Jeffrey Boschman

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

Areas of Expertise

Machine Learning | Digital Pathology | Pharmaceutical cGMP | Engineering Risk Assessments

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Education

MASc, Biomedical Engineering Sept 2019 - Dec 2021
The University of British Columbia *Vancouver, Canada*
- GPA: 4.29/4.33
- Switched from MEng to MASc in May 2020

BASc, Chemical and Biological Engineering Sept 2012 - May 2017
The University of British Columbia *Vancouver, Canada*
- GPA: 3.85/4.33
- With Distinction and Co-operative Education

Research Experience

Graduate Research Assistant May 2020 - Dec 2021
The Artificial Intelligence in Medicine (AIM) Lab *Vancouver, Canada*
The University of British Columbia
- 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 Sept 2019 - April 2020
Engineers in Scrubs program *Vancouver, Canada*
The University of British Columbia
- 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 Jan - Sept 2017
The Biofoundry *Vancouver, Canada*
The University of British Columbia

- 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

Work Experience

Research and Development Intern May - Aug 2019
New Beta Innovation Ltd. *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 Oct 2017 - Dec 2018
New Beta Innovation Ltd. *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 Jan - July 2016
Carbon Engineering Ltd. *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 May - Aug 2015
Department of Chemical and Biological Engineering (CHBE) *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 May - Dec 2014
Maxxam Analytics *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 1st Place Audience Choice Award	2015
BIOMOD Silver Project Award	2015
Go Global International Learning Programs Award ($1,000)	2015

Publications

Boschman, J., Farahani, H., 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

Machine learning

- Currently improving deep learning-based diagnosis of ovarian epithelial carcinoma subtypes (*The Artificial Intelligence in Medicine (AIM) Lab*)

Visual computing

- Led a study comparing color normalization pre-processing algorithms on digital histopathology whole slide images for improved machine learning-based cancer diagnosis (*The Artificial Intelligence in Medicine (AIM) Lab*)

Good Manufacturing Practices (GMP) pharmaceuticals

- Conducted engineering trial runs for optimizing aseptic production and filling of a haemoglobin-based pharmaceutical on a commercial batch scale with a five-day turnaround schedule (*New Beta Innovation Ltd.)*
- Authored and executed validation documents and protocols (URS, DQ, IQ, OQ, PQ, etc) for equipment on-boarding and GMP readiness and developed standard operating procedures for various production operations (*New Beta Innovation Ltd.)*
- Qualified in cleanroom control techniques such as aseptic filling, Grade B gowning, cleaning, and material and personnel flow (*New Beta Innovation Ltd.)*

Engineering Risk Assessments

- Led formal risk assessment (FMEA) on equipment installation in Grade A environment as subject matter expert (*New Beta Innovation Ltd.)*
- Corrected 11 extremely dangerous hazards and 178 safety deficiencies by conducting 22 laboratory safety inspections (*CHBE/CERC Safety Committee*)

Teaching and Mentorship

Graduate Teaching Assistant Sept - Dec 2020
The University of British Columbia *Vancouver, Canada*
- BMEG 557: Statistical Methods for Evaluating Medical Technologies

Elementary School Science Educator May 2017 - April 2018
Let's Talk Science / CHBE *Vancouver, Canada*

Committee Membership and Leadership

Trainee Education Committee Member April 2021 - Dec 2021
Gynecological Cancer Initiative (GCI) *Vancouver, Canada*
- 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

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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

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References

Ali Bashashati, PhD
Hossein Farahani, PhD
Roger Tam, PhD
Chad Pickel