Yonatan Morocz

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Professional Summary

Self-motivated McGill graduate student, currently working with the Juncker Lab in the biomedical engineering department. Passionate about additive manufacturing at the macro and micro scales.

Education

McGill University, Montreal, QC, Canada. (2023-current)

PhD Biological & Biomedical Engineering.

McGill University, Montreal, QC, Canada. (2021-2023)

M. Eng. Biological & Biomedical Engineering.
Thesis: *The Development and Characterization of a Measurement Platform for the Evaluation of Aerosol Capture Devices*

McGill University, Montreal, QC, Canada. (2016-2020)

B.Sc. Bio-Organic Chemistry / Neuroscience Minor.

Research and Work Experience

Researcher, Juncker Lab, McGill Univ. Montreal, QC, Canada. (Sept 2021 - Current)

Research and development of a microfluidic aerosol capture device for point of care applications under the supervision of Professor David Juncker. Project also included development of a wind tunnel test platform for the characterization and validation of the capture device. Experience with FDM, LCD and DLP based 3D printing and multiple CAD softwares as well as FEM modelling. Supervised and mentored over 10 undergraduate students in projects ranging from 4-8 months over 5 years.

Aerosol Sampling Lead, Influenza Challenge Trial, RI-MUHC Montreal, QC, Canada. (2026 - 2027)

Run the exhaled-aerosol sampling workstream at the Montreal site of Canada's first influenza (H3N2) controlled human infection model, a phase 1 trial led by the Canadian Center for Vaccinology (Halifax) to build Canadian capacity for vaccine development against infectious diseases. Work in a high-containment inpatient setting, sampling aerosols from infected participants to compare viral shedding across the course of disease and alongside the development of immunity. Wrote the aerosol sampling SOP, manufactured 48 individually calibrated breath collection devices, and developed an in-house duplex RT-qPCR assay (H3N2 and RPP30).

Teaching Assistant, McGill Univ. Montreal, QC, Canada. (Sept 2022 - Dec 2024)

Assisted with the course "Introduction to Micro and Nano-Bioengineering" (BMDE508) at McGill University. Responsible for designing and grading assignments, hosting tutorials and selecting content for class review.

Intern, NuChem Sciences, NuChem Sciences Montreal, QC, Canada. (Feb 2021 - July 2021)

Completed a six month internship at the CRO NuChem Sciences working as a computational chemist. The main focus of the internship was the design, optimization and testing of potential drug candidates or target interactions with modeled proteins.

Researcher, Harrington Lab, McGill Univ. Montreal, QC, Canada. (May 2020 - Aug 2020)

Completed an Honours thesis investigating the proteomics of Mussel Byssus underwater adhesion and self-assembly of polymeric fibers under Professor Matthew Harrington. Utilized BLAST and structural biology to identify key amino acid differences between species and related them to phenotypic differences.

Researcher, Levin Lab, McGill Univ. Montreal, QC, Canada. (Jan 2018 - Dec 2019)

Conducted research under Dr. Leonard Levin to investigate the effects of novel neuroprotective phosphine borane drug candidates on in vitro cultures of RGC cells. Performed quantitative Mass Spectrometry analysis of the selective disulfide reduction occurring in the cells on a molecular level to identify the mechanism of the neuroprotection demonstrated in earlier papers. Proteomics was performed in collaboration with the proteomics department at the RI-MUHC.

Research Trainee, Agar Lab, Brigham and Women's Hospital Boston, MA, USA. (Mar 2015 - Aug 2017)

Research in the Department of Neurosurgery, under Dr. Nathalie Agar. Worked with MALDI, LC-MS, and LESA Mass Spectrometry, histology, liquid chromatography, microscopy, and other common lab procedures to identify protein and lipid profiles of cancer cells. Implemented and carried out tests to determine most effective Matrix constituents for lipid identification with MALDI.

Publications

F. Lussier, B.U. Moon, M. Janta-Polczynski, **Y. Morocz**, F. Svahn, M. Shen, L. Lukic, L. Malic, T. Veres, A. Ng, D. Juncker. (2026) PiP-Plex: A Particle-in-Particle System for Multiplexed Quantification of Proteins Secreted by Single Cells. *Advanced Materials, 38(13), e06398.*

I. Kaur, A. Forigua, H.M. Titi, **Y. Morocz**, D. Juncker, C. Moraes, A. Moores. (2026) Pure Chitosan Microfluidic Spinning Affords Modular Core-Sheath Fibers and Hand-Crafted Scaffolds with Enhanced Fibroblast Compatibility. *Small, 22(23), e10372.*

