BIO-BUZZ

University of Lethbridge—Department of Biological Sciences

October 2013 VOL. 2 ISSUE **1**

Greetings!

It is my pleasure to welcome all our new and returning undergraduate and graduate students! We are delighted you have joined the Department of Biological Sciences!

Our graduate student enrolment continues to lead all other departments in the Faculty of Arts and Science. We currently have 38 MSc and 22 PhD students tackling a wide array of research projects. Our new students and their projects can be found in this newsletter. To all of our graduate students, we hope you have many positive experiences on campus, and that you'll make some lasting friendships and collaborations. You are invaluable contributors to our research programs and the delivery of undergraduate programs. We look forward to getting to know you!

To our undergraduate majors – you are over 315 strong! I encourage you to meet your professors. We would be happy to assist you with any aspect of your undergraduate programs as well as talk to you about our research and research opportunities for you. Many of our undergraduate majors routinely participate in faculty research programs and find these experiences very rewarding. Independent Study and Undergraduate Thesis courses will afford you the opportunity to perform your very own research project as well as to really get to know some of your professors! These individuals can write strong letters of reference for you when it comes time to apply for jobs, professional schools or a program in graduate studies.

I encourage all of our students to participate in Departmental events including seminars and research symposia. This can greatly add to your University experience. Also, we have a Biology Club on campus – it's a great place to learn leadership skills, and to connect with like-minded individuals. Check out the newsletter and our Departmental website (http://www.uleth.ca/artsci/biological-sciences) for upcoming events. We wish you a very successful program of study!

To our Alumni – we are grateful for your input and response to our newsletter. To you, and other interested individuals, we want to keep you informed of upcoming departmental news and events. Once again, we encourage you to stay connected with us - send us your stories, and we'll be glad to include and/or feature them.

Best wishes,

Brent Selinger

A. Hurly 2005

Upcoming Events:

Dr. Bryan Brooks, professor of environmental science and biomedical studies at Baylor University's College of Arts & Science (Waco, Texas), and a recently appointed Fulbright Canada Visiting Research Chair, will be begin a research term in January 2014 with colleagues at the University of Lethbridge's Alberta Water and Environmental Science Building (AWESB). He will begin work on projects of common importance to communities on both sides of the Canada-US border. Stay tuned for opportunities in the coming months to hear him speak about his research.

Nothing can be more incorrect than the assumption one sometimes meets with, that physics has one method, chemistry another, and biology a third.
Thomas Huxley

FUNCTIONAL FLOW

(photo—Dr. Stewart Rood and Students) - Article and photos excerpted from UL News—September 19, 2013

The University of Lethbridge's Water Institute for Sustainable Environments (WISE) is in the midst of a critical study of the province's water sources as they come under increased demand from growing human populations and industrial expansion. The project, titled Functional Flows, is made possible by a $250,000 gift from ConocoPhillips Canada.

Alberta rivers deliver mountain snow-melt and rainfall to the drier regions of the prairie and parkland zones, where most Albertans live and work. Water is trapped by dams and reservoirs and diverted offstream for agricultural irrigation, municipal and domestic use, and industrial purposes, including oil and gas production. As the human population grows and industrial expansion continues, the demand for Alberta's surface water will progressively increase.

This raises fundamental questions: how much water must be left in our rivers to ensure healthy environments; and how can we manage our limited water resources to provide economic prosperity without sacrificing healthy natural environments?

"It is critical for the environmental health of our aquatic ecosystems that we understand the ecological impacts from river damming and water diversions. Further, we need to create and implementation strategies for environmental flow regimes that will ensure that our rivers continue to sustain high water quality, as well as the fish and floodplain forests that we value," says principal researcher Dr. Stewart Rood of the Department of Biological Sciences.

ConocoPhillips Canada, a Calgary-based international integrated energy company, has been a strong supporter of the U of L for more than 15 years through extensive participation in the co-operative education program as an employer, and most recently through the establishment of the ConocoPhillips Canada Co-operative Education Award.

