

# Jantina Toxopeus, Ph.D.

Assistant Professor, Department of Biology  
St. Francis Xavier University, 2321 Notre Dame Ave, Antigonish NS, B2G 2W5, Canada  
(902) 867-2665 | [jtoxopeu@stfx.ca](mailto:jtoxopeu@stfx.ca) | <https://jantinatoxopeus.com>

## Academic Positions

---

2020-present **Assistant Professor**, *St. Francis Xavier University*, Antigonish, NS

2018-2020 **Postdoctoral Fellow**, *University of Colorado*, Denver, CO

Advisor: Dr. Gregory Ragland

## Education

---

2014-2018 **Ph.D. Biology**, *Western University*, London, ON

Advisor: Dr. Brent Sinclair

2011-2014 **M.Sc. Biology**, *Dalhousie University*, Halifax, NS

Advisor: Dr. Thomas MacRae

2007-2011 **B.Sc. Honours Biology**, *St. Francis Xavier University*, Antigonish, NS

Advisors: Dr. Stephen O'Leary (National Research Council) and Dr. David Garbary

## Pedagogical Training

---

2016 **Instructional Skills Workshop**, *Western University*, London, ON

2015 **Advanced Teaching Program**, *Western University*, London, ON

2011-2013 **Certificate in University Teaching & Learning**, *Dalhousie University*, Halifax, NS

## Research Grants

---

2015 Michael Smith Foreign Study Supplement, *NSERC* (3,195 CAD)

Project: "Metabolomics of the freeze-tolerant spring field cricket, *Gryllus veletis*"

Collaborator: Dr. Vladimir Košťál (Czech Academy of Sciences, Czech Republic)

2015 Theodore J. Cohn Research Grant, *Orthopterists' Society* (500 USD)

Project: "Freeze tolerance of the great grig, *Cyphoderris monstrosa*"

2014 JEB Travelling Fellowship, *Company of Biologists* (1,800 GBP)

Project: "Physiological and molecular adaptations to extreme climatic conditions in the butterfly *Pieris rapae*"

Collaborators: Dr. Natalia Li (Russian Academy of Sciences, Russia) and Dr. Jesper Sørensen (Aarhus University, Denmark)

## Scholarships and Awards

---

2019	Dr. John W. Arnold Fellowship, <i>Western University Biology</i> (1,300 CAD) awarded for the best Ph.D. thesis in Biology
2018	Robert and Ruth Lumsden Graduate Fellowship, <i>Western U.</i> (1,500 CAD)
2017	Inducted into Teacher Hall of Fame, <i>The Princeton Review</i>
2017	Megan J. Davey Ontario Graduate Scholarship (OGS), <i>Western U.</i> (15,000 CAD), awarded to top applicant researching in the life sciences at Western University
2016	Nominated for Teaching Assistant Award, <i>Western U. Society of Graduate Students</i>
2016	Malcolm Ferguson Award, <i>Western U. Biology</i> (1,500 CAD)
2015	Ruth Arnold Horner Fellowship, <i>Western U. Biology</i> (2,000 CAD)
2014	Canada Graduate Scholarship-Doctoral, <i>NSERC (Natural Sciences and Engineering Research Council of Canada)</i> (105,000 CAD)
2013	Best Oral Presentation, <i>Dalhousie University Patrick Lett Symposium</i>
2012	Izaak Walton Killam Memorial Scholarship, <i>Dalhousie University</i> (20,000 CAD)
2011	Julie Payette Award, <i>NSERC</i> , (25,000 CAD), one of the top 25 recipients of NSERC M.Sc. scholarship funding

## Teaching and Mentorship

---

### *Courses Taught*

*The Princeton Review*, Halifax, NS and London, ON

2013-2018 MCAT Biology – *Lecturer*

*Dalhousie University*, Halifax, NS

2014 Evolution (Biol 2040) – *Lecturer*

*Acadia University*, Wolfville, NS

2014 Principles of Development (Biol 3153) – *Lecturer and lab instructor*

### *Informal Advisor*

*University of Colorado*, Denver, CO

Two undergraduate students in the Undergraduate Research Opportunities Program (2018-2019, 2019-2020), one undergraduate student completing a research project for course credit (2019-2020), all in the Ragland lab

*Western University*, London, ON

Two undergraduate students in the Honours program (2015-2016, 2017-2018), and one student on a MITACS exchange program (2018), all in the Sinclair lab.

### *Advisory Committee Member*

*Western University*, London, ON

One undergraduate student (2016-2017) in the Thompson lab.

