Michael J. Geuenich

Curriculumn Vitae

Profile

I am a PhD candidate in the Molecular Genetics Department at the University of Toronto working on building Machine Learning methods to better understand immune escape in pancreatic cancer.

Email: m.geuenich@mail.utoronto.ca	Github: Michael-Geuenich
LinkedIn: Michael-Geuenich	Twitter: MichaelGeuenich

Education

2020-present	PhD, Computational Biology in Molecular Genetics, University of Toronto.
2016–2020	B.A.&Sc., Computational Biology, Quest University Canada.

Select courses

Mathematics	Linear Algebra, Multivariable Calculus, ODEs
CS & Statistics	Algorithm Analysis & Design, Machine Learning, Artificial Intelligence, Data Analysis in R
Biology & Chemistry	Molecular Genetics, Population Genetics, Biochemistry A, Chemistry & Organic Chemistry

Skills

Advanced	R, Python, Snakemake
Intermediate	Git, SQL, PyTorch/PyTorch Lightning
Basic	Shell Scripting, LaTeX, PyRosetta, Shiny, Docker

Research Experience

Sept. 2020 – present	**PhD Student — University of Toronto & Lunenfeld Tanenbaum Research Institute**
Toronto, Canada	Developing machine learning tools to better understand immune escape in pancreatic cancer. *PI: Kieran Campbell*
May. 2020 – August 2020	**Pre-Doctoral Summer Student— Lunenfeld Tanenbaum Research Institute**
Toronto, Canada	Analysis of imaging mass cytometry breast cancer data and benchmarking as part of the development of Astir, a cell identity assignment algorithm developed for single cell proteomic approaches. *PI: Kieran Campbell*
June 2019 – May 2020	**Undergraduate Research Assistant — Fred Hutchinson Cancer Research Center**
Seattle, USA	Analysis of ChIP-Seq and CUT&RUN NGS data pertaining to the MYC transcription factor network. Familiarity with western blotting, chromatin preparation for ChIP-Seq, fixing cells for Hi-C and Flow Cytometry. *PI: Robert N. Eisenman*
May 2018 – May 2019	**Research Assistant & Research Fellow — Quest University Canada**
Squamish, Canada	Analysis of public sequence data for the phylogenetic analysis of ribosome maturation genes and their involvement in Shwachman-Diamond Syndrome. Homology search, sequence alignment, phylogenetic tree construction & protein visualization. Awarded paid Research Fellowship (Summer 2018) to continue this research. *PI: Marina Tourlakis*

Publications

* Denotes joint first author

Preprints

2022 Hassaan Maan, Lin Zhang, Chengxin Yu, **Michael Geuenich**, Kieran R Campbell, and Bo Wang. The differential impacts of dataset imbalance in single-cell data integration. *bioRxiv*, 2022

Sebastien Martinez, Ramona Weber, Tristan Woo, Ahmad Malik, **Michael Geuenich**, Gun Ho Jang, Dzana Dervovic, Khalid Al-Zahrani, Ricky Tsai, Nassima Fodil, et al. *In vivo CRISPR screens reveal SCAF1 and USP15 as novel drivers of pancreatic cancer*. *bioRxiv*, 2022

Published

2022 Connor Yanchus, Kristen L. Drucker, Thomas M. Kollmeyer, ..., **Michael Geuenich**, ..., Robert B. Jenkins, and Daniel Schramek. *A non-coding single nucleotide polymorphism at 8q24 drives IDH1-mutant glioma formation. Science*, 2022

2021 **Michael J. Geuenich***, Jinyu Hou*, Sunyun Lee*, Shanza Ayub, Hartland W. Jackson, and Kieran R. Campbell. *Automated assignment of cell identity from single-cell multiplexed imaging and proteomic data. Cell Systems*, 2021

2020 Haritha Mathsyaraja, Jonathen Catchpole, Brian Freie, Emily Eastwood, Ekaterina Babaeva, **Michael Geuenich**, Pei Feng Cheng, Jessica Ayers, Ming Yu, Nan Wu, ..., David MacPherson, and Robert N Eisenman. *Loss of MGA repression mediated by an atypical polycomb complex promotes tumor progression and invasiveness. Elife*, 10:e64212, 2021

Arnaud Augert, Haritha Mathsyaraja, Ali H Ibrahim, Brian Freie, **Michael J. Geuenich**, Pei-Feng Cheng, Sydney P Alibeckoff, Nan Wu, Joseph B Hiatt, Ryan Basom, Adi Gazdar, Lucas B Sullivan, Robert N Eisenman, and David MacPherson. *MAX Functions as a Tumor Suppressor and Rewires Metabolism in Small Cell Lung Cancer. Cancer Cell*, 38(1):97–114.e7, July 2020

Popular Media

2018 **Michael Geuenich**. *Regarding Moustaches. Squamish Chief*, October 2018. Opinion about cancer awareness and funding allocation in the local newspaper

