 |
| Yost, Christopher | Natural Sciences and Engineering Research Council (NSERC) | Strategic Project Grant | \$439,650.00 | 30-Sep-09 |
| Yost, Christopher | Natural Sciences and Engineering Research Council (NSERC) | Discovery Grant | \$180,000.00 | 30-Mar-11 |
| Yost, Christopher | Canada Research Chair (CRC) | Renewal | \$500,000.00 | 02-Nov-12 |
| Yost, Christopher | Saskatchewan Advanced Education and Employment | | \$137,044.00 | 01-Apr-07 |
| Yost, Christopher | Saskatchewan Advanced Education and Employment | | \$200,000.00 | 01-Apr-07 |
| Yost, Christopher | Saskatchewan Agriculture and Food | | \$129,150.00 | 05-Dec-07 |
| Yost, Christopher | Canada Research Chair (CRC) | Nomination of NSERC Tier 2 | \$500,000.00 | 01-May-07 |

4. COMMUNITY SERVICE INITIATIVES

- Extensive participation, as judges, by Biology Dept members in the Regina Regional Science Fair each year.
- Mark Brigham is one of the two chief judges of the Canada-Wide Science Fair, which will be hosted by the University of Regina in May 2017.
- Extensive participation by members of the Biology Dept in the annual Science Rendezvous (public science display).
- Media interviews; approximately 30 per year.
- Many school and community group talks, including tours and presentations at the University of Regina.
- Identification of organisms for the general public, and answering biology questions for the public.
- Science demonstrations associated with Canadian Western Agribition.
- Rescuing and removal of bats from local buildings. There is an arrangement with the Saskatchewan Science Centre to house the bats over winter, for release in the spring.
- Working with local recreational fishers to reduce handling stress on fish at catch-and-release tournaments.

5. PROGRAMS OFFERED

5.1. Programs

At the undergraduate level, the Biology Dept offers BSc and BSc Hons degrees in Biology and, in conjunction with three other institutions (Saskatchewan Polytechnic, Lakeland College, Lethbridge College), BSc and BSc Hons degrees in Environmental Biology. The Dept also has a Co-op program, and offers one semester research-based courses (BIOL 396, BIOL 490XX series). There are also combined Biology-Geography BSc and BSc Hons degrees. The combined Biology-Biochemistry and Biology-Statistics BSc programs are no longer accepting students due to low enrollments; currently enrolled students will be able to complete their programs. The undergraduate programs are shown in detail in Appendix III, and the undergraduate courses are in Appendix IV (both appendices are excerpts from the 2016-17 Undergraduate Catalogue).

The Biology Dept offers both MSc and PhD degrees. There is also an option to switch from the MSc to the PhD program (certain conditions must be met, and transfers must be approved by the Faculty of Graduate Studies & Research).

Undergraduate admission standards are set by the Faculty of Science for Biology degrees, by the Biology Dept for the Co-op program, and by Science and the collaborating institutions for the Environmental Biology Degrees. Admission standards for the graduate programs are set by the Faculty of Graduate Studies & Research.

The Biology Dept is the administrative home for two BSc programs offered via the First Nations University of Canada: Indigenous Environmental Science (IES), and Environmental Health and Science (ENHS). IES is a new program, while the ENHS program was formerly in the Faculty of Engineering and Applied Science. The ENHS program is accredited by the Canadian Institute of Public Health Inspectors, and has recently added an “accelerated” (post-degree) option.

Undergraduate program advising is available via appointment arranged by the Science Student Services Office, and also via the Biology Department. Furthermore, there is substantial undergraduate advising information on the Biology website (<http://www.uregina.ca/science/biology/undergraduate/index.html>). As well, the Biology Dept makes an effort to post recent course syllabi on the Undergraduate section of the website; this approach has generated many positive comments from students.

5.2. Service teaching in support of other programs

The single largest component of Biology Dept service teaching is for the Faculty of Nursing. The Dept offers BIOL 110 (Human Anatomy & Physiology I), BIOL 111 (Human Anatomy & Physiology II) and BIOL 222 (Microbiology for Health Professionals). These courses have an enrollment of approximately 350 students each, and are taught simultaneously (via video link from Regina) in three locations (Regina [in person], Saskatoon [Saskatchewan Polytechnic], Swift Current [Great Plains College]). The instructors also travel to Saskatoon to deliver lectures (the lectures are video-linked to Regina and Swift Current) and to Swift Current (although Swift Current does not have the capacity to deliver lectures via video link). BIOL 222 has recently been opened up to students in the Pre-Pharmacy, Pre-Optometry and Pre-Veterinary Medicine programs, which has increased the enrollment by approximately 40 students.