I also directly supervised 23 undergraduate lab assistants during my Ph.D. at Western University, and 6 undergraduate lab assistants at the University of Colorado, Denver.

## Educational Leadership

---

### *Short Courses Taught*

*The Princeton Review*, Toronto, ON

2015-2020 **MCAT Biology Training – Facilitator**

- Trained new instructors to teach the biology component of a course for students intending to write the Medical College Admission Test (MCAT)

*Western University Centre for Teaching and Learning*, London, ON

2016-2018 **Teaching Assistant Training Program – Facilitator**

- Topics included best teaching practises for teaching assistants (e.g. effective lesson design, facilitating laboratories, interpersonal communication)
- Participants also delivered two sample lessons (microteaching); I facilitated peer feedback on these lessons in small groups

### *Education Workshops Developed*

4. Help, I have to TA! (2016, 2017) Western University, *Biology Graduate Student Orientation*
3. Effective TAing: Challenges and solutions (2016) Canadian Society of Zoologists (CSZ), *Annual Meeting*
2. Thinking like a scientist: Incorporating authentic scientific inquiry into laboratory courses (2015) *Advanced Teaching Program Capstone Project*
1. Teaching in the lab: Making the most of your experience (2012) Dalhousie University, *TA Professional Development Days*

### *Invited Panel Presentations*

4. Assessing student learning (2018) Western University, *Spring Conference on Teaching for Graduate Students*
3. Networking at academic conferences (2017) Western University, *Academic and Professional Communication Day*
2. Zoology education in Canada: Current state, changes and moving forward (2017) CSZ, *Annual Meeting*
1. Thriving as a TA: Panel of outstanding TAs (2016) Western University, *TA Day Graduate Conference on Teaching*

## Scholarship of Teaching and Learning

---

### *Refereed Conference Presentations*

1. **Toxopeus, J.** and Sinclair B.J. (07/2017) Thinking like scientist: strategies to measure and improve knowledge structures of biology students. *Western Conference on Science Education (WCSE)*, London, ON. [oral] [national]
  - Also presented at the Western University *Research on Teaching and Learning Symposium*

***Non-Refereed Publications***

1. **Toxopeus, J.** (2013) Undergraduate laboratories: What are we teaching? *Dalhousie Centre for Learning and Teaching FOCUS Newsletter*, 21(2): 7-8.

**Educational Outreach**

---

- 2019      **Young Hands in Science Volunteer**  
Facilitate hands-on science activities for elementary school children in Denver, CO. Volunteer of the month in March 2019.
- 2019      **Media Coverage**  
Two interviews with CBC radio on the role of cryoprotectants in cricket freeze tolerance (on “Fresh Air” and “All in a Day”)
- 2014-18   **London Bug Day Volunteer**  
Led activities to educate children about insects in this 1-day annual event jointly hosted by the Western University and the Entomological Society of Ontario.
- 2012/18   **Community Lecturer**  
Gave public talks on “Life without water: Animals that survive intense desiccation” (Pubic Library Lecture Series, Halifax NS, 2012) and “Life in the frozen lane: A winter survival guide for insects” (Retiring with Strong Minds, London ON, 2018).
- 2016      **Media Coverage**  
Interview with Western University GradCast on my Ph.D. research (freeze-tolerant crickets), live broadcast on Radio Western (CHRW 94.9).
- 2011-13   **Let’s Talk Science Rural Outreach Coordinator, Educator**  
Coordinated events focused on hands-on science activities in rural Nova Scotian schools, and recruited and trained volunteers to conduct the activities (2012-13). Facilitated hands-on science activities for school children in Halifax (2011-13).

**Service**

---

***University Service***

- 2016-2018   **Senate Subcommittee for University Teaching Awards, Student Representative**  
Evaluated applications for university-wide faculty teaching awards at Western U.
- 2014-2016   **Biology Graduate Education Committee, Student Representative**  
Conducted survey to solicit student and faculty opinions on the Western U. Biology Graduate Program. Evaluated applications for scholarships and entrance to the program.
- 2012-2013   **Science Education Journal Club Coordinator**  
Selected scholarly articles concerning education in the sciences for discussion by Dalhousie University instructors and graduate students at monthly meetings.

**Society Service**

- 2016-2018 **Canadian Society of Zoologists (CSZ) Student Councillor**  
Elected by popular vote to represent student views at biannual council meetings. Organized student events and managed student section funds at the CSZ annual meeting. Maintained active social media presence on behalf of the society.
- 2015-2016 **Conference Organizer**  
Assisted in the organization of the CSZ 2016 annual meeting in London, Canada. Designed programme layout, and maintained the conference website.
- 2015-2016 **CSZ Education Committee Student Representative**  
Planned and led a workshop for teaching assistants at the CSZ 2016 annual meeting. Liaised between local organizing committee and education committee.