The research projects bring together biologists, geographers and other natural and social scientists affiliated with WISE, working in collaboration with other academic and government researchers. The collaborations also engage regional agencies such as Alberta Environment, the Alberta Conservation Association and the public Watershed Planning and Advisory Councils.

WISE was formally established in 2011, bringing together faculty from across the U of L with interests in water research. This collaborative, multidisciplinary approach continues to advance the University as a national centre for water research and training.

For more information, connect to http://www.uleth.ca/unews/article/functional-flows

Chief Mountain A. Hurly

NEW ACADEMIC ASSISTANT

Randy Barley

In 1989 I began my academic journey at a small, little-known, liberal arts university (Bishops) which was beautifully nestled in the heart of the Eastern Townships of Quebec. At Bishops University I was first introduced to the incredible value that smaller teaching-focused universities could offer . Although the range of research opportunities can be a bit limiting at smaller institutions, I was able to select a project supervisor at the CHUS (Centre Hospitalier Universitaire de Sherbrooke) who was studying DNA repair and its role in cancer. I completed my honours degree, after which I continued my honours research at the graduate level at the Cross Cancer Institute in Edmonton, where in 1993 I earned my MSc in Genetics. Armed with a graduate degree and a range of TA experience, I desperately wanted to address a growing question within me: Could I enjoy teaching as much as research? After completing a sessional lecturer position at Thompson Rivers University in BC in 2001, I finally had the answer… and it was a resounding YES! I wasted no time in dedicating myself to this exciting new craft, where I enrolled in an Education degree which I completed in under 12 months. That turned out to be a rather eventful year for me, because in addition to witnessing the demolition of the twin towers, my wife also gave birth to our twin girls… and they both turned out to be profoundly life changing events. Unwilling to give up on the dream of obtaining my PhD, I left a research position at the U of A and a teaching position at MacEwan to embark upon a Ph.D. in Experimental Surgery. Desperate to pay off a mountain of debt incurred as a grad student with a growing family, I accepted a position with Alberta Health Care Services in their Molecular Diagnostics Lab where I earned my molecular Laboratory technologist (MLT) accreditation while performing genetic testing. Following this I was hired for a one-year term position in 2011 as an assistant professor with the University of PEI. In 2012 with family in tow, I jumped across the Northumberland Strait to accept a one year teaching contract at St. Francis Xavier University. With limited prospects in the Maritimes I took my dream job at the U of L. I now look forward to resuming all of my hobbies that have been on hold for the past 2 years which include: drumming, squash, skiing, automotive restoration, wood working, wine making and aquarium keeping.

If all mankind were to disappear, the world would regenerate back to the rich state of equilibrium that existed ten thousand years ago. If insects were to vanish, the environment would collapse into chaos.
E. O. Wilson

DR. JOHN BAIN RETIRES

Our Illustrious Leader, Brent Selinger, and John Bain, September 2013—Faculty & Staff BBQ—Presentation to John from his colleagues.

The Department of Biological Sciences, and Dr. Bain's many friends and colleagues wish John a long and happy retirement. John joined the Department in July 1989. The hiring process was an interesting one as Dr. Paul Lewis had to track John down when he was in Salt Lake City visiting Larry Flanagan. Larry was doing a postdoc at the time in Salt Lake City and John, an avid downhill skier, travelled there for a visit and skiing with Larry. Paul managed to get in touch with John by calling Larry's house at 7 in the morning. After their chat John agreed to visit the U of L on the way back home. Times were much different then and John arranged to have his slide collection couriered to him so he could prepare his research presentation.

During his 30 years as a professor John supervised numerous independent and applied studies for undergraduate students and trained many undergraduate and graduate students in his laboratory.

John is the curator of the U of L Herbarium, which is a unique collection of more than 20,000 preserved plant specimens from Waterton Lakes National Park and other environs from southern Alberta. He recently established the Herbarium Digital Collection through collaboration with the U of L library.