Various 100- and 200-level Biology courses are taken by students in the Faculty of Education, especially in the Secondary BEd Program Biology Major (EBIO), but also in several other Secondary Education major programs and in Elementary Education programs.

Six Biology courses are required as part of the BSc and BSc Hons programs in Biochemistry, and BIOL 100 (Biology I, the first majors Biology course) is part of the BSc and BSc Hons in Chemistry.

BIOL 140 (Human Biology) and BIOL 150 (Biological Principles) are non-majors Biology courses that were transferred to Luther College approximately 20 years ago; the Biology Dept is responsible for offering the BIOL 140 and 150 laboratory sections. BIOL 140 is also taught via the Faculty of Education in remote locations and as part of the SUNTEP program, and BIOL 150 has also been taught by First Nations University of Canada.

BIOL 276 (Environmental Biology) is a required course in the BA in Environmental Studies. One of BIOL 100 or 101 (Biology II) is required for the BSc in Environmental Geoscience. Both of BIOL 100 and BIOL 101 are part of the BSc and BSc Hons in Psychology, and are required courses in the BA in Resource and Environmental Studies. Biology courses are electives for several programs in the Faculty of Kinesiology & Health Studies.

BIOL 223 (Microbes and Society) is a required course in the BASc in the Environmental Systems Engineering, and is also required for the BEd program in Secondary Biology. It is also an optional course for students in the Faculty of Arts and in Biology. There are approximately 100 students per year, with approximately 70 of the students in the BASc program.

5.3. Enrollment trends

The Biology Dept graduates approximately 25-30 undergraduate students per year. Graduate student convocations have averaged 6.5 per year since 2006. Further data are found in Appendices V and VI.

5.4. Student Successes

Private Sector

Stacy Boczulak (BSc 2010) – MSc in Forest Biogeochemistry (UVic); currently environmental consultant at Associated Engineering in Vancouver, BC

Alexandra Bugajski (MSc 2011) - Wildlife Biologist, Stantech

Derek Donald (MSc 2011) - Environmental Specialist at Hatfield Consultants

Jennifer Doucette (PhD 2012) - Lead Aquatic Scientist, CanNorth Consulting

Matthew Endsin (MSc 2012) Program Manager, AGAT Laboratories

Ryan Healey (BSc 2007) – MSc (Univ of Calgary), currently Pathology Scientist at Calgary Laboratory Services

Leah Kovatch (MSc 2015) - Junior Wildlife Biologist, Bear Tracks Environmental Services

Jessica Martino (MSc 2010) - Senior Wildlife Manager, CanNorth Consulting

Samantha Pham (MSc 2008) – Environmental Consultant, Can North Consulting

Cali Scheidt (BSc 2013) - currently project manager at SaskPower

April Sefton (BSc 2012) – Accountant at Deloitte-Touche, Regina, SK

Gena Shepherd (BSc 2010) - MSc in Genetic Counseling (UBC), currently genetic counselor at Oregon Reproductive Medicine, St. John's, NL

Odette Simmie (B.Sc. 2010) - PhD (University of Saskatchewan); Research Associate (Glaxo-Smith-Kline)

Mathew Sonier (BSc 2010) - Regulatory affairs specialist, Novozymes Biologicals Ltd

Dan Stefanovic (MSc 2015) - Assistant Hatchery Manager, Okanagan Nation Alliance

Megan Stobbs (BSc 2008) - Doctor of Naturopathic Medicine, Vancouver

Amanda Tetlock (BSc 2011) - Biologist, SaskEnergy

Brenda Vaness (MSc 2008) R&D Coordinator, Western Ag Innovations, North Dakota, USA

Public Sector

Bijaya Aryal (MSc 2012) Plant Health Technician, Saskatchewan Ministry of Agriculture

Lauren Baron (BSc 2009) - Water quality analyst at Buffalo Pound Water treatment lab, Saskatchewan

Jared Clarke (BSc 2008) – Elementary school teacher, former chief naturalist for the Wascana Centre Authority, and well-known local naturalist

Kim Dohms (MSc 2008) - PhD (Lethbridge University), now working in policy development for Environment Canada

Ryan Fisher (PhD 2010) – Endangered species biologist, Saskatchewan Environment

Dallas Foreman (MSc 2008) - High school Science teacher, Regina Public School Board

Carolyn Gaudet (MSc 2014) - Zoologist with Saskatchewan Conservation Data Centre

Laura Gardiner (MSc 2012) - Resource Management Officer, Parks Canada

Auralee Gettis (MSc 2006) – Associate Analyst, Public Health Agency of Canada

Robert Gosselin (BSc 2008) - Senior Science Educator, Good Spirit School Division, SK

Jenna Gritzfeld (BSc 2007) - Senior Scientist at Vaccine Evaluation Unit, Public Health England.

