WESTERN UNIVERSITY BIOLOGY

ALUMNI NEWSLETTER

SUMMER 2023

2023 Adirondacks Field School Campfire
Photo credit: Mitchell Zimmer

Western Science

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CHAIR'S REPORT

A MESSAGE FROM DAVID COLTMAN

Welcome to the Summer 2023 Biology Alumni Newsletter!

July 2023 was the hottest month on record, and for the first time I know of, Southern Ontario and London endured the neo-apocalyptic experience of extended periods of wildfire smoke and haze blowing in from fires raging in the Canadian boreal forest. These and other events make it abundantly clear we are living in interesting times, as global climate change increasingly presents profound challenges, even an existential threat, to life on Earth. As environments change, living things are faced with the biological options to move, adapt, or go extinct. The Anthropocene is scary - can Western Biology make a difference?

This month's newsletter features several of our colleagues who work at the interface of environmental stress and biological responses. Our new professor Dr. Tom DeFalco, highlighted on page 4, studies the adaptive responses of plants to environmental stress at the molecular level. The newly minted Centre for Animals on the Move, featured on pages 5-6, has a core mission to understand the impacts of environmental changes on animal movements and the conservation of migratory species on an international scale. We also feature Professors Keith Hobson and Jeremy McNeil's ground-breaking work on monarch butterfly migration, which is providing key insights into the conservation of this now endangered species.

Western Biology has a long history of training highly qualified personnel that rise to the environmental challenges our changing world presents. Western alumnus Matt Kennedy (MSc '94) studies' in ecology and evolution at Western helped pave the way to his current leadership position in a renewable energy company, where he manages the environmental responsibilities and compliance for their renewable energy facilities. Matt's accomplishments and his philanthropy show that Western alumni can, and do, make a difference.

Part of the core mission of Western Biology, and biology departments everywhere, is to make the world a better place through teaching, learning, and discovering things about the living world. Which reminds me that September will herald the timely arrival of our newest faculty recruit to Western Biology, Dr. Robert Buchkowski, who specializes in climate change biology. Welcome Robert!

I hope that some of the highlights in this newsletter provide us with some optimism, inspiration, and courage, as we go forward together to face the interesting times in which we live.

David Coltman
Professor and Chair,
Department of Biology Western University

New Faculty Profile

WESTERN BIOLOGY SPOTLIGHTS DR. THOMAS DEFALCO

By Jorden Mikeala Maglov, PhD Candidate

New to the Western Biology family is Dr. Thomas DeFalco, joining us from the University of Zurich in Switzerland. He was initially drawn to Western Biology for its PhD Candiates, academic reputation as a research-intensive program, and hopes to develop his own cutting-edge research laboratory with the support of the department.

Dr. DeFalco is a plant molecular biologist studying the pathways that allow plants to respond to environmental stimuli. He got his first taste for the field studying as an undergraduate student at Queen's University. It was there that he realized his passion for laboratory work in an academic setting, and his career took off shortly after. Dr. DeFalco's career has taken him all over the world, studying in prestigious labs in both the United Kingdom and Switzerland. He won several fellowships in Switzerland that allowed him to expand the scope of his research and gain experience supervising graduate students.

Currently, the aim of Dr. DeFalco's research is to understand how plants sense and respond to their environment at the molecular level. Plants use proteins called receptor kinases as cell-surface sensors, which allow plants to perceive and react to diverse external signals. Dr. DeFalco is particularly interested in understanding the cell signalling downstream of these receptor kinases, and hopes to uncover how this signalling regulates plant immunity, development, and abiotic stress responses.

Dr. DeFalco's skillset and drive makes him an excellent fit for the Western Biology research program. We are excited to see Dr. DeFalco's career come to its full potential in his new position as Assistant Professor. Welcome to the Western Biology family!

BIOLOGY PROFESSOR THOMAS DEFALCO

Do You Remember?

How many of these faculty from the departments of Zoology/Biology can you name?

Please send your entries to milligan@uwo.ca in the following order:

First row, right to left (6 people)
Second row, right to left (15 people)

The first three (3) correct answers will be awarded a genuine, one-of-a-kind Biology Water Bottle.

Good luck on your walk down memory lane!