John is really into gadgets and this interest has bled through into his teaching. John led the way with incorporating the latest technologies into his teaching right up to his very last class He is the teaching technology guru in the department and we credit him for pioneering the use of Clickers, Mastering Biology and webpages. He was a major supporter of developing web pages in the early days.

John has been a stellar member of our department and greatly valued friend and colleague for 24 years. We wish you prosperity, happiness and good health during your well earned retirement. You have made a lasting positive impact on both students and colleagues.

A. Hurly 2008

AWARDS— ALBERTA CONSERVATION ASSOCIATION GRANTS IN BIODIVERSITY

The ACA Grants in Biodiversity program is pleased to announce that the following Biological Sciences graduate students are amongst this year's grant winners:

Rachael Adams (supervisor T. Burg) – "Landscape genetics of the black-capped chickadee (*Poecile atricapillus*) among Southern Alberta's riparian areas"

Patrick Barks (supervisor R. Laird) – "Genetic diversity in rates of senescence in the aquatic plant *Lemna minor*"

Stephanie Crowshoe (supervisor C. Goater) – "Epidemiology of an emerging virus in tiger salamanders in southern Alberta"

Vincent Hervet (supervisor R. Laird) – "Biodiversity and life history of natural enemies of prairie *Noctuidae*"

These projects exemplify the Grant program's goal to enable research that will ultimately conserve, protect, and enhance Alberta's fish, wildlife and natural habitats. With this year's awards, the ACA Grants in Biodiversity has now awarded over $4 million dollars to 402 researchers in its 19 year history. Congratulations Rachael, Patrick, Stephanie, and Vincent!

MSc. & PhD Graduates since February

M.Sc.

Allison Becker, M.Sc. Environmental Sciences, Co-Supervisors:T.A. Hurly & J. Rasmussen, *Aquatic Insects as an Energetic Subsidy in the Oldman River Basin, Alberta*

Caitlin Good, M.Sc. Biological Sciences, Supervisor: J. Rasmussen, *Variability of Fish Production: Nutrients as Chemical Drivers Across a Diverse Geographic Range*

Kathryn Kuchapski, M.Sc. Biological Sciences, Supervisor: J. Rasmussen, *Effects of Selenium and Other Surface Coal Mine Influences on Fish and Invertebrates in Canadian Rockies Streams*

Brittany Lanser, M.Sc. Biological Sciences, Supervisor: R. Golsteyn, Characterization of Checkpoint Adaptation in Human Fibroblastic Glioma Cells and an Analysis of Protein Phosphatase Inhibitors

Preston Lennox, M.Sc. Biological Sciences, Supervisor: J. Rasmussen, Examining the Impacts of Stream *Channelization on Salmonid and Aquatic Invertebrate Communities of a Fifth Order Montane River*

Nicole Pilgrim, M.Sc. Biological Sciences, Supervisor: A. Hontela, *A Multigeneration Study of the Effects of Selenium in Rainbow Trout, Brook Trout and Cutthroat Trout*

Paul Walz, M.Sc. Biological Sciences, Co-Supervisors: I. and O. Kovalchuk, *Influence of Pathogenic Bacterial Determinants on Genome Stability of Exposed Intestinal Cells and of Distal Liver and Spleen Cells*

Stephanie Wickersham, M.Sc. Biological Sciences, Co-Supervisors: I. and O. Kovalchuk
The DOWN-Regulation of Ku70, DNA-PKCS, and PARP-1 in Mammalian Cell Lines

Ph.D.