Caroline Hamelin (MSc 2016) – Forest Engineer with Quebec Ministry of Forests

Nick Henderson (BSc 2013) - Lab Technician, Saskatchewan Disease Control Lab

Tara Hicks (BSc 2010) – Laboratory Technologist, Saskatchewan Disease Control Laboratory
Ryan McDonald (PhD 2013) – Section manager, Molecular Diagnostics, Sask Disease Control Laboratory

Maggi Pettit (BSc 2011) - Environmental Specialist, SK Ministry of Highways and Infrastructure
Kurt Samways (MSc 2008) – PhD at Univ. of New Brunswick; currently post at DFO

Jennifer Schauenberg (BSc 2006) – Research associate at Sask Disease Control Laboratory

Kollin Schmalenberg (BSc 2011) - Lab Technician, Saskatchewan Disease Control Laboratory

Katie Sessions (MSc 2015) – Biologist, New York State Department of Natural Resources.

Salina Stilborn (MSc 2011) – Product Safety Officer at Health Canada; Deputy Minister's Award of Excellence - Young Professional

Vanessa Swarbrick (PhD in progress, expected 2017) – Limnologist with Alberta Environment

Post-Secondary

Miranda Dunbar (PhD 2010), Associate Professor at Southern Connecticut University

Kerrigan Gilbert (MSc 2006) – Research associate, Danforth Plant Science Center, USA

Tianna Gross (MSc 2008) – Biological and Radiation Consultant; Health, Safety and the Environment, University of Regina

Teddie Rahube (PhD 2013) Postdoctoral Fellow at Agriculture and Agri-Food Canada; currently Assistant Professor, Botswana International University of Science and Technology

Elizabeth Starks (MSc 2012) - Computational Biologist at Genome Sciences Centre, Vancouver BC

Liz Vanderlinde (PhD 2012) Research Facilitator at the University of Regina Research Office

Continuing Education

Patrick Barks (BSc 2010) - MSc (Carleton University), PhD (Lethbridge University), currently PDF (University of Calgary). NSERC-funded at every stage

Matthew Bogard (MSc 2011) – NSERC CGS for PhD at UQAM, currently PDF at University of Washington

Graham Brown (B.Sc. 2006) -- M.Sc. (University of Saskatchewan), PhD (University of Connecticut), PDF (University of Connecticut and University of Regina)

Kristen Gray (BSc 2015) – Research assistant at Univ of Saskatchewan, then MSc program in microbiology at Simon Fraser Univ

Julia Hart (BSc 2012) – MSc in limnology at UQAM; currently environmental engineering student

Erin Hillis (BSc 2013) – Research assistant, now graduate student at Great Lakes Institute for Environmental Research, Univ. of Windsor

Katherine Ludlow (MSc 2015) – Research associate with RQHR for 1.5 years, then Univ of Sask Medical School

Kara Neudorf (PhD 2014) – Post-doctoral fellow at Dalhousie University

Benjamin Perry (MSc 2015) - PhD candidate University of Otago, New Zealand

Avnee Paranjape (BSc 2016) – Graduate program in English at Univ of Toronto

Lucas Robinson (MSc 2015) – PhD student, Pasteur Institute, Paris, France

Sabrina Träger (PhD 2016) – Post-doc at University of Tartu, Estonia.

Derek Wright (BSc 2013) - Master's degree (Justus Liebig University); currently research associate in Genomics at University of Saskatchewan

Jacob Zeigler (BSc 2011) – PhD program in limnology at McGill University

In addition, there are many UofR Biology graduates who have attended “professional programs” in Medicine, Dentistry, Optometry, Veterinary Medicine, Pharmacy and other programs.

6. UNIT BUDGET

A more detailed budget is available in Appendix VII. “FAST” is the financial reporting tool used at the University of Regina.