Animals on the Move

BIOLOGY HOME BASE FOR WESTERN'S NEWEST CENTRE

By Justin To, MSc Candidate

Given Canada's high latitude and extreme seasonality it has a high diversity of migratory animal species that play important roles in many ecosystems, such that the effects of climate change and human activity on the movements of migratory species are of increasing international interest. The establishment of **Centre for Animals on the Move (CAM)** at Western is an important advance as a number of faculty, recognized as global leaders in animal migration and movement, regularly collaborate with government, non-governmental organizations, and researchers around the world to advance fundamental knowledge and conservation of migratory species.

Western made its first big investment in the study of animal migration with the establishment of the Advanced Facility for Avian Research (AFAR) in 2009. The unique hypobaric wind tunnel has allowed faculty and students to simulate migratory flights with birds, as well as examine the impact of changing atmospheric pressure on bird and insect behaviour. Furthermore, recent advancements in miniaturization of electronics has ushered in a new age of animal tracking capability and Western faculty were instrumental in creating the Motus Wildlife Tracking System. In addition, a core facility dedicated to tracking migrants using naturally occurring stable isotopes in feathers, insect wings, and other tissues has been established.

CENTRE FOR ANIMALS ON THE MOVE GROUP PHOTO, MAY 2023

The CAM was established June 2022 to unify these facilities and foster greater interaction among 20 faculty members and their students. In the past decade the current members of CAM have collectively published over 900 research articles, trained over 300 students and post- doctoral scholars, and obtained over $52 million in research grants. They are excited that the new technologies and analytical tools will enable them to answer questions about animal migration which were not previously possible.

The CAM has four key missions:

1. To promote collaborative research, education, training, and public outreach relating to animal migration and movement, while creating new opportunities for equity, diversity, and inclusion of participants from underrepresented groups;

2. To coordinate large scale research projects involving multiple researchers and organizations;

3. To inform government policy and private sector activity relating to the protection of migratory animals;

4. To build relationships with Indigenous communities in collaboration with the Western Office of Indigenous Initiatives.

These missions are in line with Western's Strategic Plan, *Towards Western at 150*, which aims to establish the university as a global leader in interdisciplinary, sustainability research. CAM will help achieve this through addressing biodiversity challenges and emphasizing sustainability, resilience to environmental changes as key components, with a focus on understanding and conserving migratory species on an international scale.

Migrating Monarchs

By Drs. Jeremy McNeil, Battle Professor of Chemical Ecology, and Keith Hobson, Environment and Climate Change Canada and Western Biology

The eastern population of the North American monarch butterfly, *Danaus plexippus*, is an iconic example of animal migration because of its seasonal movements between Mexico where they aggregate at the high-altitude overwintering sites and the summer breeding grounds in the Canada and the United States. However, based on long-term declines in the overwintering populations it has recently it been placed on the red list for endangered species by International Union for Conservation of Nature (IUCN).

The population decline of the eastern North American monarch population has been associated with several non-exclusive causes, including habitat loss, pesticides, the availability of milkweed species, and climate change, and significant conservation programmes are required if we wish to reverse the trend. There has been considerable emphasis placed on ensuring the availability of milkweed in the summer breeding zones, as milkweed, *Asclepias spp.*, are the only plants larvae utilise as a food source. However, while there is normal year-to-year variability in the size of breeding populations from 1993-2013, there is no evidence of a continuous decline paralleling that observed at the overwintering sites. This suggests that the density of milkweed plants in the breeding zones is not necessarily the critical factor currently regulating monarch populations but encouraging people to plant native milkweed on their property is a positive step and should be encouraged.

One aspect that has received considerably less attention relates to the six month long non-breeding season, including the period during the fall migration and the time adults spend in reproductive diapause at the overwintering sites. During migration to overwinter sites milkweed is not essential, but adults need access to nectar as it is converted into lipids, the energy source to fuel migratory flight and to provide the reserves required to pass

the winter when adults generally fast. Thus, having a better fundamental understanding of lipid accumulation and use over this period could provide insight into other conservation strategies to conserve this species, namely those aimed at ensuring nectar resources along the fall migration route.

This has been the goal of an ongoing multidisciplinary and multiyear initiative involving the Hobson and McNeil labs, both CAM members, and their collaborators in the United States and Mexico. We have been collecting data on lipid content, body mass, and wing loading, as well using stable isotope profiles from wing samples determining their natal origin at different points along the north-south migratory pathway for three consecutive years (2019-2021). Within a given year there was at least one site where lipid levels were much lower, although not at the same site each year. This could be related to the weather conditions having a direct effect on monarch foraging and/or the effect on nectar availability. In all three years we also noted a significant increase in lipid reserves between Texas and northern Mexico and the overwintering sites. Both findings suggest a conservation strategy: ensuring that there are appropriate nectar sources available at all sites along the migratory pathway.