Presentations

2022 **Geuenich Michael J.** *With great data come great pipelines: Creating flexible standardized pipelines for common biomedical analysis tasks using Snakemake*. In *Toronto Workshop on Reproducibility*, Feb 2022. Talk

2019 **Geuenich Michael J.**, Brian Freie, Patrick Carroll, Vijay Ramani, and Robert N. Eisenman. *An activating point mutation in Myc (T58A) mitigates ER stress*. In *BC Cancer Summit*, Nov 2019. Poster

2018 **Geuenich Michael J.**, Johanna Rommens, and Marina E. Tourlakis. *Identifying differences in the Shwachman- Diamond syndrome associated gene SBDS across species*. In *BC Cancer Summit*, Nov 2018. Poster

2018 **Geuenich Michael J.**, Johanna Rommens, and Marina E. Tourlakis. *How computation and a rare disease can teach us about Basic Biology and Cancer*. In *Quest Scholarship Symposium*, Nov 2018. Invited talk

Student Supervision

Sept. 2021 - April 2022	**Anna Lai — University of Toronto BCB430 Student** Supervised a student in comparing mouse and human single cell RNA-Sequencing data to infer the ability of mouse models to recapitulate human pancreatic cancer subtypes.
May 2021 - Aug. 2021	**Sean Gong — University of Toronto BCB330 Student** Supervised a student in the development *WhatsThatCell*, a shiny app for manual cell type annotation.

Teaching

Sept. 2019	**Teaching Assistant — Quest University Canada** *Molecular Genetics*
Squamish, Canada	Created a UCSF Chimera dry lab to predict the effect of mutations on a protein interaction. The assignment was designed to ease students into using software and included usage of the command line.
April 2019	**Guest Lecturer — Quest University Canada** *Linear Algebra*
Squamish, Canada	Lecture on the mathematics of PCA, using it in R, and applications in genomics.
Oct. 2018 – Nov. 2018	**Guest Lecturer & Teaching Assistant — Quest University Canada** *Ecological Genomics*
Squamish, Canada	Lecture on Multiple Sequence Alignments using MUSCLE. Teaching assistant for the R based dry lab.

Awards

Sept. 2022-Aug. 2023	University of Toronto Open Fellowship, $12,000 – University of Toronto
Sept. 2021-Aug. 2022	University of Toronto Open Fellowship, $12,000 – University of Toronto
April 2020	Keystone Distinction Award – Quest University Canada – Thesis award for the top 10% of students
Spring 2019	Presidential Honours Award – Quest University Canada – Awarded to the top 10% of students
Fall 2018	Presidential Honours Award – Quest University Canada
Spring 2018	Presidential Honours Award – Quest University Canada
2016 – 2020	Presidential Scholarship, $32,000 – Quest University Canada

Other employment

Oct. 2016 – Aug. 2018 *Squamish, Canada*	**Data Analyst Coordinator — Quest University Canada** *Communications & Development Office* Organized the university's donation data and imported it into a single database.
Oct. 2015 – Aug. 2016 *Barcelona, Spain*	**Business Development — EIMS** Worked in marketing and sales for two major IT companies (BlackBerry and Riverbed), communicating with IT executives to solve critical infrastructure problems. Responsible for generating $775,000/year from new and existing customers.
May 2014 – July 2015 *Barcelona, Spain*	**CEO & Co-Founder — BioEnvío** Built an online shop to distribute organic food across the Spanish peninsula.

Outreach & Academic Leadership

June. 2021 – Present	**Computational Biology in Molecular Genetics event organizer — University of Toronto** *I regularly organize events with outside and student speakers for the students in the computational track of our department.*
Sept. 2018 – May 2019	**Co-Editor in Chief — Momenta** *Quest's Academic Journal*
Sept. 2017 – May 2019	**Board Member & President** *Quest Biomedical Journal Club*
Dec. 2018 – April. 2019	**Co-Founder & Organizer — Stand-Up Science** *Local Science Outreach Event*
Mar. 2019	**Topic Editor (Biology) — Our_Futures** *Academic Conference*
Dec. 2017 – Aug. 2018	**Peer-reviewer — Momenta**

Languages

German	Mothertongue
Spanish	Fluent
English	Fluent
Catalan	Basic

REFERENCES

Dr. Kieran Campbell	Advisor & Professor, University of Toronto & Lunenfeld Tanenbaum Research Institute, Affiliate Faculty, Vector Institute
Dr. Marina Tourlakis	Undergraduate Mentor & Professor, Molecular Genetics, Quest University Canada
Dr. Richard Hoshino	Professor, CS & Mathematics, Northeastern University, formerly at Quest University Canada
Dr. Robert Eisenman	Professor, Fred Hutchinson Cancer Research Center
	Contact information provided upon request