

Jeffrey Boschman

Graduate Research Assistant, *Artificial Intelligence in Medicine (AIM) Lab*

Areas of Expertise

Deep Learning | Data Science | Digital Pathology | Pharmaceutical cGMP | Medical Devices

Education

MASc, Biomedical Engineering

The University of British Columbia

Sept 2019 - Dec 2021

Vancouver, Canada

- GPA: 4.29/4.33
- Switched from MEng to MASc in May 2020

BASc, Chemical and Biological Engineering

The University of British Columbia

Sept 2012 - May 2017

Vancouver, Canada

- GPA: 3.85/4.33
 - With Distinction and Co-operative Education
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Research Experience

Graduate Research Assistant

The Artificial Intelligence in Medicine (AIM) Lab

The University of British Columbia

May 2020 - Dec 2021

Vancouver, Canada

- Developed novel augmentation strategy for improving H&E slide classification performance of popular deep learning models (Resnet, VGG16, Efficientnet)
- Led study comparing eight color normalization preprocessing algorithms (using Python or MATLAB) for machine learning-based diagnosis of histopathology images
- Currently improving deep learning-based diagnosis of ovarian epithelial carcinoma subtypes
- Supervisor: Ali Bashashati, PhD

Graduate Student

Engineers in Scrubs program

The University of British Columbia

Sept 2019 - April 2020

Vancouver, Canada

- Designed and created medical device prototype (with a team of 4) to decrease the mobility of plaque to facilitate more accurate injections in treating Peyronie's disease
- Iteratively developed needs-based technology by identifying stakeholders, analyzing the market, shadowing surgeries, and conducting patient and clinician interviews
- Supervisors: Roger Tam, PhD and Ryan Flannigan, MD

Fermentation Engineer
The Biofoundry

The University of British Columbia

Jan - Sept 2017
Vancouver, Canada

- Managed the operation, maintenance, and coordination of a 2L bioreactor, including authoring the standard operating procedures
 - Optimized bioreactor for genetically modified bacteria under different aeration conditions
 - Supervisor: Vikramaditya Yadav, PhD
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Work Experience

Research and Development Intern
New Beta Innovation Ltd.

May - Aug 2019
Hong Kong SAR

- Achieved 60% increase in volumetric yield of a recombinant *E. coli* fermentation product by optimizing 2L bioreactor conditions
- Ensured purity and enzymatic activity using techniques such as inclusion bodies extraction, SDS-Page, and activity assays

Production Technician
New Beta Innovation Ltd.

Oct 2017 - Dec 2018
Burnaby, Canada

- Conducted commercial-scale engineering trial runs for optimizing aseptic production and filling of a haemoglobin-based pharmaceutical with a five-day turnaround
- Authored and executed validation documents and protocols (URS, DQ, IQ, OQ, PQ, etc) for equipment on-boarding and cGMP readiness and developed standard operating procedures for various production operations
- Led formal risk assessment (FMEA) on equipment installation in Grade A environment as subject matter expert

Pilot Plant Chemical Engineering Intern
Carbon Engineering Ltd.

Jan - July 2016
Squamish, Canada

- Redesigned fluidized bed pellet reactor by analyzing flaws in previous models, improving ease of use, researching materials, and making equipment modifications
- Constructed two 20 ft tall reactors and conducted tests to quantify pellet growth and attrition by analyzing total suspended solids, pH, and pellet size distribution

Laboratory/Workshop Assistant
Department of Chemical and Biological Engineering (CHBE)

May - Aug 2015
Vancouver, Canada

- Streamlined workplace by organizing laboratory, workshop, and basement storage and disassembling broken equipment using plasma torch, grinder saw, and oxyacetylene torch
- Built new equipment for undergraduate labs involving thermodynamics and fuel cells, and fixed older experiments involving biological wastewater treatment and particle characterization

Technician

Maxxam Analytics

May - Dec 2014

Burnaby, Canada

- Ensured clients received accurate, timely results by efficiently managing up to 300 samples per day while accounting for RUSH samples, making new reagents with back-titration, and technical reporting
 - Mastered and taught other co-op students ~15 analytical procedures, including solids analysis, soil pH measurement, and UV/Vis spectrophotometry to quantify sulfides, Cr6+, tannins, lignin, and chlorophyll
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Awards

Dean's Award (\$150)	2017
Design and Innovation Award (\$150)	2017
Sherman Chen Scholarship in Chemical Engineering (\$3,920)	2016
Dorothy and Arthur Holt Scholarship (\$450)	2016
BIOMOD 1 st Place Audience Choice Award	2015
BIOMOD Silver Project Award	2015
Go Global International Learning Programs Award (\$1,000)	2015