2015-16 Fiscal Year - From FAST

| | | |
|--|----------------------|----------------------------|
| Carry Forward from 2014-15 | \$1,621.00 | |
| Chillers Re-imburement | \$9,402.91 | (from 2014-15 fiscal year) |
| Academic Salaries | -\$98,026.18 | |
| <i>Benefits</i> | | <i>Not paid by</i> |
| Master's Awards | -\$762.40 | <i>-\$5,833.19 Biology</i> |
| Total Salaries | -\$98,788.58 | |
| Non-Capital Expenditures | -\$37,496.96 | |
| Capital Expenditures | -\$30.00 | |
| Total Spending (2015-16) | -\$136,315.54 | |
| Salaries Budget | \$101,935.00 | |
| Other Expenditures | \$40,000.00 | |
| Total Budget (2015-16) | \$141,935.00 | |
| Net Surplus/Deficit (2015-16) | \$5,619.46 | |
| | | |
| Incl Previous Year | \$16,643.37 | |
| | | |
| Total Revenues (from previous page) | \$16,643.37 | |
| | | |
| Unaccounted for Funds | \$0.00 | |

7. SWOT ANALYSIS (STRENGTHS, WEAKNESSES, OPPORTUNITIES, THREATS)

Strengths

- 1) The people – The tremendous passion on the part of the people who work in the Dept; the drive to make things work better; constantly looking for better ways of doing things; the passion for teaching, research, and outreach. This is exemplified by the constant discussions about curriculum and course and laboratory content, and the recent re-working of the Biology BSc curriculum. However, even in the absence of an official re-working, there is constant tweaking going on as the Dept tries to continually improve the undergraduate programs.
- 2) Hands-on laboratories in many undergraduate courses. As well, the Dept's four laboratory instructors are constantly updating the laboratories, trying out new experiments and exercises, and updating laboratory manuals.
- 3) Extensive writing experience in undergraduate courses.
- 4) Graduate student mentoring; former graduate students have remarked on the remarkable level of mentoring (by supervisors, committee members, and other personnel) that they received in the Biology Dept.
- 5) The very strong level of research output in the Biology Dept, and the ability to attract research funding from various sources.
- 6) Associations with UofR institutes, such as the Institute for Environmental Change and Society (IECS), which has brought both research equipment and PhD-level scientists to the Biology Dept (three members of IECS are adjunct members of the Biology Dept), and the recently established Institute for Microbial Systems and Society (IMSS).
- 7) Associations with several external entities, especially but not limited to, the Royal Saskatchewan Museum and the Saskatchewan Disease Control Laboratory; these have led to numerous research collaborations, employment opportunities for students, addition of adjunct faculty members, and facilitated undergraduate co-op placements.
- 8) Our willingness to partner with other educational institutions in providing the BSc in Environmental Biology and BSc Hons in Environmental Biology programs. We have formal agreements with three other institutions, and also have offered this program in an ad hoc fashion with several other institutions (mainly from Ontario).
- 9) The Biology Co-op program - this program is small but effective; in conjunction with the UofR Co-op Office, we offer high quality work term placements for undergraduate students.
- 10) Areas of Concentration - While this term explicitly relates to the undergraduate BSc and BSc Hons programs, the two Areas of Concentration (Cellular & Molecular Biology, Ecology and Environmental Biology) inform much the teaching and research planning in the Dept. The Areas of Concentration have proven to be very popular among the Dept's undergraduates, although students are not required to choose an Area (they can complete a BSc in Biology without a Concentration). These same Areas inform all of the planning for faculty and lab instructor hires; with a small department it's necessary to remain focussed on managing and maintaining the core areas of strength.
- 11) Collegiality - Overall there is a very good level of collegiality in the Dept, as exemplified by the great deal of cooperation in various aspects of teaching, research collaborations, and the three-times-per-semester departmental "socials". We also have very good relations with Luther

College and First Nations University of Canada. This level of collegiality greatly facilitates the work of the Dept.

- 12) The University of Regina Field Station is used and organized largely via the Biology Dept. This field station, located in the Cypress Hills of southwestern Saskatchewan, is used for both research and teaching. While the Field Station is a strength, it has limited capacity (it is composed of three connected trailers), and vehicular access can sometimes be problematic when water levels in Battle Creek are high (the access road goes through the creek).
- 13) Service and Leadership - The members of the Biology Dept. exhibit a high commitment to service and leadership at the University level and beyond. The Dept members are heavily involved in University collegial governance and various committees and planning groups (chairing many of them), participate in running the University of Regina Faculty Association (in several different roles), and are also very involved in grant selection committees, running scientific societies, and scientific journals. Biology Dept members sit on the executives of several scientific societies, hold journal editorships and associate editorships, and organize conferences, etc. This is a substantial amount of service and leadership work for a small dept. The details of the service work may be found in the CVs of the Dept members (Appendix I).