**Peer Review for Academic Journals**

---

*22 manuscripts reviewed across 15 journals*

Agricultural and Forest Entomology (1), BMC Biology (1), The Canadian Entomologist (3), Cell Stress and Chaperones (2), Comparative Biochemistry and Physiology (1), Conservation Physiology (1), European Journal of Entomology (2), Functional Ecology (1), Journal of Economic Entomology (1), Journal of Experimental Biology (1), Journal of Insect Physiology (2), Journal of Integrative Agriculture (1), Oecologia (1), Scientific Reports (2), Teaching Innovations Projects (TIPs) Journal (2)

**Professional Affiliations**

---

Canadian Society of Zoologists (2014-present), Educational Developers Caucus (2017-present), Entomological Society of America (2018-present), Entomological Society of Ontario (2014-2018), Orthopterists' Society (2014-2015), Society for Experimental Biology (2015-present), Society for Teaching and Learning in Higher Education (2017-present)

**Peer-Reviewed Publications**

---

*16 total, h-index=9, 259 citations since 2015 (source: Google Scholar); trainees underlined.*

16. Lebenzon, J.E., **Toxopeus, J.**, Anthony, S.E. and Sinclair B.J. (2020) *De novo* assembly and characterisation of the transcriptome of the Beringian pseudoscorpion. *The Canadian Entomologist*, in press.
15. Li, N.G., **Toxopeus, J.**, Moos, M., Sørensen, J.G. and Sinclair, B.J. (2020) A comparison of low temperature biology of *Pieris rapae* from Ontario, Canada, and Yakutia, Far Eastern Russia. *Comparative Biochemistry and Physiology A*, 242: 110649.
14. Rozsypal, J., **Toxopeus, J.**, Berková, P., Moos, M., Šimek, P. and Košťál, V. (2019) Fat body disintegration after freezing stress is a consequence rather than cause of freezing injury in larvae of *Drosophila melanogaster*. *Journal of Insect Physiology*, 115: 12-19.

13. **Toxopeus, J.**, Košťál, V. and Sinclair, B.J. (2019) Evidence for non-colligative function of small cryoprotectants in a freeze tolerant insect. *Proceedings of the Royal Society B*, 286: 20190050.
12. **Toxopeus, J.**, Des Marteaux, L.E. and Sinclair, B.J. (2019) How crickets become freeze-tolerant: the transcriptomic underpinnings of acclimation in *Gryllus veletis*. *Comparative Biochemistry and Physiology D*, 29: 55-66.
11. **Toxopeus, J.**, McKinnon, A.H., Štětina, T., Turnbull, K.F. and Sinclair, B.J. (2019) Laboratory acclimation to autumn-like conditions induces freeze tolerance in the spring field cricket *Gryllus veletis* (Orthoptera: Gryllidae). *Journal of Insect Physiology*, 113: 9-16.
10. **Toxopeus, J.** and Sinclair, B.J. (2018) Mechanisms underlying insect freeze tolerance. *Biological Reviews*, 93: 1891-1914.
9. Newman, C.E., **Toxopeus, J.**, Udaka, H., Ahn, S., Martynowicz, D.M., Graether, S.P., Sinclair, B.J. and Percival-Smith, A. (2017) CRISPR-induced null alleles show that *Frost* protects *Drosophila melanogaster* reproduction after cold exposure. *Journal of Experimental Biology*, 220: 3344-3354.
8. Des Marteaux, L.E., McKinnon, A.H., Udaka, H., **Toxopeus, J.** and Sinclair, B.J. (2017) Effects of cold-acclimation on gene expression in Fall field cricket (*Gryllus pennsylvanicus*) ionoregulatory tissues. *BMC Genomics*, 18: 357.
7. Andrushchenko, I.V., Taylor, B.R., **Toxopeus, J.** and Wilson, E. (2017) Congregations of the leaf-shredding insect *Lepidostoma togatum* mediate exceptionally rapid mass loss from leaf litter in Nova Scotia rivers. *Hydrobiologia*, 78:245-265. [authors in alphabetical order]
6. **Toxopeus, J.**, Lebenzon, J.E., McKinnon, A.H. and Sinclair B.J. (2016b) Freeze tolerance of *Cyphoderris montrosa* (Orthoptera: Prophalangopsidae). *The Canadian Entomologist*, 148: 668-672.
5. **Toxopeus, J.**, Jakobs, R., Ferguson, L.V., Gariepy, T.D. and Sinclair, B.J. (2016a) Reproductive arrest and stress resistance in winter-acclimated *Drosophila suzukii*. *Journal of Insect Physiology*, 89: 37-51.
4. **Toxopeus, J.**, Warner, A.H. and MacRae, T.H. (2014) Group 1 LEA proteins contribute to the desiccation and freeze tolerance of *Artemia franciscana* embryos. *Cell Stress & Chaperones*, 19: 939-948.
3. King, A.M., **Toxopeus, J.** and MacRae, T.H. (2014) Artemin, a diapause-specific chaperone, contributes to stress tolerance of *Artemia* cysts and influences their release from females. *Journal of Experimental Biology*, 217: 1719-1724.
2. King, A.M., **Toxopeus, J.** and MacRae, T.H. (2013) Functional differentiation of small heat shock proteins in diapause-destined *Artemia* embryos. *FEBS Journal*, 280: 4761-4772.
1. **Toxopeus, J.**, Kozera, C.J., O'Leary, S.J.B. and Garbary, D.J. (2011) A reclassification of *Mycophycias ascophylli* (Ascomycota) based on nuclear large ribosomal subunit DNA sequences. *Botanica Marina*, 54: 325-334.