John Hindley, Ph.D. Evolution and Behaviour, Evolutionary, Supervisor: T. Burg, *Post-Pleistocene Dispersal in Black-Capped (Poecile Atricapillus) and Mountain (P. Gambeli) Chickadees, and the Effect of Social Dominance on Black-Cappled Chickadee Winter Resource Allocation.*

Chad Laing, Ph.D., Biomolecular Science, Bioinformatics, Co-Supervisors: V. Gannon & J. Thomas, *The Evolution of the Pan-Genome of Shiga-Toxin (Stx) Producing Escherichia coli and the Stx2 Bacteriophage*

Carolyn Penniket, Ph.D. Biomolecular Science, Molecular Genetics, Co-Supervisors: A. Laroche & B. Selinger, *Tissue-Specific Gene Expression and Promoter Characterization in Triticale*

Willeid Warnock, Ph.D., Biosystems and Biodiversity, Ecology, Supervisor: J. Rasmussen
Examining Brook Trout Invasion Into Bull Trout Streams of the Canadian Rockies

Pan Wang, Ph.D. Biomolecular Science, Co-Supervisors: T. McAllister & B. Selinger, Transcriptomic and Metatranscriptomic Approaches to Characterizing Genes Coding for Fiber Digestion Within the Rumen Ecosystem

CANADA WIDE SCIENCE FAIR

Excerpted from the University of Lethbridge U News May 10,/12013 and a Report by Dr. Roy Golsteyn, Chief Judge for the 2013 Canada Wide Science Fair

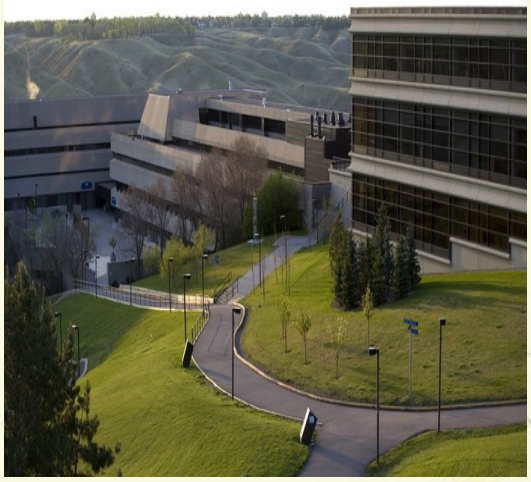
The University of Lethbridge welcomed the country's top young scientists to campus, from May 11 to May 18, when the 52nd annual Canada-Wide Science Fair (CWSF) 2013 came to Lethbridge.

The science and engineering community rose to the challenge and by April 2013, judges representing nearly all Alberta communities and scientific organizations between Edmonton to Cardston, and Medicine Hat to Crowsnest Pass had signed on. The University of Lethbridge was a major source of judges (70), with much help from colleagues from the Lethbridge Research Centre, Lethbridge College, Canadian Food Inspection Agency, and Mount Royal University. The highlight of the recruitment call was Judging day on 14 May 2013, when 481 of Canada's brightest school age children were interviewed and encouraged by 330 of Alberta's top scientists and engineers. Canada Wide Science Fair National Committee ranked the Lethbridge Fair amongst the best of fairs based upon Judge-Student interaction, and hosting of the students.

More than 1,100 students, chaperones, judges, sponsors and dignitaries attended CWSF 2013, an event that awarded close to $1 million in cash, prizes and scholarships to the winners. For one week, the University of Lethbridge was the focus point for over 400 schools and families in all parts of Canada.

There were public viewing days, school visits, as well as innovative, hands-on activities designed for the science fair participants that were created and organized by undergraduate, graduate students and faculty members at the U of L, Lethbridge College and other partner groups throughout the city and region.

The Lethbridge Host Committee, which includes members from the UoL, has been nominated for an ASTech Foundation 2013 award.



University of Lethbridge Campus—2013 CWSF Location

In an age of molecular genomics, it is ever more apparent that the fingerprints of evolution are pressed deeply into human DNA, just as they are into the genomes of every other organism. Biologists understand this, and so do students who study the science of life.
Kenneth R. Miller

NEW MSc STUDENTS

Stephen Foster
Start Date: May 2013

Project Title:
Evaluating the effects of the functional flow regimes on the riparian vegetation along the Waterton River, Alberta

Cathy Metzler
Start Date: Sept. 2013

Project Title:
The Effects of the Libby Dam on River Flows and Riparian Zones Along the Kootenai River

