

THE PETRI DISH

Trent Biology Department



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Stay Connected

Biology Department
DNA Building, 1st floor

705-748-1011 x 7424
biology@trentu.ca

X: @Trentbiology
Instagram: @trentbiology

Message from the Chair - Neil Emery

Welcome to the first "Petri Dish". I can't recall if we had a Departmental newsletter before, but I know we have been talking about needing one for a long time! I want to thank everyone involved in putting it together, they are the behind-the-scenes local heroes. Now we finally have a place to update our department and its wider audience: Bio-Alumni, community members, staff, faculty, undergraduates, graduate students, postdoctoral associates, and anyone else lucky enough to be on our list.

You can look forward to hearing about the wonderful teaching and research that one of the biggest and best performing Departments at Trent has to offer. As this is December, we are kicking it off in Holiday Brag Letter style – and we have lots to brag about. You can check out our USRA researchers (so many, so cool), impactful alumni (hey Jake), high flying graduate students (go Emma & Dan), new courses (dark side adventure), new faculty (welcome Cayleih), and a tapas-like offering of publication highlights.

While I am at it, let's thank the lab-rats who agreed to be written up in the first issue. I'm sure once the rest see this issue, they will want to jump in on future issues with the many bottled-up stories that have awaited the opening of the Petri Dish. We all know what happens when the lid is pulled off in the middle of a teaching lab – some expected and unexpected things start to grow. Either good or gross, as Biologists, we know it will be interesting.



BIOL 3090H Field Trip October 28, 2024



Fungi Fascination: Exploring a Hidden World in the latest Biology Course Offering

By: Susan Chow

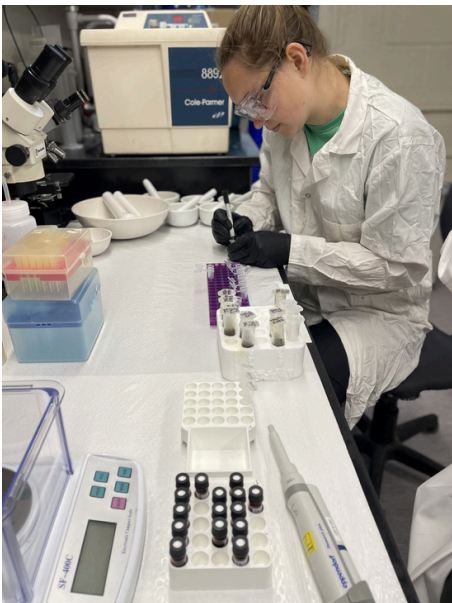
BIOL 3200H: Fungi: Functions, Friends, Foes

Over the years, Biology Departments around the world have seen an erosion of offerings about our 3rd multicellular Kingdom. The Fungi (aka, The Hidden Kingdom, the Dark Kingdom) have not had a Kingdom's worth of attention. But that is changing, as fungi are experiencing a resurgence in pop culture, foraging, ecology, medicine, and agriculture. Biol 3200H is meant to help plug the blind spot that has become so obvious.

We do our best to cover what is an incredibly diverse range of issues: taxonomy, field mycology and evolution; cellular and physiological growth and development; critical roles played as pathogens and symbionts in the environment and agriculture; and applications in foods, drugs and medicine. It's a lot to ask of just 12 weeks of study, but we feel that students get some major takeaways that impact their other studies and make them more knowledgeable and marketable for their job hunts in their life after Trent.



Biology faculty at the Céilie - Otonabeer Lunch



Lexie Northey at her placement at Metaboly Research Group Inc.



Hannah Smith collecting a trans-Atlantic parcel to work on her USRA summer project in the Tobin Lab.

Spotlight on Department Publications



Anna Lane

Anna was an NSERC-USRA during summer 2024. Above, she is holding nestling tree swallows as part of her research on the effects of artificial light at night on nestling immunity. This contributed to a paper on light attraction in Atlantic Puffin fledglings that was led by EnLS graduate student Taylor Brown, and includes former BSc (Hons) student Kaitlyn Baker as a co-author.

Brown, T. M., Wilhelm, S. I., Slepko, A. D., et al. (2024). Navigating the night: effects of artificial light on the behaviour of Atlantic Puffin fledglings. Animal Behaviour 218: 135-148.

