Caitlin Simopoulos, PhD

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DISCIPLINES Bioinformatics, Computational Biology, Molecular Biology, -omics Technologies, Machine Learning

EDUCATION

Doctor of Philosophy - Computational Biology 2019
McMaster University, Hamilton, ON
Supervisors: Elizabeth Weretilnyk and Brian Golding
Thesis: Using machine learning to predict long non-coding RNAs and exploring their evolutionary patterns and prevalence in plant transcriptomes

Master of Bioinformatics (MBinf) 2014
University of Guelph, Guelph, ON
Supervisors: Paul McNicholas and Steven Rothstein
Major Research Project: Weighted gene correlation network analysis of maize and rice undergoing nitrogen stress

Bachelor of Science, Molecular Biology and Genetics 2012
University of Guelph, Guelph, ON

CONTINUING EDUCATION

From Lab 2 Fulfillment Entrepreneur workshop 2020
WinSETT Becoming Leaders, professional development 2019
TECHNOMISE-CREATE Professional development bootcamp 2019
Canadian Bioinformatics Training Metabolomics workshop 2013

RELEVANT EXPERIENCE

TECHNOMISE-CREATE Postdoctoral Associate 2019-present
University of Ottawa, Ottawa, ON
Supervisor: Daniel Figeys
Co-supervisor: Mathieu Lavallée-Adam
Research topic:

- Identify effects of drugs on human gut microbiomes based on a machine learning framework
- Reclassify drugs according to their effects on the gut microbiota
- Contribute to computational methodology for metaproteomic data analysis including the creation of web applications written in R shiny
- Working on an interdisciplinary and collaborative research team

Research Assistant January 2014-August 2014
University of Guelph, Guelph, ON
Responsibilities:

- Identified transcriptional responses to nitrogen stress in rice.
- Created an efficient R package for genetic network analysis.
- Collaborated with a multi-disciplinary team.

MBinf Research Project May 2013-December 2013
University of Guelph, Guelph, ON
Responsibilities:

- Analyzed microarray data of important crops undergoing nitrogen stress.
- Used and further developed programming skills in R.

Undergraduate Research Project September 2011-April 2012
University of Guelph, Guelph, ON
Research topic:

- The effects of stress on *S. mediterrinea* after RNAi knock-down of *age*-1.

USEL Position Summer 2011
University of Guelph and OMAFRA, Guelph, ON
Responsibilities:

- Created a viral infection identification protocol for Ontario strawberries.
- Established relationships to maintain communication between OMAFRA and Ontario farmers.

SCIENTIFIC OUTREACH

TECHNOMISE Special Seminar Organizing Committee 2020-present
Member

- Invite respected researchers in the field of microbiomes to speak to TECHNOMISE-CREATE trainees
- Co-host monthly seminar series

Early Career Scientist Committee 2019-present
Communication and Outreach, Member, Genetics Society of America

- Work within a diverse team of early career scientists who are dedicated to science communication
- Communicate novel scientific discoveries by writing pieces published in online blogs or articles accessible to both scientists and the general public

Pint of Science 2019-present
Local organizer

- In charge of three day event that brings scientists into cafes and pubs
- Organize event logistics
- Invite speakers to the events
- Host the three day speaker series
- Lead other local volunteers

Pulsar Collective 2019-present
Mentor

- Visit highschools virtually
- Highlight underrepresented genders in STEM
- Communicate that STEM is accessible to all genders

Skype a Scientist 2020-present
Scientist volunteer

- Visit classrooms virtually
- Answer student questions about science and research

Plant Molecular Workshop 2013-2019
McMaster University, Hamilton, ON

- Lead high school students though typical plant molecular biology experiments
- Develop young people's interest in biology

Researcher's Night Hamilton 2018
Presenter
- Combined art and science for fun and approachable science outreach
- Presented computational work in a visual manner to the public

Software Carpentry 2017
Workshop Assistant
- Offer hands-on assistance to workshop attendees
- Promote inclusivity in computer and data science

TEACHING EXPERIENCE

Student Mentoring 2020 - present
University of Ottawa
Isaac Kuk, Translational and Molecular Medicine
Expanding pepFunk to support eggNOG and GO annotations