Natalia Hein
Start Date: May 2013

Project Title:
The development of a highly sensitive and specific copro-antigen detection tool for *Dicrocoelium dendriticum* in livestock

Ryan Moedt
Start Date: Sept. 2013

Project Title:
Vesicle Transport: The Role of UNHINGED/VPS51 in GARP complex in *Arabidopsis thaliana*

Greg Holmes
Start Date: Sept. 2013

Project Title:
The impact of the leaf galling wasp *Aulacidea pilosellae* and the rust fungus *Puccinia hieracii* on the invasive hawkweed *Pilosella caespitosa*, and their potential for use as biological control agents

Trina Orchard
Start Date: Sept.2013
Project Title:
Water requirements of the Helen Schuler Nature Reserve cottonwood riparian system determined through flux measurements and isotope analysis, with empirical modelling for use in remote investigations

David McWatters
Start Date: Sept 2013

Project Title:
Characterization and in vitro reconstitution of protist snoRNP complexes

Jordan Pepper
Start Date: Sept.2013

Project Title:
Efficiency of Cell Penetrating Peptide Mediated Gene Delivery to Nuclei, Mitochondria and Chloroplasts in Cereal Crop Tissue Culture

MSc & PhD Students (cont)

Laurens Philipsen
Start Date: May 2013

Project Title:
Red Deer River Regulation and Environmental Management

Dustin Smith
Start Date: May 2013

Project Title:
Characterization and substrate specificity divergence of inositol polyphosphatases

Diane Wilches Correal
Start Date: Sept. 2013

Project Title:
Effects of Extreme Temperatures on the Quarantine Stored Product Pest, *Trogoderma granarium* (Khapra Beetle) and on its Symbiotic Bacteria

Vincent Hervet
PhD Student
Start Date: Sept. 2013

Graduate Project:
Biodiversity and life history of hymenopteran parasitoids of prairie *Noctuidae*

STUDENT REPRESENTATIVES - UNDERGRADUATE & GRADUATE

Jessica Baedke,
Undergrad Student Rep.

Ashley Moore
Graduate Student Rep.

BIOLOGY CLUB PRESIDENT?

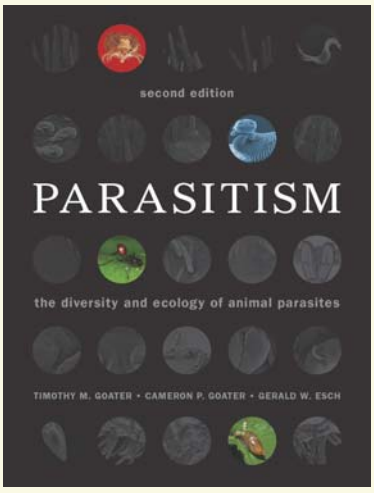
We are looking for a highly motivated individual who is interested in providing a leadership role for our Biology Club. If you are interested, please contact Katrina Mendez, Advisor to the Biology Club at katrina.mendez@uleth.ca
We look forward to hearing from you.

"And you are made of a hundred trillion cells. We are, each of us, a multitude."
— Carl Sagan, *Cosmos*

BIOLOGY DEPARTMENT FACULTY & STAFF WELCOME BACK BBQ—FALL 2013

"Look how we've grown!"

PUBLICATION



Congratulations to **Dr. Cameron Goater**, whose textbook "Parasitism" will be published in December 2013.

Cam, his brother Tim, and Dr. Larry Estes have recently completed the 2nd edition of the text: 'Parasitism: The diversity and ecology of animal parasites'. The first edition of the text was used in senior undergraduate courses around the world. The new edition has been completely revised to incorporate the enormous advances that have occurred in the field over the past decade.

Attention Alumni:

Participate in our First Online Contest:
We will draw from the alumni who correctly guess the subject of the picture shown below. So dust off your rusty recognition skills, and send an email to:
sheila.matson@uleth.ca
The winner will receive a Starbucks card, and an opportunity to be featured in our Spring 2014 publication.

A. Hurly 2008

What am I?