Weaknesses

- 1) Teaching and research facilities - Some of the facilities related to aspects of teaching and research represent a challenge (e.g. lack of a greenhouse, very outdated animal facility, some outdated teaching equipment). There is a “history” to some of this, especially related to the construction of the Research & Innovation Centre (with the cancellation of the new greenhouse and animal care facility projects that were originally part of the project). On the upside, the UofR recently allocated a budget line item of \$200,000 per year towards purchasing teaching equipment within the Faculty of Science. This has provided for a modest recent upgrade to teaching infrastructure within the Biology Dept, although it is not clear whether this budget line item will survive the anticipated upcoming (and perhaps substantial) cut to provincial funding to the two universities in Saskatchewan. The short period for which there has been a budget line item has led to noticeable improvements in the undergraduate laboratories.
- 2) Graduate student funding – This has been continuous challenge for a few decades. The recent Saskatchewan government graduate scholarship program (Saskatchewan Innovation Scholarships) is welcome, but limited in scope (there are two such scholarships available in Science for 2016-17) and the scholarships are variable in value. The limited scope of the Innovation Scholarships program hinders the ability of Saskatchewan universities to compete for graduate students with universities in provinces with well-established graduate scholarship programs (e.g. Alberta). While the Faculty of Graduate Studies & Research is certainly trying very hard to distribute scholarship and teaching assistantship funds, the total available funding is simply limited. Graduate student funding is one of the major challenges to research activity at the UofR, although the recently-released UofR Research Strategic Plan indicates that improving graduate student funding is a key objective.
- 3) Space – This is a common issue at universities, and the UofR is no different. There is a shortage of lab space (teaching & research) and office/desk space. The teaching labs are operating at capacity, and any increase in enrollments will lead to an undergraduate laboratory crunch. Finding space for new research equipment (e.g. obtained through CFI) is a major

challenge, and there is a shortage of graduate student and post-doc student desks. Part of the graduate student desk problem in the RIC has been alleviated by having Biology graduate students temporarily move into Computer Science space on the third floor (but far away from the Biology research labs); however between the two departments that space been filled as well. The Biology Dept is currently trying to develop a plan to deal with desk space for additional incoming graduate students and post-doctoral fellows; temporary graduate student desk space for the 2017 Spring/Summer semester in a teaching laboratory is a possibility. Desk space for emeritus faculty is also a challenge (no offices, even shared offices, are available), and we currently have a regular faculty member (Daniel Gagnon, who recently stepped down as Dean of Science) who has a research program but no designated research lab (attempts are underway to make arrangements for temporary lab space).

- 4) Nursing-associated courses – The Biology Dept teaches three courses for the Nursing (BScN) program: Human Anatomy and Physiology I and II (BIOL 110, 111) and Microbiology for Health Professionals (BIOL 222). These courses are simultaneously taught in three locations (Regina, Saskatoon, Swift Current), and the logistics issues are substantial. There are ongoing efforts aimed at dealing with these issues, but the fact that two different Faculties (Science, Nursing) and two different institutions (UofR, Saskatchewan Polytechnic), are involved means that the progress is slow.
- 4) Emergency power - The University has been grappling with the issue of emergency (back-up) power for several years now, and the Laboratory Building has mainly done without. For the LB, we hope that the situation will change in the near future with the upcoming upgrades to the electrical and HVAC systems. For both the RIC and the LB, there are some issues with the existing emergency system with respect to proper functioning (i.e. that it activates when it is supposed to activate).
- 5) Security issues - there have been many break-ins and attempted break-ins in the past year, campus-wide. Biology, in the LB, has been hit particularly hard. We are hopeful that installation of some security cameras would help alleviate the situation. The RIC seems to have fewer security issues, as the key-carded doors and elevators are closed to general use on evenings and weekends.

Opportunities

- 1) As mentioned above (point #1 under “Weaknesses”), the recent addition (approximately three years ago) of a \$200,000 budget line item for equipment renewal in the Faculty of Science has led to some noticeable improvements in the departmental teaching capabilities. We hope that this line item will continue, leading to further improvements in the teaching facilities (equipment and laboratories).
- 2) Continue to build on the infrastructure established with the Institute of Environmental Change and Society (IECS), and the new Institute of Microbial Systems and Society (IMSS). These are both Faculty of Science institutes initiated and headed by Biology faculty, with facilities that are available for use to all University researchers, and also to outside researchers. These institutes will facilitate research, and also collaborations within the University and with researchers external to the UofR. This type of institute can serve as a model for other small- to medium-sized universities schools in Canada; IECS was recently showcased to the National Vice-Presidents Academic Council (NATVAC). Furthermore, both institutes align with one or

more of the UofR's Strategic Research Clusters (outlined in 2016-2020 Research Strategic Plan).