Neil Emery

Neil's team investigated the impact of glyphosate and glyphosate-based herbicides (GBH) on 18 strains of *Methylobacterium*, a beneficial bacteria in the plant phyllosphere known to aid plant growth and stress tolerance. The research found that most *Methylobacterium* strains showed sensitivity to the commercial GBH formulations WeatherMax® and Transorb® in a modified Kirby Bauer test.

Palberg, D., Kaszecki, E., Dhanjal, C. et al. 2024. Impact of glyphosate and glyphosate-based herbicides on phyllospheric *Methylobacterium*. BMC Plant Biol 24: 119



Jim Schaefer

During my recent research trip to the Arctic, the need for change became evident as we adapted our approach to new safety concerns, such as the presence of grizzly bears on Victoria Island. Armed with rifles, bear spray, and enhanced vigilance, we camped near Wellington Bay, Nunavut, surrounded by electric fences to ensure our safety. Our goal was to assess how tundra plants had changed over the past 30 years due to climate change.

While the trip reaffirmed the importance of long-term planning and perseverance in scientific research, it also highlighted the necessity of adapting to evolving circumstances in both safety and methodology.

Schaefer, J. "The Canadian Arctic shows how understanding the effects of climate change requires long-term vision." The Conversation, Oct. 22, 2024.



BIOL 3090 Looking for marked caddisflies on a field trip.

Other recent publications:

Fleming, K.J., Schaefer, J.A., Abraham, K. F., Brook, R., Brown, G.S., Beresford, D.V. 2024. Ground beetles (Coleoptera: Carabidae) of Akimiski Island, Nunavut. *The Canadian Entomologist* 156 e26: 1-15, doi.org/10.4039/tce.2024.26

*Koprach, S., Cripps, S., Simms, A.J., Tsui, N., Edwards, S.A., Tobin, S.W. 2024. Monitoring cardiovascular disease in Métis citizens across Ontario, 2012-2020. CJC Open 6:857-867.

* = undergrad trainee



Wanting a summer job that gives you research experience? Learn about Undergraduate Student Research Awards (USRA):

The Undergraduate Student Research Awards (USRAs) allow students to gain valuable research work experience that complements their studies in an academic setting by providing financial support available through Trent University. Through the support of the USRA program, students are able to develop the potential for a research career in the sciences while it also encourages students to undertake graduate studies and foster the pursuit of a research career in these fields. Students must find a faculty member who will supervise the research project they will be working on during the tenure of the award. Refer to the [Biology Faculty](#) page for potential supervisors.

Students and Faculty are encouraged to consult the [NSERC USRA Guidelines](#) before completing an application.

Deadline: February 17, 2025 (Trent University)

Duration: 14 - 16 consecutive weeks, from May 1st, 2025

Award Value: \$6000 from NSERC plus host institution/supervisor contribution (see below)

- The minimum pay for the tenure of the award of 14 weeks is \$9,368.42 (\$6,000 awarded from NSERC + \$3,368.42 supervisor's contribution)
- The minimum pay for the tenure of the award of 15 weeks is \$10,037.59 (\$6,000 awarded from NSERC + \$4,037.59 supervisor's contribution)
- The minimum pay for the tenure of the award of 16 weeks is \$10,706.76 (\$6,000 awarded from NSERC + \$4,706.76 supervisor's contribution)

Special Considerations:

- Indigenous heritage students (NSERC only): All applications from students of Indigenous heritage that otherwise meet all the eligibility criteria will be submitted to NSERC for funding.
- Black heritage students: All applications from students of Black heritage that otherwise meet the eligibility criteria will be submitted to NSERC for funding. CIHR and SSHRC USRAs: Trent University plans to host 1 CIHR USRA and 1 SSHRC USRA recipient at our campuses. This unique pilot competition will run concurrently with the NSERC USRA competition and use the existing NSERC USRA portal.

Basic Eligibility (more details can be found online) :

- Be a Canadian citizen, a permanent resident of Canada or a Protected Person under subsection 95(2) of the Immigration and Refugee Protection Act (Canada), as of the internal deadline date for applications.
- Be registered in a non-professional bachelor's degree program as of the internal deadline date for applications.
- Have a minimum cumulative average of 70% (B - range)
- Have a supervisor who is willing to co-apply for the award and has the resources to pay the supervisor portion of the award in accordance with the NSERC guidelines above.