Publications

Boschman, J., Farahani, H., Darbandsari, A., Ahmadvand, P., Farnell, D., Levine, A., Naso, J. R., Churg, A., Jones, S., Yip, S., Koebel, M., Huntsman, D., Gilks, B., Bashashati, A. (2021). "The Utility of Color Normalization for AI-Based Diagnosis of Hematoxylin and Eosin-Stained Pathology Images". **The Journal of Pathology**. in review

Chan, K. Y. T., Zhao, C., Siren, E. M. J., Chan, J. C. Y., **Boschman, J.**, & Kastrup, C. J. (2016). "Adhesion of blood clots can be enhanced when copolymerized with a macromer that is cross-linked by coagulation factor XIIIa". **Biomacromolecules**, 17(6), 2248–2252.
<http://doi.org/10.1021/acs.biomac.6b00481>

Oral Presentations

Boschman, J., (2021, June). "Improving Deep Learning Models for Clinical Epithelial Ovarian Carcinoma Whole Slide Pathology Image Classification Using Color Normalization", *BME-AI Monthly Research Exchange*, Virtual

Boschman, J., Brown, J., Levschuk, A., Werschler, N., (2020, April). "Local Traction to Facilitate Accurate Injection of Xiaflex for Peyronie's Disease", *Engineers in Scrubs 2020*, Vancouver, BC

Fu, D., **Boschman, J.**, Chan, N., Co, I., Fegen, A., Luvalle-Burke, I., Shahali, A. (2015, October). “DNA origami, gold nanoparticle and liposome drug delivery system enabling simultaneous and triggered release”, *BIOMOD 2015 Competition*, Boston, MA

Poster Presentations

Boschman, J., Farahani, H., Farnell, D., Jones, S. J. M., Huntsman, D. G., Gilks, C. B., Bashashati, A. (2021, May). “The Utility of Color Normalization for Artificial Intelligence-Based Diagnosis of Hematoxylin and Eosin-Stained Pathology Images”, *UBC Pathology Day 2021*, Virtual

Amiri, A., **Boschman, J.**, Yadav, V. G., Scaman, C., Rahim, R. A., Yada, R. Y., Mohamad, R. (2017, July). “Optimal Hemin Stimulation for Maximizing Lactococcus lactis Biomass Production under Respiration Conditions in Batch Cultivation”, *2017 BIO World Congress on Industrial Biotechnology*, Montreal, QC

Apduhan, M., **Boschman, J.**, Chan, N., Chin, B., Co, I., Goertsen, D. (2017, March). “Industrial Scale Production of Biocompatible Polyhydroxybutyrate (PHB) Using Apoptosis-regulated Recombinant Escherichia coli”, *UBC Applied Science Design Day*, Vancouver, BC

Skills

Languages: Python, R, SQL, MATLAB
Tools: Vim, Jupyter Notebooks, Google Colab, RStudio, SQLite, MySQL
Libraries: PyTorch, Keras, torchvision, Pandas, Matplotlib, scipy, scikit-learn, git

Teaching and Mentorship

Graduate Teaching Assistant The University of British Columbia - BMEG 557: Statistical Methods for Evaluating Medical Technologies	Sept - Dec 2020 Vancouver, Canada
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Elementary School Science Educator Let's Talk Science / CHBE	May 2017 - April 2018 Vancouver, Canada
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Committee Membership and Leadership

Trainee Education Committee Member Gynecological Cancer Initiative (GCI)	April 2021 - Dec 2021 Vancouver, Canada
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- Helped build and support academic, professional development, and mental health initiatives for GCI trainees
- Conducted research impact assessment to achieve more funding
- Wrote articles to help patient's learn more

Event Organizer

May 2020 - Dec 2021

Artificial Intelligence in Medicine Lab

Vancouver, Canada

- Led weekly book club by facilitating discussion and choosing appropriate study materials
- Organized the presenters of weekly literature reviews to stay up to date with research
- Planned lab events, such as cultural celebrations and summer BBQs, ensuring that everyone felt welcome, included, and

Undergraduate Safety Committee Representative

Sept 2016 - Sept 2017

CHBE/CERC Safety Committee

Vancouver, Canada

- Corrected 11 extremely dangerous hazards and 178 safety deficiencies by conducting 22 laboratory safety inspections

Voluntary Work

Homeless Shelter Volunteer

Oct 2017 - Feb 2020

Union Gospel Mission

Vancouver, Canada

Construction and Farming Volunteer

Feb - May 2019

WWOOF Japan

Fujinomiya, Ishigaki, and Kasumigaura, Japan

Recreational Program Volunteer

Oct 2017 - Jan 2019

Burnaby General Hospital - Fellburn Care Center

Burnaby, Canada

Undergraduate Research Assistant

Feb - Aug 2015

Kastrup Lab

Vancouver, Canada

Hobbies

Calisthenics | Running | Cooking with my cast iron pan (Loonardo DiCastironio) | Reading

References

Ali Bashashati, PhD

Hosseini Farahani, PhD

Roger Tam, PhD

Chad Pickel