3) Indigenization is something that the Biology Dept is working on, and although we are in the early stages of the process we feel that we have made significant progress. The indigenization efforts are detailed below (under "Relation to Strategic Plan"). Via these indigenisation efforts, we hope to:

- Make non-indigenous students more aware of the contributions and worldview of the original inhabitants of Saskatchewan.
- Make the Biology program more attractive to indigenous students. First Nations University of Canada offers both BIOL 100 and BIOL 101 (the two first year Biology majors courses), and we are hoping to see increased numbers of Indigenous students in the UofR Biology program (in 200-level courses and above).

Threats

1) Anecdotally, there are increasing numbers of first year students who struggle with basic background knowledge, study skills, writing skills, and/or English language skills. Part of the issue is associated with the increasing internationalization of the campus (which certainly has clear benefits in terms of producing a more diverse student body, but presents challenges when English language is a struggle, and/or when background preparation is inadequate). Another aspect of the issue is that some domestic students (anecdotally, the ones who enter the Faculty of Science with a high school GPA of < 70%) also struggle with things like study skills. Several initiatives, at the Dept level and above, have been tried, or will be tried, in order to try to address this issue:

- The Faculty of Science has a "Science Qualifying Process" (described in section 16.2.3 of the Undergraduate Calendar; <https://www.uregina.ca/student/registrar/publications/undergraduate-calendar/current.html>). This process places restrictions on students entering Science with a high school GPA between 65 and 70%, in terms of the maximum number of courses that they can take and imposes a requirement for advising. This is a useful process, but the general feeling is that there are nonetheless under-qualified students in first year Science courses.
- In BIOL 100 we have long offered advice about study strategies (advice is given during lecture, and various articles are posted on the course website); some students have indicated that they greatly appreciate this information, as they have never heard it before. There is also advice about topics such as "answering exam questions" and "how to choose a major". We have also aggressively advertised the resources offered by the Student Success Centre (<https://www.uregina.ca/student/ssc/index.html>), but we suspect that uptake is low.
- In BIOL 101 (January 2017 version), we will be using the newly-introduced Early Referral Student Initiative of the UofR's Student Success Centre (whereby struggling students are identified early, and the SSC will invite the student to meet). We have also invited the SSC to provide a seminar about note-taking and studying to the BIOL 101 students (this will occur during lecture time).

- The Faculty of Science for several years offered Supplemental Instruction (“SI”), but recently cancelled it because the participation rates were low, and the general consensus was that students who could most benefit from SI did not attend. The Faculty of Science has put a lot of effort and funds into the SI program, and the senior students who led the Biology sessions were excellent; nonetheless attendance was very low.
- The Biology Dept has a lab report writing guide for undergraduates (<http://urbiolabreports.wikidot.com/>). This guide has been put together by L. Lintott and H. Dietz, and is referenced in many of the Dept’s lab manuals and course websites.

- 2) The rising tuition fees, and overall expenses associated with post-secondary education, mean that many undergraduate students work many hours at outside employment; this causes problems with respect to being to focusing on their studies and in completing their degrees in 4-5 years. In BIOL 100 and 101 we have been trying to mitigate the cost of textbooks by emphasizing that the purchase of a new textbook is not necessary; we encourage them to consider the options of used textbooks, open textbooks (OpenStax Biology) and/or making use of the collection of introductory biology textbooks in the BIOL 100 laboratory (LB 411; accessible Monday to Friday from 11:30 am to 2:00 pm). While the cost-savings associated with not purchasing a new textbook are small relative to the overall cost of a degree, it is one thing that the Dept can do to try to save some money for the students. Rising tuition fees also negatively affect graduate students, and the scholarship environment (limited available funding from the Faculty of Graduate Studies & Research, limited provincial graduate scholarship program) means that supervisors are required to contribute a substantial proportion of the stipends of most graduate students.
- 3) “GPA shopping” among pre-professional students - Biology, and Science in general, has a reputation for being “hard”, and this often leads students to switch Faculties (away from Science and away from being a Biology major). The UofR has a lot of students who are in “pre-professional” programs (especially pre-medicine, but also pre-veterinary medicine, pre-optometry, pre-dentistry, pre-pharmacy, and several others), and many of those students are mainly focussed on GPA to the exclusion of all else. This is apparently a common problem at other institutions as well.
- 4) Student mental health issues - This is an increasing problem at universities across Canada. Although the UofR has been steadily increasing the resources allocated to Counselling Services (which is much appreciated), there are still long wait-times for appointments and also (perhaps ironically) a reluctance on the part of students to access the services. However, information from UofR Counselling Services, and from publications such as University Affairs, suggests that the number of students dealing with stress-related issues keeps increasing (both at the UofR and nationally).
- 5) Uncertainty about replacing personnel who retire or leave - This is typically due to budget pressures at the University level. This has obvious potential negative effects on the ability to plan at the departmental level.
- 6) Dealing with students with academic “accommodations” - There is an ever-increasing number of these students (some large classes have up to 20 students with accommodations), and making arrangements for these students (often with very different accommodations) is taking up an inordinate amount of time. Moreover, it is not always clear that the arrangements are effective