Teaching Assistant 2014-2018
McMaster University, Hamilton, ON
Biology 1M03: Biodiversity, Evolution & Humanity
Tutorial TA (2014, 2017-2018)
- Lead an engaging, hands-on and discussion friendly tutorial
- Mark weekly assignment and final group project
- Answer online discussion board questions

Lead lecture TA (2015-2017)
- Act as first contact for all first year undergraduate life sciences students
- Hold office hours to discuss lecture material
- Answer online discussion board questions

Biology 1A03: Cellular & Molecular Biology
Lead lecture TA (2015-2017)
- Act as first contact for all first year undergraduate life sciences students
- Hold office hours to discuss lecture material
- Answer online discussion board questions

Biology 4BB3: Plant Metabolism and Molecular Biology
Lecture TA (2017)
- Develop and present lectures throughout the semester on appropriate material
- Curate data for bioinformatics-focused final project
- Grade final project

Biology 3B03: Plant Physiology
Lab TA (2018)
- Lead plant physiology based wet labs
- Mark weekly lab reports

SOFTWARE

pepFunk
- R Shiny app built for metaproteomic functional analysis
- Written in R
- Part of iMetaLab suite

CREMA

- Prediction of lncRNAs from transcript sequences
- Unix command line interface
- Written using Python and R

HONOURS AND AWARDS

IAPB Travel Grant 2018
Awarded to present a seminar at IAPB Dublin, August 2018

Catherine Jane Stevenson Memorial Bursary 2016-2018
Awarded for research supporting Northern Canada

McMaster University Department of Biology Travel Scholarship 2016
Awarded for travel to attend CSPB-CSBV, 2016

George H. Duff Student Travel Bursary 2016
Awarded for travel to attend CSPB-CSBV, 2016

Outstanding Achievement as a Teaching Assistant 2015
Awarded to a graduate student in the Department of Biology for their outstanding achievement as a teaching assistant during the 2014/2015 school year.

Graduate Scholarship 2014
McMaster University, Hamilton, Canada
Total funding: $1070/year

Queen Elizabeth II Award in Science and Technology 2013
Awarded by nomination for academic merit, research strength, leadership, and communication skills.
Total funding: $5,000/semester

University of Guelph Entrance Scholarship 2008
Awarded to students with a minimum 85% admission average.
Total funding: $1000

SELECT PUBLICATIONS

Simopoulos, CMA*, MacLeod, MJR*, Irani, S, Sung, WWL, Champigny, MJ, Summers, PS, Golding, GB, Weretilnyk, EA. (2020) Coding and long non-coding RNAs provide evidence of distinct transcriptional reprogramming for two ecotypes of the extremophile plant *Eutrema salsugineum* undergoing water deficit stress. BMC Genomics 21, 396 https://doi.org/10.1186/s12864-020-06793-7

Simopoulos, CMA, Ning, Z, Zhang, X, Li, L, Walker, K, Lavallée-Adam, M, Figeys, D. (2020). pepFunk, a tool for peptide-centric functional analysis in metaproteomic human gut microbiome studies. Bioinformatics, btaa289 https://doi.org/10.1093/bioinformatics/btaa289

Simopoulos, CMA, Weretilnyk, EA, Golding, GB. (2019) Molecular traits of long non-protein coding RNAs from diverse plant species show little evidence of phylogenetic relationships. (2019) G3. 9(8), 2511-2520 https://doi.org/10.1534/g3.119.400201

Simopoulos CMA, Weretilnyk, EA, Golding, GB. (2018). Prediction of plant lncRNA by ensemble machine learning classifiers. BMC Genomics. 19, 316 https://doi.org/10.1186/s12864-018-4665-2

Coneva, V*, **Simopoulos, C***, Casaretto, JA, El-kereamy, A, Guevara, D R, *et al.* (2014). Metabolic and co-expression network-based analyses associated with nitrate response in rice. BMC Genomics, 15, 1056 http://www.biomedcentral.com/1471-2164/15/1056

* Shared first authorship

OUTREACH PUBLICATIONS

Carla Bautista, Elisabeth Adkins Marnik, **Caitlin MA Simopoulos***, Anna Drangowska-Way, Thomas James Smyth Merritt (2020) What is the new way scientists edit DNA? Frontiers for Young Minds. (*In review*).