Research in Focus: Honours Thesis Topics

Biology Undergraduate Honour theses 2024/25

Dr. Thomas Hossie, Coordinator

This year I have the pleasure of coordinating the 2024/25 offering of the biology undergraduate thesis course. We have an excellent cohort of new and talented undergraduate students completing independent research projects and they are working on a wide variety of exciting topics. As we enter the midpoint of the fall semester, these students have been delivering oral presentations of their project proposals and are now putting the finishing touches on their written proposals. As such, this is a great time to showcase the work being done by these emerging scientists. The following is an alphabetical list of the students, their working project titles, and the supervisory team that they are working with.

Aaron Young: Brown adipose tissue regulation in cold exposed environments. *Supervisory team:* Cayleih Robertson, Stephanie Tobin

Anna Fox: Evaluating psychosocial impact on athletes: A Cross-Sectional Pilot Study Comparing the Mental Health of Athletes at Canadian versus American Post-Secondary Schools. *Supervisory team:* Sarah West, Holly Bates

Anna Lane: Impact of exposure to artificial light on the immune response of tree swallow (*Tachycineta bicolor*) nestlings. *Supervisory team:* Gary Burness, Jeff Bowman

Anne Warigia Kitheka: Optimization of sample collection and DNA extraction for genotyping-by-sequencing of the succulent plant *Lithops* spp. *Supervisory team:* Tucker Cambridge, Dennis L. Murray, Neil Emery

Breanna Driezen: Investigation of the protein-protein interaction between the Frog Virus 3 75L ORF and LITAF. *Supervisory team:* Craig Brunetti, Stephanie Tobin

Britt Petersen: Shining a light on the shadows: Examining the cascading effects of native gardens on nocturnal pollinators and their predators. *Supervisory team:* Sarah Jamieson, Cayleih Robertson

Courtney Arnestad: Effects of caloric restriction and anti-aging drugs on telomere length of *Daphnia pulex*. *Supervisory team:* Paul Frost, Stephanie Tobin

Eric St-Hilaire: Impact of cold shocks during different developmental stages on the morphology of painted lady butterflies. *Supervisory team:* Gary Burness, Sarah Jamieson

Hannah Kavanagh: Adiposity in cardiac cachexia. *Supervisory team:* Stephanie Tobin, Holly Bates

Hannah Smith: The role of TRIT1 in skeletal muscle.

Supervisory team: Stephanie Tobin, Rob Huber

Jackson Paul: Validation of eDNA as a reliable method for wildlife pathogen detection. *Supervisory team:*

Andrew Tanentzap, Kirk Hillsley

Jacob Coates: Pugnose Shiner density patterns across southern Canada in relation to local and broad-scale habitat factors. *Supervisory team:* Andrew Drake, Dave Beresford

Jessica Flis: Killing Highly Pathogenic Avian Influenza from eagle feathers for first nations use. *Supervisory team:* Jay Fitzsimmons, Amy Greer

Jocelyn O'Brien: Characterizing the effects of anti-aging drugs on gene expression in *Daphnia* *Supervisory team:* Paul Frost, Stephanie Tobin

Jonah Bergquist-Best: The effect of plastic dragonfly decoys on deterring horse and deerfly (Tabanidae). *Supervisory team:* David Beresford, Sarah Jamieson

Joseph Batherson: Poppies, pharmaceuticals, and fungi. *Supervisory team:* Neil Emery, Zeynab Azimychetabi

Julia Delaire: The transmission dynamics of equine herpes virus (Ehv-1) infection in a population of thoroughbred racehorses in Ontario, Canada. *Supervisory team:* Amy Greer, Kirk Hillsley

Kait Madden: The effects of physical activity level on ADHD symptom severity in young adults

Katie Lycett: Sex-dependent effects of cardiac cachexia on UCPI expression in white adipose tissue using immunohistochemistry. *Supervisory team:* Holly Bates, Stephanie Tobin

Katie Pearce: Using genetic markers and demographic modeling to test hypotheses in *Arabidopsis lyrata*. *Supervisory team:* Marcel Dorken, Wesley Burr

Lucy van Haaften: The secret nightlife of flying squirrels: Examining the patterns and cause of ultraviolet-induced fluorescence in flying squirrels. *Supervisory team:* Jeff Bowman, Gary Burness

Noah Fiorucci: Sex-dependent effects of monocrotaline-induced cardiac cachexia. *Supervisory team:* Stephanie Tobin, Kirk Hillsley

