

Jantina Toxopeus, Ph.D.

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Current Position

2018-present **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
▪ Thesis accepted with no revisions required
- 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
▪ Academic Rank: 2nd in Faculty of Science, GPA 4.0

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
- I have also attended education-focused conferences (8) and workshops (27) since 2011.

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

- 2018 Robert and Ruth Lumsden Graduate Fellowship, *Western University Faculty of Science* (1,500 CAD)
- 2017 Megan J. Davey Ontario Graduate Scholarship (OGS), *Western U.* (15,000 CAD), awarded to top applicant researching in the life sciences at Western University
- 2016 Malcolm Ferguson Award, *Western U. Biology* (1,500 CAD)
- 2015 Ruth Arnold Horner Fellowship, *Western U. Biology* (2,000 CAD)
- 2015 EPCOR Student Travel Award, *Canadian Society of Zoologists (CSZ)* (500 CAD), conference travel funding for finalists in student presentation award competitions
- 2014 Canada Graduate Scholarship-Doctoral, *NSERC (Natural Sciences and Engineering Research Council of Canada)* (105,000 CAD)
- 2014 EPCOR Student Travel Award, *CSZ* (500 CAD)
- 2013 Best Oral Presentation, *Dalhousie University Patrick Lett Symposium*
- 2012 Izaak Walton Killam Memorial Scholarship, *Dalhousie University* (20,000 CAD)
- 2011 Julie Payette Award, *NSERC*, (25,000 CAD),
one of the top 25 recipients of NSERC M.Sc. scholarship funding
- 2011 Leo P. Chiasson Memorial Award, *St. Francis Xavier (St. FX) University* (300 CAD),
for the top-ranked biology Honours undergraduate student
- 2010 Undergraduate Student Research Award, *NSERC* (4,500 CAD)
- 2009 Undergraduate Student Research Award, *NSERC* (4,500 CAD)
- 2007 President's Scholarship, *St. FX University* (32,000 CAD),
one of two recipients of the top entrance scholarship to St. FX

Teaching

Courses Taught

The Princeton Review, Halifax, NS and London, ON

- 2013-2018 MCAT Biology – *Lecturer*; 12 sections of 6 – 30 pre-medical students
- Topics included physiology, genetics, cell and molecular biology, biochemistry.
 - Inducted into The Princeton Review **Teacher Hall of Fame** (2017).

Western University Centre for Teaching and Learning, London, ON

- 2016-2018 Teaching Assistant Training Program – *Facilitator*; 6 sections of c. 30 graduate students
- Topics included best teaching practises for teaching assistants (e.g. effective lesson design, facilitating laboratories, interpersonal communication)

Dalhousie University, Halifax, NS

- 2014 Evolution (Biol 2040) – *Lectures*; c. 170 undergraduates

Acadia University, Wolfville, NS

- 2014 Principles of Development (Biol 3153) – *Lectures and labs*; 13 undergraduates
- **Designed two new laboratories**, including a directed scientific inquiry project that was adopted by the permanent instructor (Dr. G. Gibson).

Teaching Assistantships*Western University, London, ON*

- 2015-2017 Animal Physiology (Biol 3601) – *Tutorials*, 12 sections of c. 20 students
- Introduced concept mapping activities in 2016 and 2017.
 - Nominated for Society of Graduate Students **Teaching Assistant Award** (2016, 2017, 2018).

Dalhousie University, Halifax, NS

- 2013-14 Introductory Biology II Online (Biol 1021) – *Online*, 2 sections of c. 25 students
- 2012-13 Developmental Biology (Biol 3050) – *Labs*, 2 sections of c. 25 students
- Developed new material for two laboratory exercises.
- 2012-13 Genetics and Molecular Biology (Biol 2030) – *Tutorials*, 6 sections of c. 20 students
- 2011-12 Genetics and Molecular Biology (Biol 2030) – *Labs*, 2 sections of c. 25 students

St. Francis Xavier University, Antigonish, NS

- 2010-11 Introductory Biochemistry (Chem 255) – *Labs*, 2 sections of c. 25 students
- 2010 Advanced Cell Biology (Biol 395) – *Labs*, 1 section of c. 25 students
- 2009-11 Botany (Biol 202) – *Labs*, 2 sections of c. 25 students
- 2008 Animal Biology (Biol 201) – *Labs*, 1 section of c. 25 students

