

Yuliya Zubak

Email | GitHub | LinkedIn | Site

Education

University of Toronto, Scarborough Campus

Sept 2015 – Jun 2020

Honors BSc: Molecular Biology & Biotechnology (Specialist Double Major, Co-op), Neuroscience (Major, 3rd)

Thesis: Development and validation of a novel polygenic risk score for depression (2020) with **Yuliya Nikolova**

Awards & Grants

- CogSci Student Travel Grant 2024
- NSERC Research Grant 2019
- BioTalent Research Grant 2019
- BioTalent Research Grant 2018
- University of Toronto Entry Scholarship 2016
- President's Entry Scholar 2015

Languages & Tools

Javascript, Python, R (RMarkdown), SQLite, PHP, HTML5, BIOPAC (EEG), Freesurfer (fMRI), PrediXcan, Matlab, LaTeX, WebPPL

Mentorship

- Jesse Yang - Processing of fMRI data
Summer 2024
- Pranav Dronavalli - Empirica site design
Winter 2023

Papers

- **Zubak, Y.**, Dronavalli, P., Chuang, Y., & Hawkins, R. (2024). Distributed statistical inference in social interaction networks. Proceedings of the Annual Meeting of the Cognitive Science Society, 46.
<https://escholarship.org/uc/item/8km974x4>
- Lunardon, A. and Patena W., Warren-Williams M., Pacini C., **Zubak Y.**, Laudon M., Silflow C., Lefebvre P., Jonikas M. (2024). The *Chlamydomonas reinhardtii* CLiP2 mutant collection expands genome coverage with high-confidence disrupting alleles. BioRxiv
- Scipio, M. D., Tavares, E., Deshmukh, S., Audo, I., Green-Sanderson, K., **Zubak, Y.**, . . . Vincent, A. (2020). Phenotype Driven Analysis of Whole Genome Sequencing Identifies Deep Intronic Variants (...). IOVS <https://doi.org/10.1167/iovs.61.10.36>

In Preparation

- **Zubak, Y.**, Dronavalli, P., Chuang, Y., & Hawkins, R. (2024). Distributed statistical inference in social interaction networks.
- Bergey C.A., Lyu A., O'Keeffe M., Li B., **Zubak Y.**, Plum B., Yang S., Patil A., Zhou I., Hawkins R. (in preparation). Examining Social Interaction from a Preschooler's Point of View.
- Lunardon, A. and Patena W., Warren-Williams M., Pacini C., **Zubak Y.**, Laudon M., Silflow C., Lefebvre P., Jonikas M. (in preparation). An expanded Chlamydomonas mutant library enables placement of eukaryotic photosynthetic genes into pathways.

Posters

- Chemical genetics of the newly expanded Chlamydomonas mutant library **Zubak Y.**, Lunardon A., Patena W., Pacini C., Jonikas M.C. (2023) Chlamy2023
- Predicting gene functions by linking genes to cellular pathways in *Chlamydomonas reinhardtii*. Pacini C., Lunardon A., Patena W., **Zubak Y.**, Jonikas M.C. (2023) Chlamy2023
- Expanding and improving the Chlamydomonas CLiP mutant library. Lunardon A., Patena W., Pacini C., Warren-Williams M., **Zubak Y.**, Jonikas M.C. (2023) Chlamy2023
- Risk Score for Depression. **Zubak, Y.**, Nikolova, Y. (2020) Women in Science and Engineering Toronto
- Inflammatory response to ethanol in neuroimmune cell culture models of FASD. **Zubak, Y.**, Torres-Perez, M., Tian, A., (...) Muffat, J. (2019) Sickkids Summer Undergraduate Research

- Accelerating maturation of neurons and glial cell types from iPSCs using an optimized inducible overexpression system. Rao, A. Tian, A., **Zubak, Y.**, (...) Muffat, J. (2019) Sickkids Summer Undergraduate Research
- An in vitro platform to study the interactions of glioblastoma multiforme and its associated microglia and macrophages. Velayudhan, P. Tian, A., **Zubak, Y.** (...) Muffat, J. (2019) Sickkids Summer Undergraduate Research

Research Experience

Lab Manager/Research Coordinator

Sept 2023 – Present

Dr. Robert Hawkins, Psychology, University of Wisconsin - Madison & Linguistics, Stanford University

