

# Jeffrey Boschman

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

## Areas of Expertise

Machine Learning | Visual Computing | GMP Pharmaceuticals | Engineering Risk Assessments

## Education

### **MASc, Biomedical Engineering**

*The University of British Columbia*

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

Sept 2019 - Dec 2021

*Vancouver, Canada*

### **BASc, Chemical and Biological Engineering**

*The University of British Columbia*

- GPA: 3.85/4.33
- With Distinction

Sept 2012 - May 2017

*Vancouver, Canada*

## 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 <sup>st</sup> Place Audience Choice Award         | 2015 |
| BIOMOD Silver Project Award                                | 2015 |
| Go Global International Learning Programs Award (\$1,000)  | 2015 |

## Research Experience

### **Graduate Research Assistant**

*The Artificial Intelligence in Medicine (AIM) Lab*

*The University of British Columbia*

- Supervisor: Ali Bashashati, PhD
- Led study comparing color normalization pre-processing algorithms on digital histopathology slides for improved machine learning-based cancer diagnosis
- Currently improving deep learning-based diagnosis of ovarian epithelial carcinoma subtypes

May 2020 - Dec 2021

*Vancouver, Canada*

**Graduate Student*****Engineers in Scrubs program***

*The University of British Columbia*

Sept 2019 - April 2020

*Vancouver, Canada*

- Supervisor: Roger Tam, PhD
- Clinical Advisor: Ryan Flannigan, MD
- Developed medical device prototype to improve the accessibility and decrease the mobility of plaque to facilitate more accurate injections in treating Peyronie's disease

**Fermentation Engineer*****The Biofoundry***

*The University of British Columbia*

Jan - Sept 2017

*Vancouver, Canada*

- Improved efficiency of culturing bacteria by writing standard operating procedures for 2L bioreactor and managing its operation
- Optimized bioreactor conditions for growth by collecting samples for 24 hours under different aeration conditions

## **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 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
- 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
- Led formal risk assessment (FMEA) on equipment installation in Grade A environment as subject matter expert
- Qualified in cleanroom control techniques such as aseptic filling, Grade B gowning, cleaning, and material and personnel flow
- Put in charge of training new technicians, volunteered to take Level 2 Occupational First Aid to keep others safe on night shifts, and managed the production department's reporting of the environmental management system (EMS)

**Pilot Plant Intern**

Jan - July 2016

**Carbon Engineering Ltd.**

Squamish, Canada

- Redesigned fluidized bed pellet reactor by analyzing flaws in previous models, examining ways to improve ease of use, researching optimal materials to fit design, and making equipment modifications
- Optimized input variables for pellet growth by constructing two 20ft tall reactors and conducting 24-36hour tests
- Quantified pellet growth and attrition by analyzing 6-20 total suspended solids, pH, and pellet size distribution samples per day, improved data collection by remodeling Excel sheet, and authored report to summarize results

**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
- Managed two stations for one month each, incurring the responsibilities of a full-time employee, troubleshooting by reviewing older procedures, and getting audited by a major client

## **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**

*The University of British Columbia*

Sept - Dec 2020

*Vancouver, Canada*

- Statistical Methods for Evaluating Medical Technologies

### **Elementary School Science Educator**

*Let's Talk Science / CHBE*

May 2017 - April 2018

*Vancouver, Canada*

## **Committee Membership and Leadership**

### **Trainee Education Committee**

*Gynecological Cancer Initiative (GCI) Trainee*

April 2021 - Dec 2021

*British Columbia, Canada*

- Helped build and support academic, professional development, and mental health initiatives for GCI trainees

### **Undergraduate Safety Committee Representative**

*CHBE/CERC Safety Committee*

Sept 2016 - Sept 2017

*Vancouver, Canada*

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

## **Voluntary Work**

### **Homeless Shelter Volunteer**

*Union Gospel Mission*

Oct 2017 - Feb 2020

*Vancouver, Canada*

**Construction and Farming Volunteer**  
*WWOOF Japan*

Feb - May 2019  
*Fujinomiya, Ishigaki, and Kasumigaura, Japan*

**Recreational Program Volunteer**  
*Burnaby General Hospital - Fellburn Care Center*

Oct 2017 - Jan 2019  
*Burnaby, Canada*

**Undergraduate Research Assistant**  
*Kastrup Lab*

Feb - Aug 2015  
*Vancouver, Canada*

## **Hobbies**

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

## **References**

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