Biology Alumni Profile

MATT KENNEDY MSC '94

By Hossein Asgari, PhD Candidate

It was my pleasure to interview Matt Kennedy, the VP Environment for Innergex Renewable Energy Inc., and of course, our alumnus with a long family history at Western, who completed his undergraduate as well as Master's degree at Western. In this article you can find out more about his exciting journey, from his studies at Western, to his career after graduation, and even his music band!

London born but growing up in Calgary, Matt was good in biology at high school. After high school, and wanting to return to London, he completed his undergraduate degree in Ecology & Evolution at Western. Matt went on to complete his MSc, where he worked with Dr. Robert Bailey studying freshwater ecosystems. He investigated the use of aquatic larval insect communities as a sentinel for environmental change in streams affected by mineral mining activity in the Yukon territory, travelling to Yukon Territory for two summers to complete the field work portion of his thesis. "It was an amazing experience for a 22-year-old biology student, and in retrospect, a pretty rugged and aggressive approach to getting a Master's degree," Matt explained.

After completing his Master's at Western, it was the mining-linked and applied nature of his graduate studies that helped him pursue his first job. He started his career at consultant Golder Associates Ltd. in Calgary, where he was sent to Northwest Territories to work as a field technician on the aquatic environmental baseline studies for what became the Diavik Diamond Mine in the spring of 1996. The mine site was located ~300 km north of Yellowknife, on the tundra north of the tree-line. As Matt put it, "a real adventure for a southern kid." He stayed with Golden Associates for five years, where he worked on a wide range of projects across sectors: mining, forestry, construction, oil and gas, and linear development (pipelines and power lines). Each of the projects Matt worked on typically had a field component, as well as an office component involving research, data analysis, and writing reports. Furthermore, the work involved collaborating with a diverse group of professionals, including engineers, botanists, wildlife ecologists, geographers, and socio-economic experts. "There is so much to learn from working in a team of diverse people, and I cannot recommend that enough to the students entering the working world," Matt added.

It was an amazing experience for a 22-year-old biology student, and in retrospect, a pretty rugged and aggressive approach to getting a Master's degree.

After working for several other consulting companies, Matt's been working in the renewable energy industry since 2006. He's currently the VP Environment for Innergex Renewable Energy Inc., a leading Montreal-based renewable electricity developer and operator. He leads a team of nine people who manage the environmental responsibilities and compliance for the company's 80+ renewable electricity facilities (hydro, wind, solar, battery) in four countries (Canada, USA, France, and Chile).

When asked what a typical day looks like for him at work, Matt replied, "There's none! Everyday can be different as the projects vary in their location, phase, and energy generation type." Matt continues to oversee work related to biology including environmental baseline studies, construction and operational monitoring, in order to make sure that the predictions made during a project's Environmental Assessment were correct. As a fun side project when not working in renewable energy, Matt spends his time performing in local shows with his band, Headlong Hearts; check them out on Spotify.

Matt is not the only person in his family that has gone to school at Western. Matt's parents, grandparents, aunt, and uncle, all went to Western. His grandfather for instance, graduated with a degree in history back in 1941, when the only building on the campus was the University College building. His grandfather even came back and went to law school at Western when he was 57 years old, before practicing law for 7-8 years after graduation. As a way of giving back to Western, *Matt is funding the Kennedy Award in Environmental Science* at Western.

At the end of the interview, he advised students to work hard and stay curious. "A career is long – 30+ years – and good careers are an adventure. You never know where you will end up. If you are being challenged, learning a lot, and you enjoy the people you are working with, then grow roots, do your best, and make the very most of it." Matt continued, "Having a positive, optimistic, can-do attitude goes a very long way – farther than you might expect."

Where Are They Now?