GSA Communications & Outreach Subcommittee* (November 26, 2020) Hurdles and advances to making science gender-neutral. ecrLife. https://ecrlife.org/hurdles-and-advances-to-making-science-gender-neutral/

GSA Communications & Outreach Subcommittee* (October 8, 2020) Navigating fake news as a scientist. ecrLife. https://ecrlife.org/navigating-fake-news-as-a-scientist/

* Written as a collaboration with the GSA Communications & Outreach Subcommittee.

CONFERENCE PRESENTATION

Simopoulos, C, Ning, Z, Zhang, X, Li, L, Walker, K, Lavallée-Adam, M, Figeys, D. pepFunk: peptide-centric functional enrichment for metaproteomic gut microbiome data. Video presentation at useR!2020. https://youtu.be/UZtpi-Bg9i0

Simopoulos, C, Ning, Z, Zhang, X, Li, L, Walker, K, Lavallée-Adam, M, Figeys, D. pepFunk: peptid-ceentric functional enrichment for metraproteomic gut microbiome data. Virtual oral presentation at ISMB2020.

Simopoulos, C. Simopoulos, C, Ning, Z, Zhang, X, Li, L, Walker, K, Lavallée-Adam, M, Figeys, D. pepFunk: peptide-centric functional enrichment for metaproteomic gut microbiome data. Poster at the 2020 meeting for the European Conference on Computational Biology. (*Poster presentations cancelled due to the COVID-19 pandemic.*)

Simopoulos, C., Weretilnyk, E. A., Golding, G. B. (August 21, 2018) *Local adaptation in the extremophile Eutrema salsugineum: Exploring the roles of putative lncRNAs*
Oral presentation at the 2018 meeting of the International Association for Plant Biotechnology, Dublin, Ireland.

Simopoulos, C., Weretilnyk, E. A., Golding, G. B. (July 15, 2018) *Using machine learning to predict long non-protein coding RNAs from plant transcriptome*
Poster presented at the joint meeting of ASPB and CSPB, Montreal, Quebec.

Simopoulos, C., Golding, G. B., Weretilnyk, E. A. (Nov 19, 2016) *An improved method for long non-coding RNA prediction that includes small ORF coding probabilities*
Presented at the annual Biology Graduate Research Day at McMaster University in Hamilton, Ontario.

Simopoulos, C., Golding, G. B., Weretilnyk, E. A. (Nov 19, 2016) *An improved method for long non-coding RNA prediction that includes small ORF coding probabilities*
Presented at the annual Eastern meeting of the Canadian Society of Plant Biologists at McMaster University, Hamilton, Ontario

Simopoulos, C. Golding, G. B., Weretilnyk, E. A. (June 16, 2016) *Insights into the abiotic stress response of Eutrema salsugineum by co-expression network analysis*
Poster presented at the annual national meeting of the Canadian Society of Plant Biologists at Queen's University, Kingston, Ontario.

Garvin, A.*, **Simopoulos, C.***, Sung, W., Golding, B., Weretilnyk, E. (Nov. 21, 2015) *A long non-coding RNA associated with nutrition in Eutrema salsugineum: An example of local adaptation?*
Poster presented at the annual Eastern meeting of the Canadian Society of Plant Biologists at the University of Toronto, Toronto, Ontario.
* Shared first authorship

Simopoulos, C. Garvin, A., Sung, W., Golding, B., Weretilnyk, E. (Oct. 15, 2015) *How do outlier samples affect the results of a co-expression network?*
Poster presented annual Biology Graduate Research Day at McMaster University in Hamilton, Ontario.

Simopoulos, C., Garvin, A., Sung, W., Golding, B., Weretilnyk, E. (Dec 4, 2014) *Does Yukon Eutrema salsugineum require elevated sulfur and, if so, why?*
Poster presented at annual Biology Graduate Research Day at McMaster University in Hamilton, Ontario.

PROFESSIONAL AFFILIATIONS

International Society for Computational Biology	2020
Genetics Society of America	2019-present
The Canadian Society for Plant Biologists	2014-2019
Canadian Association for Plant Biotechnology	2018

JOURNAL REVIEW ACTIVITIES

- Molecular Omics
- Journal of Proteomics
- Nature Protocols
- Scientific Reports
- Interface Focus