Y. Morocz. (2025) Multi-Axis FDM 3D Printing. *Engineering Archive (engrXiv) preprint.*

H. Shafique, V. Karamzadeh, G. Kim, M.L. Shen, **Y. Morocz**, A. Sohrabi-Kashani, D. Juncker. (2024) High-resolution low-cost LCD 3D printing for microfluidics and organ-on-a-chip devices. *Lab on a Chip, 24(10), 2774–2790.*

Y. Morocz, R.E. Greben, L.A. Levin. (2023) Redox Targets for Phosphine-Boranes. *Inorganics, 11(7), 310.*

Manuscripts in Preparation

G. Kim, L.A. Huynh, M.L. Shen, **Y. Morocz**, A. Ng, D. Juncker. (2026) Multiphase capillarics for structurally pre-programmed sequential and parallel operations of high and low cohesion liquids. *bioRxiv preprint.*

Y. Morocz, X. Lefebvre, A. Ng, E. Robert, D. Juncker. Compact 3D-printed microfluidic aerosol impactor and extractor array for high-efficiency capture of bioaerosols and low-volume extraction of biomolecules. *Manuscript in preparation.*

Y. Morocz, H. Shafique, V. Hung, A. Ng, D. Juncker. Programmable 3D capillary pump cartridges enabling tunable microfluidic flow. *Manuscript in preparation.*

Y. Morocz, D. Krykhtin, D. Juncker. Standardizing exhaled breath collection: a low-cost, open platform for guided, volume and flow targeted sampling. *Manuscript in preparation.*

Y. Morocz, K. Béland, H. Galsworthy, Z. Allakhverdieva, B. Ward, D. Juncker. Longitudinal tracking of exhaled influenza virus aerosols in a controlled human infection model using a novel 3D-printed aerosol capture device. *Manuscript in preparation.*

Patents

D. Juncker, **Y. Morocz**. Microfluidic Channel Impactor for Aerosol Capture. *International patent application PCT/CA2025/051345, filed October 2025 (priority US 63/706,376, October 2024).*

Conference Presentations

Y. Morocz, X. Lefebvre, A. Ng, E. Robert, D. Juncker. (2026) Robust 3D-printed compact microfluidic comb impactor for high-efficiency exhaled bioaerosol capture and ultralow-volume extraction. *Poster, 30th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS 2026), Granada, Spain, October 2026.*

G. Kim, L.A. Huynh, M.L. Shen, **Y. Morocz**, A. Ng, D. Juncker. (2026) Multiphase capillaric microfluidic chain reaction for on-chip lipid nanoparticle fabrication. *Poster, 30th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS 2026), Granada, Spain, October 2026.*

Y. Morocz, X. Lefebvre, J. De Vries, E. Robert, D. Juncker. (2024) 3D printed microfluidic channel impactor for exhaled bioaerosol capture. *Poster, 28th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS 2024), Montreal, Canada, October 2024.*

V. Karamzadeh, A. Sohrabi, **Y. Morocz**, H. Shafique, M. Shen, D. Juncker. (2023) Fabrication of Functional Microfluidics and Capillarics Using DLP and LCD 3D Printing. *Poster, Gordon Research Conference: The Physics and Chemistry of Microfluidics, Il Ciocco, Italy, June 2023.*

Y. Morocz, D. Juncker. (2023) Development of an Aerosol Capture Quantification Platform. *Poster, Biological and Biomedical Engineering Student Society Biennial Symposium, Montreal, Canada, May 2023.*

D. Calligaris, A. Changelian, K. Kellersberger, **Y. Morocz**, F. White, J. Agar, J. Sarkaria, N. Agar. (2016) Visualizing tumors in three dimensions: a first look at drug distribution in brain tumors using 3D MSI. *Poster, 64th ASMS Conference on Mass Spectrometry and Allied Topics, San Antonio, TX, USA, June 2016.*

Awards and Funding

James Dyson Award, Canada National Runner-up (2026): AnemoSwab, a non-invasive breath test that captures exhaled aerosols, was named national runner-up for Canada and advanced to the international top 20.

PSO Grant, Quebec Ministry of Economy, Innovation and Energy (2026): Awarded $75,000 to AnemoSwab through the Programme de soutien aux organismes de recherche et d'innovation (PSO) of the Ministère de l'Économie, de l'Innovation et de l'Énergie (MEIE).

Genium360 Award (2026): Awarded $15,000 to AnemoSwab by Genium360, with the application prepared with the support of Axelys.