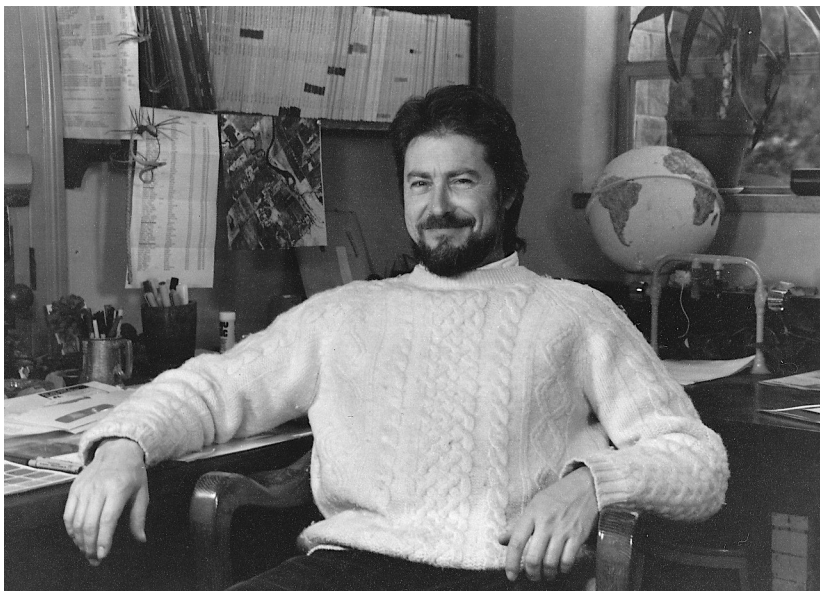
SPOTLIGHT ON RETIRED BIOLOGY PROFESSOR PAUL HANDFORD, FACULTY MEMBER, 1977 – 2010

Memories:

Much of my time at Western, Collip provided for a really tight-knit ecology-evolution group, greatly benefiting the grad students, with lots of fun and fruitful discussion of their research projects, especially in our weekly 'Wednesday-Nighter' sessions— a really valuable institution, which I remember fondly.

I much enjoyed teaching Bio-284, my 'bio-diversity' course. It was great to have the opportunity to design and deploy my individual take on the 'big picture' of life's panoply.

But every year I most looked forward to teaching our Desert Ecology field course, along with Jane Bowles.



What am I up to these days?

Post-retirement (2010), we moved to BC, and over our decade there I became an avid field botanist. Then we moved to Ireland where I continue with my plant obsession and getting annoyed at global politics.

Courses Taught:

- Biology 201, Population Biology
- Biology 284a, Patterns in Life's Diversity
- Biology 346b, Wildlife Biology
- Biology 320y, Desert Ecology Field Course
- Biology 366b/Zoology 446, Evolutionary Genetics
- Biology 4441a/Zoology 441a, Topics in Evolutionary Biology
- Biology 4243g, Political Biology
- Biology 4999e/Zoology 450a, 451b, Honours Thesis

Photo credit: Mitchell Zimmer

Make a Difference

ALUMNI, YOU CAN SUPPORT THE GREAT WORK HAPPENING IN BIOLOGY

As you have read in this newsletter, the Department of Biology is carrying out impactful research and providing an enriched learning environment for our students.

As an alumnus of the department, there are many ways you too can make a difference by supporting one of the funding initiatives that enable us to continue the important work we do in the Department.

One such initiative that continues to be a priority is the field course program. Field courses continue to be a memorable and impactful part of the biology education.

The **John S. Millar Field Course Award in Biology** is one such initiative which prepares biology students for future careers in areas such as conservation, research, ecology, and botany. Learning in the field is critical to student success, and donor generosity makes it possible. Your gift helps students apply knowledge gained in the classroom and gain skills employers value in their new hires. To donate to this fund, visit our donation website.

Homecoming 2023 events

Homecoming is Western's longest running alumni tradition, and we are thrilled to welcome you and your family back to campus for an unforgettable weekend.

This year's Homecoming will feature a variety of exciting events and activities that will make you proud to be part of the Western community. The Faculty of Science is hosting the following events:

- The Western Science Homecoming BBQ
  Details and registration
- Science Talks Homecoming Lecture
  Details and registration

You are always welcome to reach out directly to me to discuss the nature of your personal engagement with the Department of Biology or if you have any questions.

Warm regards,

Paula L. Luchak
Director of Alumni Relations & Development, Western Science
Paula.Luchak@uwo.ca

STUDENTS IN THE 2023 ADIRONDACKS FIELD SCHOOL

SAVE THE DATE

WESTERN SCIENCE HOMECOMING BBQ
Saturday, September 23 at 11 a.m.

uwo.ca/biology @WesternuBiology @WesternuScience @WesternuScience