## Book Chapters

---

1. Garbary, D.J., Brown, N.E., MacDonell, H.J., and **Toxopeus, J.** (2017) *Ascophyllum* and its symbionts – a complex symbiotic community on North Atlantic shores. Edited by M. Grube, J. Sechback, L. Muggia, *In Algal and Cyanobacteria Symbiosis*. World Scientific Publishing Europe Ltd.: Hackensack, NJ, USA. pp. 547-572.

## Invited Talks

---

4. **Toxopeus, J.\***, Dowle, E.J and Ragland, G.J. (2020) Challenging the hallmarks of insect diapause: A case study in *Rhagoletis pomonella*. *Canadian Society of Zoologists (CSZ) Annual Meeting*. Saskatoon, SK. **Finalist for Presidents' Award for best postdoc talk**
3. **Toxopeus, J.\*** and Sinclair B.J. (2018) Life in the frozen lane: *Gryllus veletis* as an emerging model for insect freeze tolerance. *Orthopteroids: Small Orders, Big Ideas [Entomological Society of America Annual Meeting]*. Vancouver, BC.
2. **Toxopeus, J.** (2016) Uncovering the mechanisms underlying insect freeze tolerance. *Czech Academy of Science [Physiology Seminar Series]*, České Budějovice, Czech Republic.
1. **Toxopeus, J.\***, Warner, A.H. and MacRae, T.H. (2014) Group 1 Late Embryogenesis Abundant (LEA) proteins enhance desiccation and freeze tolerance of the crustacean, *Artemia franciscana*. *Genomes to/aux Biomes [CSZ Annual Meeting]*, Montreal, QC. **Finalist for Hoar Award for best student talk**

## Conference Presentations

---

*12 total; presenting author indicated with an asterisk; trainees underlined*

21. **Toxopeus, J.\***, Dowle, E.J. and Ragland, G.J. (2020) Tracking physiological time: Timing and duration of cold exposure impacts seasonal life history timing in a temperate insect. *Society for Integrative and Comparative Biology (SICB) Annual Meeting*. Austin, TX. [oral] [international]
20. **Toxopeus, J.\*** and Ragland, G.J. (2019) Do mechanisms of cold tolerance change with development? A case study using RNA interference of multiple genes in *Drosophila melanogaster*. *International Symposium on the Environmental Physiology of Ectotherms and Plants (ISEPEP) 8*. Buenos Aires, Argentina. [oral] [international] **Recipient of Sable Systems Young Scientist Award**
19. **Toxopeus, J.\***, Dowle, E.J. and Ragland, G.J. (2019) Development and thermal sensitivity of the apple maggot fly (*Rhagoletis pomonella*): Implications for overwintering ecology. *CSZ Annual Meeting*. Windsor, ON. [oral] [national]
18. Lebenzon, J.E.\*, **Toxopeus, J.**, Anthony, S.E. and Sinclair, B.J. (2018) Not just another cute Chelicerate: *De novo* assembly of the Beringian pseudoscorpion (*Wyochernes asiaticus*) transcriptome reveals putative venom proteins. *Entomological Society of Ontario Annual Meeting*, Irondale, ON. [poster] [regional]

