Elia Afanasiev

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Work & research experience

Computational Research Technician (Goeva Lab) 2025/06 - 2026/11
University of Toronto Toronto, Canada

- Lead and assisted with multiple projects (e.g. designing & developing novel computational analysis methods, generating library/package implementations for internal projects, conducting performance optimization of existing methods, analyzing large-scale scRNA-seq datasets, orchestrating systematic benchmarking)
- Drove manuscript (as first author) and project/equipment grant writing
- Mentored, provided guidance to, and onboarded trainees in the lab
- Managed lab hardware, software, and cloud/web infrastructure

Graduate Student (Stratton Lab) 2022/09 - 2025/04
McGill University Montreal, Canada

- Trained other students in and assisted with various bioinformatics/computational matters across a variety of projects, including: code upload policies, data management policies, technical troubleshooting, and RNA-seq analysis/visualisation
- Conducted miscellaneous software development (e.g. creating a data format conversion service, establishing data ingestion pipelines for longitudinal time-series data, generating novel visualisation methods for scRNA-seq data)
- Trained other lab members in applied wet lab techniques
- Mentored undergraduate students (e.g. by providing advice on thesis project direction and writing)
- Involved in multiple publications as a co-author
- Conducted thesis work, involving: animal handling, surgical interventions, tissue collection, tissue processing, IF-IHC, light microscopy imaging (epifluorescent and confocal), image analysis, RNA extraction, RNA-seq analysis (bulk and single-cell), and genotyping.

Lab Helper B (Stratton Lab) 2022/05 - 2022/08
McGill University Montreal, Canada

- Developed a novel data visualization tool
- Assisted with data management and infrastructure handling
- Involved in multiple publications as a co-author

Course Assistant (COMP 189) 2022/01 - 2022/04
McGill University Montreal, Canada

- Held weekly office hours
- Answered student questions on class forums
- Graded assignments

Education

Master of Science - Thesis based: Integrated Program in Neuroscience (cGPA: 4.0 / 4.0) 2022/09 - 2025/05
McGill University Montreal, Canada

- Thesis: *Investigating effects of ependymal IFNGR activation in neuroinflammatory contexts*
- Supervisor: Jo Anne Stratton

Bachelor of Science: Major Neuroscience - Cell/Molecular Stream (cGPA: 3.91 / 4.0) 2019/09 - 2022/05
McGill University Montreal, Canada

Project portfolio

glmGamPoi[2] (goeva-lab fork) - Core *fork* developer
Developed a fork of the existing glmGamPoi library to improve performance and allow for use with atlas scale scRNA-seq data.

UMAT - Sole developer
Independently developed a toolkit for comprehensive processing of atlas-scale MERSCOPE data.

USCI - Sole developer
Developed a spatial correlation metric suitable for discovery of spatially co-regulated gene sets.

SCS - Sole developer
Independently developed a graphical tool for annotation of cells from single-cell spatial datasets using arbitrary user inputs.

found - Core developer
Developed a complete implementation of the previously published HiDDEN framework, with packaged libraries for both Python and R.

spatialPeeler - Core developer
Developed the spatialPeeler library, which served as the canonical implementation accompanying manuscript publication.

UAPL - Sole developer
Independently developed a set of adapters allowing direct access to data stored in AnnData objects for plotting via plotnine.

UDP - Sole developer
Developed a static-site-based interface for visualization/exploration of single-cell datasets.

Technical skills

Programming languages and frameworks

Python: extensive experience, comfortable with application development as well as generic data science (pandas, polars, geopandas, numpy, plotnine), scRNA-seq analysis (anndata, scanpy, squidpy), and machine learning (jax, flax, optax, pytorch) workloads

Rust: extensive experience, comfortable with backend (axum, tokio, rayon) and GUI application (bevy, macroquad) development, as well as Python/R interop via Py03/rextendr

Sh/**Bash**/**Zsh**: extensive experience with shell scripting and UNIX/POSIX command line tools

Lua: extensive experience with generic scripting/configuration applications and game development (LÖVE, PICO-8)