- Established an individual line of research in the lab group, designing a web game on Empirica using Javascript, Python, and R, recruiting participants from Prolific, and processing and analyzing the resulting data, employing Bayesian and mixed effect models
- Coordinated and conducted experimental sessions with families and children, including oversight of diverse and representative participant recruitment of child and adult participants and ethical experimentation
- Trained and supervised undergraduate research assistants in pre-processing and analyzing multivariate datasets including text, audiovisual, and fMRI data
- Created and maintain lab resources, such as the lab website, and a lab database of best practices on version control and open science using Notion
- First lab manager, helping to establish and maintain the lab's experimental and data analysis pipelines, maintaining research protocols with the Institutional Review Board and onboarding incoming lab members into these processes

Research Specialist

Nov 2021 – Oct 2023

Dr. Martin Jonikas, Department of Molecular Biology, Princeton University

- Generated and replicated a collection of random DNA insertion algal mutants (300k unique mutants) as part of the Chlamydomonas Library Project, towards the aim of creating a whole-genome library of Chlamydomonas reinhardtii as a global scientific resource
- Developed a list of systems-targeting compounds, then designed and tested a high-throughput pooled screen, with the intent of collecting high quality phenotypic data on each mutant by exposing them to hundreds of compounds targeting all major protein pathways. This ultimately created an atlas of the organism
- Modified statistical pipeline to identify mutants before and after compound exposure

Junior Research Analyst

Sept 2019 – Apr 2020

Dr. Yuliya Nikolova, Centre for Addiction and Mental Health (CAMH)

- Created and applied a prediction score for genetic risk factors between the sexes based on MDD-associated candidate regions and genes using linear regression models based on transcriptomic, polymorphism and MRI data from the Human Connectome Project
- Used R, Freesurfer, and prediXcan to process data and complete a large volume of data conversion and processing, keeping a detailed record of work using Rmarkdown
- Studied Weighted Gene Correlation Network Analysis (WGCNA) to understand graph theory's practical applications to neuroscience

Research Summer Student

May 2019 – Aug 2019

Dr. Julien Muffat, Neurosciences and Mental Health, Hospital for Sick Children

- Opened a new project for the lab in examining the cellular origins of Fetal Alcohol Spectrum Disorder, conducting a literature search, designing and carrying out experiments, and processing resultant data
- Cultured and maintained human neuroimmune models in the form of iPSC derived astrocytes, neurons, phagocytes, and cancer cells using high resolution and immunofluorescence microscopy
- Gathered the data with RT-qPCR and created a data analysis pipeline for multi-gene expression that controlled for various variables (eg. primer annealing) and graphed the significant results

Research Assistant

Jan 2019 – Apr 2019

Dr. Karen Gordon, Department of Otolaryngology, Hospital for Sick Children

- Analyzed EEG brain scan data in MATLAB to draw conclusions on auditory inter-connectivity development in children after cochlear implants in comparison to controls
- Collected data from toddlers using Biopac/AcqKnowledge

Research Assistant

Sept 2018 – Dec 2018

Dr. Elise Heon, Genetics and Genome Biology, Hospital for Sick Children

- Employed bioinformatics to outline a backbone pipeline to filter whole genome BAM files, identifying candidate variants with R, MANTA, and Erds/CNVnator, as well as population filtering with GnomAD
- Isolated deep intronic splicing errors in low-expression genes using primers, PCR, and minigenes

Relevant Courses

(2023-2024) **Auditing Student** Design and Analysis of Psychological Experiments II, Dr. Hawkins, University of Wisconsin-Madison

(2022) **Auditing Student** Probabilistic Models of Cognition, Dr. Griffiths, Princeton

(2020) Sensorimotor Systems, Dr. Niemeier, UTSC

(2019) Cognitive Neuroscience, Dr. Souza, UTSC

(2019) Learning and Motivation, Dr. Ito, UTSC

(2018) Neuroanatomy Lab, Dr. LeBoutillier, UTSC

(2017-2018) Intro Psychology I&II, Dr. Joordens, UTSC

Activities

(2021) **Fellow** NATO Innovation Hub Thinktank

(2021) **Writer** University of Toronto School of Continuing Studies - Literary SciFi Novel Mentorship

(2015-2021) **Director** on Board of Directors (Elected, Two Terms) YCC No. 457

(2018-2020) **Moderator** University of Toronto Scarborough Discord Server

(2017-2018) **First Year Representative** Association of Philosophy Students

(2015-2017) **President** Urban Movement Club