17. **Toxopeus, J.\***, Des Marteaux, L.E., Košťál, V. and Sinclair, B.J. (2018) Do cryoprotectants really protect against cold? An experimental evaluation of insect freeze tolerance. *CSZ Annual Meeting*, St. John's, NL. [oral] [national]
16. Sinclair, B.J.\* and **Toxopeus, J.** (2018) New directions in the study of freeze tolerance. *CSZ Annual Meeting*, St. John's, Canada. [oral] [national]
15. Kuper-Psenicnik, A.C.\*, **Toxopeus, J.** and Sinclair, B.J. (2018) A calorimetric method for measuring ice content of the freeze-tolerant cricket *Gryllus veletis*. *Ontario Biology Day*, Waterloo, ON. [oral] [regional]
14. **Toxopeus, J.\***, Des Marteaux, L.E., Košťál, V. and Sinclair B.J. (2018) Why frozen insects die: a tale of metabolomics, transcriptomics and cryoprotectant manipulation in freeze-tolerant crickets. *SICB Annual Meeting*. San Francisco, CA. [oral] [international]
13. **Toxopeus, J.\***, Košťál, V. and Sinclair B.J. (2017) Manipulating the transcriptome and metabolome of the spring field cricket, *Gryllus veletis*. *ISEPEP 7*, Tartu, Estonia. [oral] [international]
12. Li, N.G.\*, **Toxopeus, J.**, Sinclair B.J. and Sørensen, J.G. (2017) On the question of cold hardiness strategy of the *Pieris rapae* L. inhabiting central Yakutia. *ISEPEP 7*, Tartu, Estonia. [poster] [international]
11. Štětina, T.\*, Rozsypal, J., **Toxopeus, J.** and Košťál, V. (2017) Study on the nature of freeze injury: a morphological approach. *ISEPEP 7*, Tartu, Estonia. [oral] [international]
10. **Toxopeus, J.\*** and Sinclair B.J. (2017) Thinking like scientist: strategies to measure and improve knowledge structures of biology students. *Western Conference on Science Education (WCSE)*, London, ON. [oral] [national]
9. Sinclair, B.J.\*, **Toxopeus, J.**, Lebenzon, J.E. and Košťál, V. (2017) Progress in understanding freeze tolerance and metabolic suppression in dormant insects. *Third RCM on Dormancy Management to Enable Mass-rearing and Increase Efficacy of Sterile Insects and Natural Enemies*, Vienna, Austria. [oral] [international]
8. **Toxopeus, J.\***, Košťál, V. and Sinclair B.J. (2017) Functional assessment of cryoprotectants in the freeze-tolerant spring field cricket, *Gryllus veletis*. *CSZ Annual Meeting*, Winnipeg, Canada. [oral] [national]
7. **Toxopeus, J.\***, Košťál, V. & Sinclair B.J. (2017) Metabolomics and transcriptomics of freeze tolerance acclimation in *Gryllus veletis*. *SICB Annual Meeting*, New Orleans, LA, USA. [poster] [international]
6. **Toxopeus, J.\***, Košťál, V. and Sinclair B.J. (2016) Crickets on ice: dissecting the mechanisms underlying insect freeze tolerance. *CSZ Annual Meeting*, London, ON. [poster] [national] **Honourable mention for Battle Award for best student poster**
5. Sinclair, B.J.\*, **Toxopeus, J.**, Jakobs, R., Ferguson, L.V. and Garipey, T.D. (2015) Dissecting the winter morph of *Drosophila suzukii*. *Entomological Society of Canada Annual Meeting*, Montreal, Canada. [oral] [national]



4. **Toxopeus, J.\***, Jakobs, R., Ferguson, L.V., Garipey, T.D. and Sinclair, B.J. (2015) Reproductive diapause alters stress tolerance in *Drosophila suzukii*. *CSZ Annual Meeting*, Calgary, Canada. [poster] [national] **Finalist for Battle Award for best student poster**
3. King, A.M., **Toxopeus, J.\*** and MacRae, T.H. (2013) Functional differentiation of small heat shock proteins in diapause embryos of *Artemia franciscana*. *ISEPEP 5*, London, ON. [oral] [international]
2. **Toxopeus, J.\***, Warner, A.H. and MacRae, T.H. (2013) Life without water: the importance of Late Embryogenesis Abundant (LEA) proteins in a stress-tolerant crustacean. *Dalhousie University Patrick Lett Symposium*, Halifax, Canada. [oral] [institutional] **Best Oral Presentation Award**
1. **Toxopeus, J.\***, Kozera, C.J., O'Leary, S.J.B. and Garbary, D.J. (2011) Classification of *Mycophycias ascophylli*, a marine fungus associated with two brown algae. *APICS Undergraduate Biology Conference*, Halifax, Canada. [poster] [regional]