Guest Lectures*Western University, London, ON*

- 2016/17 “Anhydrobiosis: A strategy for desiccation tolerance,” Animal Physiology (Biol 3601)
- 2014 “Stress physiology of sea monkeys,” Animal Physiology (Biol 3601)

Dalhousie University, Halifax, NS

- 2013 “Animals that survive intense dehydration,” Invertebrate Biology (Biol 3301)

Mentorship**Informal Mentor***University of Colorado, Denver, CO*

- 2018-present Matin Sanaei (undergraduate research opportunity program; Ragland lab)

Western University, London, ON

- 2018 Kendra Corral (MITACs exchange student; Sinclair lab)
- 2017-2018 Aisa Kuper-Psenicnik (honours student; Sinclair lab)
- Presented results at a regional conference (Kuper-Psenicnik et al. 2018)
- 2015-2016 Claire Newman (honours student; Sinclair and Percival-Smith labs)
- Published results (Newman et al. 2017 *Journal of Experimental Biology*)

Advisory Committee Member*Western University, London, ON*

- 2016-2017 Rosalyn Phung (honours student; Thompson lab)

I also directly supervised 23 undergraduate lab assistants during my Ph.D. at Western University.

Educational Leadership

Short Courses Taught

The Princeton Review, Toronto, ON

2015-present **MCAT Biology Training** – *Facilitator*; 9 sections of 2-4 new biology instructors

- 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*; 6 sections of c. 30 graduate students

- 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 (4-6 participants)

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-present **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” (Public 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.
- 2014-2016 **Mustang Bioinformatics Club, Co-Founder and Co-President**
Organized monthly meetings for graduate students at Western University to discuss best practises in bioinformatics research.

- 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.
- 2015/16 **Conference Volunteer**
Moderated oral presentation sessions for Society of Teaching and Learning in Higher Education (2016), Western Conference on Science Education (2015)

Peer Review for Academic Journals

The Canadian Entomologist (2), Comparative Biochemistry and Physiology (1), Conservation Physiology (1), European Journal of Entomology (2), Functional Ecology (1), Journal of Economic Entomology (1), Journal of Insect Physiology (1), Scientific Reports (1), 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

14 total, h-index=7, 159 citations since 2014 (source: Google Scholar); trainees underlined.

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. (2019c) 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. (2019b) 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. (2019a) 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., Garipey, 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

3. **Toxopeus, J.** (2018) Life in the frozen lane: Mechanisms underlying freeze tolerance in the spring field cricket. *Department of Integrative Biology, University of Colorado [Graduate Student Seminar Series]*, Denver, CO.
2. Docker, M., Lamarre, S., Schulte, P. and **Toxopeus, J.** (2017) Zoology education in Canada: current state, changes and moving forward. *Education Panel [Canadian Society of Zoologists Annual Meeting]*, Winnipeg, MB.
1. **Toxopeus, J.** (2016) Uncovering the mechanisms underlying insect freeze tolerance. *Czech Academy of Science [Physiology Seminar Series]*, České Budějovice, Czech Republic.

Conference Presentations

20 total; presenting author indicated with an asterisk; trainees underlined

20. **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. [invited talk] [international]
19. Lebenzon, J.L.*, **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]
18. **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. *Canadian Society of Zoologists (CSZ) Annual Meeting*, St. John's, NL. [oral] [national]
17. Sinclair, B.J.* and **Toxopeus, J.** (2018) New directions in the study of freeze tolerance. *CSZ Annual Meeting*, St. John's, Canada. [oral] [national]
16. 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]
15. **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. *Society for Integrative and Comparative Biology (SICB) Annual Meeting*. San Francisco, CA. [oral] [international]

14. **Toxopeus, J.***, Košťál, V. and Sinclair B.J. (2017) Manipulating the transcriptome and metabolome of the spring field cricket, *Gryllus veletis*. *International Symposium on the Environmental Physiology of Ectotherms and Plants (ISEPEP) 7*, Tartu, Estonia. [oral] [international]
13. 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]
12. 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]
11. **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]
10. 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]
9. **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]
8. **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]
7. **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**
6. 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]
5. **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**
4. **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. [oral] [national] **Finalist for Hoar Award for best student talk**
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]