(i.e. the students don't necessarily succeed). The Centre for Student Accessibility, which coordinates the accommodations university-wide, is overwhelmed with work (there are only two people working in the unit) and is overbooked in terms space for tests/exams.

Accommodations become particularly challenging when they are associated with Biology courses that are taught for Nursing, in that two different institutions (UofR, Saskatchewan Polytechnic) are involved and miscommunications occur. The University administration seems to understand that accommodations are a large source of stress and extra work, and is looking at ways to expedite the process; we can describe the accommodations system as a "work in progress" for now, however accommodations continue to pose a significant strain on faculty time and departmental resources.

7) Budget uncertainty – Yet another common issue at Canadian universities, but nonetheless makes long-term planning a major challenge.

8) Workload – The people in the Biology Dept work a lot of hours each week, and it is clear that the heavy workload sometimes takes a toll on personnel. This is especially evident near the ends of the Fall and Winter semesters.

Relation of the SWOT Analysis to the University of Regina Strategic Plan

Two of the major themes in the *2015-2020 UofR Strategic Plan - peyak aski kikawinaw* (Together we are stronger - <https://www.uregina.ca/strategic-plan/>) - are "research impact" and "student success". One of the objectives under student success is to "**Strengthen the quality and impact of teaching and learning for all students**", and one of the objectives under research impact is to "**Strengthen support required for students and researchers to deliver high impact outcomes**". These two objectives in the Strategic Plan are two of the prime objectives for the Biology Dept, and are probably the two most fundamental objectives for any university. Many aspects of the SWOT analysis outlined above can be viewed through those two lenses.

A third lens is the "**commitment to our communities**". The Biology Dept is very good at things such as outreach, and many of the research projects in the Dept are local or regional in scope (especially as addressing environmental concerns). Even some of the local research that is not explicitly environmental has local connections, for example with the Regina Qu'Appelle Health Region (which is scheduled to be amalgamated into a larger region, but the local research links will remain).

Indigenization – The UofR Strategic Plan identifies Indigenization as one of its two overarching themes. The Dept has one faculty member (Fidji Gendron) at First Nations University of Canada, and we maintain contact with respect to the teaching of BIOL 100 and 101. Furthermore, Biology has recently become the administrative home of two First Nations University programs: Indigenous Environmental Science and Environmental Health & Science.

As well, two of the Biology Dept lab instructors (Mel Hart, Heather Dietz), along with Fidji Gendron (Biology Dept member from First Nations University) received a grant from the

Indigenous Advisory Circle for developing Indigenous-related teaching materials. BIOL 101, BIOL 150, BIOL 275, BIOL 302, BIOL 310 and BIOL 378 labs all now contain Indigenous content. This addresses not only one of the goals of the UofR Strategic Plan, but also some of the Truth and Reconciliation Commission's Calls to Action (10-iii and 10-vii, 62-ii, 63-iii, in particular).

The commitment to ecological and environmental biology as one of the core research and teaching areas for the Dept has also facilitated interactions with Saskatchewan First Nations communities. For example, P. Leavitt is currently advising the Pasqua First Nation on designing a sampling regime for the Qu'Appelle River in relation to an oil pipeline, and is in the early stages of developing a partnership with the Federation of Sovereign Indigenous First Nations (FSIN, which represents 72 Saskatchewan First Nations) for NSERC's Canadian Lake Pulse Network. He also served as an expert witness on behalf of the Standing Buffalo Dakota First Nation in a (successful) federal court case that triggered a cumulative impacts assessment of water extraction from the Qu'Appelle R. catchment.