Noah Peyton: Mechanisms of Epilepsy. *Supervisory team:* Holly Bates, Neil Fournier

Pakin Pongpaiboon: Sex and dose dependent response to monocrotaline (MCT) on cultured C2C12 myoblasts. *Supervisory team:* Kirk Hillsley, Stephanie Tobin

Panashe Foster: Avian influenza. *Supervisory team:* Andrew Tanentzap, Kirk Hillsley

Rachel Wamsteeker: Understanding stroke among Métis citizens of Ontario. *Supervisory team:* Stephanie Tobin, Sarah Edwards

Awards and Achievements

Celebrating Alumnus Jake Brownscombe's National Recognition



Above: Jake with a colleague

Congratulations to alumnus Jake Brownscombe (BSc Biology, 2005-09) on receiving a prestigious national award, the 2025 Stevenson Award, for his groundbreaking research in fisheries science! Jake completed his honours thesis in Professor Marguerite Xenopoulos' lab and later pursued his MSc with Mike Fox before embarking on his PhD journey. This award represents the highest national recognition for early-career researchers (within 10 years of PhD completion) in aquatic and fisheries science. As part of this honor, Jake will deliver the plenary talk at the upcoming Society of Canadian Aquatic Sciences (SCAS) conference in February.

Learn more about the event at scas.ca/CONFERENCE.

We're proud to celebrate Jake's remarkable achievements and contributions to the field!

Emma Kaszecki Receives Major Alumni Award Following International Research Exchange

PhD candidate Emma Kaszecki (BSc '16, Lady Eaton College) has recently returned from a four-month research exchange with Ellis O'Neill's lab at the Biodiscovery Institute, University of Nottingham. This exchange was supported by the EPSRC UK International Collaboration Grant.

Emma's achievements continue to shine as she will be honored with

the Robert W.F. Stephenson Prize for Excellence in Student Governance at the Alumni Awards ceremony on November 21. Learn more about the event here: <https://mycommunity.trentu.ca/alumniawards>.

Congratulations, Emma, on this well-deserved recognition!



Biodiscovery Institute, University of Nottingham

Daniel Palberg Completes International Research Exchange

PhD candidate Daniel Palberg has recently returned from a four-month research exchange with Romina Gazis' lab at the University of Florida's Plant Pathology Tropical Research & Education Centre. This exchange was made possible through funding from the NSERC Michael Smith Foreign Study Supplement.

Congratulations to Daniel on this enriching international research experience!

Meet the Prof: The Biology Department is pleased to welcome Dr. Cayleih Roberston!

What kind of research takes place in the Robertson Lab?

We're a comparative developmental physiology lab. We study how the environment experienced early in development impacts the metabolism of young animals throughout their lifetime and over evolutionary time. Our goal is to understand what tools a young animal has in their toolbox to cope with stressful environmental conditions (whether natural or human-made). Since the environment of young animals is often largely shaped by the physiology and behaviour of their mothers, we also study maternal effects.

Right now, we are researching how small mammals are impacted by temperature stress during three critical periods: pregnancy, nursing and puberty. Much of our research focusses on the regulation of the mammalian heater organ, brown adipose tissue, which is especially important source of heat production during infancy but can also be critical for overwinter survival in adults. We use a range of techniques to integrate across levels of biological organization, from studying whole animal metabolic performance and behaviour to examining cellular and molecular regulatory pathways.

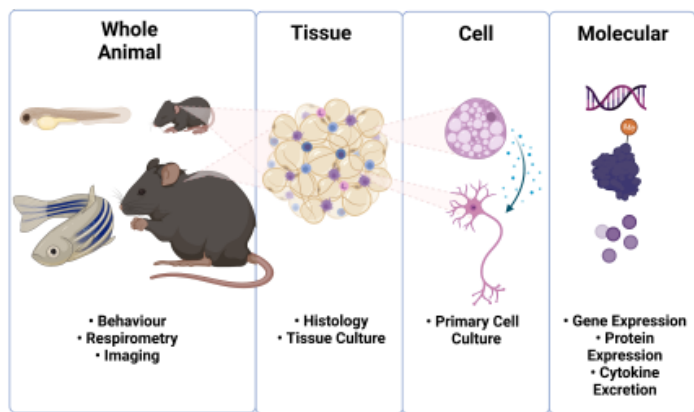
What part of your research excites you the most?