R: extensive experience, comfortable with application development as well as generic data science (data.table, lme4, ggplot2), RNA-seq analysis (Seurat/scrapper, DESeq2/glmGamPoi), and geospatial (sf) workloads

C++: strong experience with recent language editions (C++11 and later), comfortable with computational algebra methods (Eigen, Armadillo) development, as well as R interop via Rcpp

HTML/**CSS**/**JavaScript**/**TypeScript**: intermediate experience with web-app development (solidJS)

Typesetting systems: extensive experience with using LaTeX, Typst, and CommonMark/Markdown for website & document generation

Applications and systems

Containerization solutions: extensive experience with using Docker for application deployment and packaging, Apptainer for HPC utilization, and Kubernetes for orchestration and deployment

Continuous Integration / Deployment: extensive experience with orchestrating automated pipelines for project testing and deployment via GitHub Actions and GitLab CI

Linux system administration: extensive experience with Linux/UNIX/POSIX systems, comfortable with apt, dnf, pacman, and nix - based distributions

HPC Utilization: extensive experience with utilizing High Performance Computing infrastructure via the SLURM scheduling system to run complex, heterogeneous, intensive, and fallible workloads

Presentations / posters

Wellcome Connecting Science 6th Single Cell Biology Conference 06/2026
Wellcome Sanger Institute — Wellcome Genome Campus, Hinxton, United Kingdom
- Poster title: *found - a HiDDEN implementation*

Single Cell and Spatial Biology in Precision Medicine Workshop 12/2025
McGill Institute of Genomic Medicine — Bellairs Research Institute, Holetown, Barbados
- Talk title: *MERFISH case studies - successes and troubleshooting, discussion and considerations*

16th International Congress of Neuroimmunology 08/2023
International Society of Neuroimmunology — Quebec City, Canada
- Poster title: *Ependymal interferon-gamma receptor activation plays a crucial role in mediating ependymagliosis and periventricular barrier integrity*

Awards

Laszlo and Etelka Kollar Fellowship 2023 - 2024
Awarded by the McGill Faculty of Medicine on the basis of academic merit

Tomlinson Engagement Award for Mentoring (BIOL 201) 2022
Awarded for notable performance and engagement while taking the course and conducting peer mentoring in the following year

Extracurriculars

Donnelly PDF/RA "Big Data - Omics & Bioinformatics" Symposium - Organizer 2026/03 - 2026/05
Helped organize the May 2026 Donnelly PDF/RA "Big Data - Omics & Bioinformatics" Symposium. Determined the program, recruited speakers, worked to advertise event to ensure attendance, and managed logistics on the day of.

Toronto Bioinformatics Hackathon - Organizing Committee Member & Judge 2024/06 - 2025/11
Helped organize the 2024 and 2025 Toronto Bioinformatics Hackathons, managing duties related to the judging process (rubric creation, judging scheduling, etc.) while also serving as a judge. Managed data and compute infrastructure, handling HPC deployment and serving as a liaison with SciNet (2024) and AWS (2025) staff on behalf of the Organizing Committee. Attended in a mentor and advisor capacity, holding office hours and helping troubleshoot any technical issues throughout the hackathon.

Neuroimmunology Unit Technical Workshops - Sole Organizer and Workshop Lead 2022/12 - 2025/05
Lead and organized workshops on various technical bioinformatics-related topics for members of the Neuroimmunology Unit & associated staff at the Montreal Neurological Institute.

McGill Computer Task Force - Technical Coordinator 2023/05 - 2025/05
Oversaw and managed all technical projects organized by the McGill Computer Task Force, including:
- Free election service for clubs, empowering admins to easily organize online elections using a friendly web UI while allowing students to authenticate via McGill credentials
- Free web hosting service for clubs, allowing clubs to run websites with automated TLS certificate management on CTF infrastructure
- Free hardware/laptop lending, printing, and computer lab services for students
- Self-hosted infrastructure for student developers, including running instances of Zulip & GitLab, a custom OIDC server, a Kubernetes cluster, as well as self-managed DNS and DHCP servers
- Broad technical workshops provided for McGill students and internal workshops for CTF members