Similarly, C. Somers has been working with Indigenous peoples in various aspects of his fisheries research. His lab has frequently partnered with First Nations and Métis fishermen who have extensive knowledge of the local areas where fish tissue samples are to be collected. Often the locations are remote, such as lakes in central and northern Saskatchewan, or large and difficult to work on, such as Lake Huron. These partnerships have ranged from work for hire, where research funds have paid fishermen to set nets and collect fish, to volunteer activities in which fishermen take students out to collect samples as a contribution to advancing knowledge. For example, for the recent work on the lake whitefish of Lake Huron, a University of Regina Biology graduate student (Rebecca Eberts) joined several aboriginal fishing crews to collect samples for her thesis research.

Also related to fisheries research, the Manzon lab group has benefited significantly from a variety of interactions and collaboration with First Nations commercial fishers. The most extensive interactions have been with members of the Jackfish-Murray Lakes Fisheries Co-Operative, many of whom are from the local First Nations. Members of this co-operative have provided the Manzon group with extensive advice on whitefish populations, lake characteristics and historical catch data. For the past few years, the members of the Manzon lab have worked side-by-side these fishers, gill-netting on frozen lakes. The Manzon group has been taught their methods for gill-netting under the ice, been permitted to collect milt and eggs from all whitefish in spawning condition, and in turn provided the commercial fishers with assistance in harvesting fish. This has been an invaluable relationship that has led to some lasting personal relationships. Finally, Manzon and co-workers have also presented their research findings, and interacted with many First Nations commercial fishers, at the Saskatchewan Commercial Fisheries Limited Annual Conference and Meeting.

Sustainability – The UofR Strategic Plans describes its commitment to sustainability as:
“Commitment to sustainability is critical to ensure institutional and societal longevity and success into the future. At the University of Regina sustainability is deeply rooted in social

justice and is taken to encompass economic, cultural, social, and environmental sustainability". Environmental sustainability is the basis of much of the research in the Dept, from water quality to freshwater fisheries to wastewater treatment, and other areas as well. Environmental sustainability is also a part of many undergraduate courses in the Dept. Sustainability is explicitly addressed in such courses as BIOL 276 (Environmental Biology), BIOL 316 (Conservation Biology), BIOL 356 (Ecosystems since Glaciation), BIOL 456 (Global Biogeochemistry), and to varying degrees in other courses.

The UofR Strategic Plan also uses "sustainability" in a different context, that of institutional sustainability. This is something that the Biology Dept has kept in mind in its planning processes for many years already. I.e. Will new courses or initiatives be sustainable in the long run?

Relationship of the SWOT Analysis to the UofR Strategic Research Plan

The 2016-2020 UofR Strategic Research Plan (<https://www.uregina.ca/research/strategic-research-plan.html>) identifies five Strategic Research Clusters. The Research Plan (pg 6) states that:

Based upon research impact, critical mass of highly qualified personnel, distinctiveness, and commitment to partners in the community and the Province of Saskatchewan for high impact research, the University has identified five thematic areas of research priority

The Biology Dept has a major presence in two of the identified Research Clusters:

Water, environment & clean energy

Integrated human health: Equity, disease & prevention

In terms of the first Research Cluster, environmental and ecological research is one of the Biology Dept's two key areas of research (discussed earlier in relation to Areas of Concentration). Furthermore, a substantial part of this research effort is focussed on the aquatic environment. And while we do not do a lot of energy research per se, we do run research projects that examine the effects of energy extraction, and other industrial processes, and also remediation of environmental stresses caused by energy extraction.

Our relation to the second Research Cluster includes neurobiology and disease-causing microbes. We have research collaborations with the local Regina-Qu'Appelle Health Region and with the Saskatchewan Disease Control Laboratory related to various aspects of human health. Much of this work fits under the other Area of Concentration – Cellular and Molecular Biology.

Lastly, both of the institutes headed by Biology faculty members (IECS, IMSS) fit within the two Research Clusters identified above. IECS, while primarily focussed on the health and functioning of the aquatic environment, is also involved in projects that examine regulation of

cyanobacterial toxin production in local water bodies. Many IMSS projects will span both of the Research Clusters, from examination of hospital-acquired infections to microbial contamination of waters and the spread of bacterial antibiotic resistance via wastewater treatment plants.