MI4 Innovation Prize, McGill Clinical Innovation Competition (2026): Awarded to AnemoSwab at the 9th annual McGill Clinical Innovation Competition (CLIC) by the McGill Interdisciplinary Initiative in Infection and Immunity: a $4,000 prize with up to $16,000 in matching funds.

GREAT Travel Award (2026): McGill Graduate Research Enhancement and Travel (GREAT) Award of $600 to present at MicroTAS 2026 in Granada, Spain.

PhD / BBME Recruitment Award (2023): Given to top incoming prospects to the Biological and Biomedical Engineering department for $10,000/year over three years.

DMURL (2021): Dean's Multidisciplinary Undergraduate Research List, received for multidisciplinary research in the Department of Neuroscience and the Department of Chemistry.

Skills and Certifications

- Tissue sectioning
- Cell culture maintenance
- Histology
- Microscopy
- Proteomics and Lipidomics
- Drug design and synthesis
- 3D Design (CAD)
- 3D printer repair/modification
- Microsoft Office
- Statistics
- Machine learning
- IR instrumentation operation
- Proficient LESA & MALDI
- IodoTMT labelling
- Python, Java & Gcode
- Computational Chemistry
- Molecular Operating Environment (MOE)
- Aerosol dynamics
- Fusion 360 and Blender
- Intellectual Property
- Debian and Linux OS
- FEM and COMSOL Sim.
- Fluid Dynamics

Leadership and Community Involvement

Workshop Presenter, MicroTAS 2026, Granada, Spain. (2026)

Co-organized and presented Workshop 8, Photopolymerization 3D Printing for Microfabrication, with D. Juncker and H. Shafique: a workshop for novices to experts covering the origins and current methods of photopolymerization 3D printing (pp3DP), from laser scanning and high-resolution DLP to ultra-low-cost LCD, two-photon and holographic printing, with sessions on photopolymerization theory, ink design, applications in microfluidics and bioprinting, AI-driven design, and vendor demonstrations.

CAD Coordinator, Juncker Lab Hands-on Workshop, Montreal, QC, Canada. (2026)

Led the CAD studio module of the 16th Annual Hands-on Workshop in 3D Printing and Microfluidics for Bioengineering, teaching computer-aided design fundamentals to participants in a three-day hands-on program.

Clinical Study Coordinator, Juncker Lab, McGill University, Montreal, QC, Canada. (2026-Present)

Prepared and obtained Research Ethics Board approval for an in-lab clinical study in healthy participants that compares exhaled breath, saliva and nasal swab sampling, aimed at improving the standardization and quality of aerosol sampling in the field. Coordinate recruitment, consent and sample collection.

Peer Reviewer, Academic journals. (2024-Present)

Reviewed manuscripts for Science Advances, Sensors and Actuators Reports, and Microsystems and Nanoengineering, contributing to the peer-review and academic publication process.

President, McGill University Dept. Biomedical Engineering, Montreal, QC, Canada. (2023-2024)

Elected leader of the graduate student body in charge of all student rights advocacy, event planning and communication with the department. During my tenure as president I played a key role in proposing and passing a new student stipend policy to provide students with fair pay.

Workshop Coordinator & Lecturer, 3D-Bioprinting and Microfluidics, Montreal, QC, Canada. (2021-2024)

VP Social, McGill University Dept. Biomedical Engineering, Montreal, QC, Canada. (2021-2022)

Leader for event organization within the biological and biomedical engineering student society. Orchestrated in person holiday gatherings, departmental bonding events and end of year banquet for over 140 participants.

VP Logistics, Student Pharma, Montreal, QC, Canada. (2019-2020)

Head of logistics in the Student Pharma organizational body. Played a large part in the organization of the annual PharmaHacks competition in Montreal in 2019, hosted by MILA, the Quebec Artificial Intelligence Institute.

VP Social, McGill University Dept. Chemistry, Montreal, QC, Canada. (2018-2020)

Head of event planning for McGill's Chemistry undergraduate council. Organized a number of social and academic events for the benefit of the chemistry student body at McGill.

Orientation Leader, McGill University, Montreal, QC, Canada. (2018 & 2019)

Fencing Instructor, McGill University, Montreal, QC, Canada. (2017-2018)

Photographer, McGill University, Montreal, QC, Canada. (2017-2024)

Photographer for several departments and organizations at McGill including Pharmacology, Anatomy, Human Genetics, McGill Regenerative Medicine, as well as external organizations such as CANTrain among others.

Languages

- English (Native)
- Hungarian (Fluent at reading and writing)
- French (Conversational)