As physiologists we have a long history of ignoring early life stages and female subjects (whether human or animal). This means there is a lot of bias in our fundamental understanding of basic physiology. I'm most excited about doing a small part to fill in those gaps.

We also tend to forget that our most popular pre-clinical models (domesticated house mice) are animals with a unique evolutionary history. We tend to house lab mice at temperatures that are ideal for their human caregivers, but we are sub-optimal for the animals themselves. We've got some very exciting work underway trying to figure out how housing temperatures during development contribute to variation in pre-clinical studies of metabolic disease.

What makes Trent a great place to do research on animal physiology and thermal biology?

Trent is a fabulous place to study animal physiology. I personally love collaborating with and learning from experts in other fields. I find the physiological traits we study are most exciting when we can put them in the context of evolution, ecology or human disease research. Our biology department is really strong in areas of human health-related research as well as ecology/evolution. My research integrates both so I'm really looking forward to working with others in the department. We also have some unique animal care facilities. We're set up to house many different types of animals, whereas most Ontario universities can only house classic lab rodents. Having the OMNR next door is also an invaluable resource.



Research approach



Juvenile mouse Mount Blue Sky

As far as my personal research interests go, we're in an interesting ecological zone for my favourite small mammals, the *Peromyscus* mice. Peterborough happens to be in the contact zone for three different subspecies of this genus which lets us ask some super interesting questions about the effects of genetics vs environment. Right next door in Algonquin Park we also have one of the longest running small mammal monitoring programs in North America. That's over 70 years of ecological data!

What courses are you teaching at Trent?

This year I will be teaching vertebrate biology (BIOL 2110H) and co-teaching cell biology (BIOL 2070H) with Dr. Tobin.

How can a student get involved in your research and what potential experiments might they conduct?

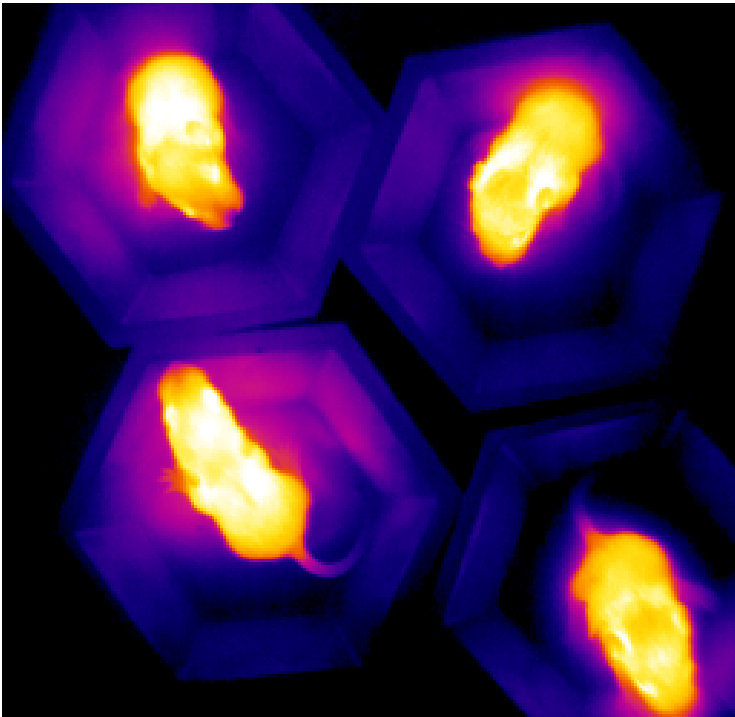
I have students in both 3rd and 4th year doing independent research projects, either for 1 term or the whole year. Their experiments in the lab involve molecular biology techniques and histology. We're gearing up to start whole animal metabolism and cell culture measurements soon!

We are currently studying how temperature stress during early development affects brown adipose tissue metabolism in three groups of rodents:

- Rodents native to central Ontario, facing unpredictable heatwaves and cold snaps
- Mice from the Rocky Mountains, where they have adapted to extreme cold for thousands of years.
- Lab mice used in pre-clinical studies of metabolic diseases like obesity.

What advice would you give to an undergraduate student interested in gaining research experience?

Reach out to faculty members you might be interested in working with early. Don't be shy, we love to chat about science. Talk to your TAs in your lab courses about their own research experience and keep an eye on BUGS events.



TI P10



Baby mouse

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