**Jeffrey Boschman**

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

**Areas of Expertise**

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

**Education**

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| **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

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| **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**

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| **Graduate Research Assistant** | May 2020 - Dec 2021 |
| ***The Artificial Intelligence in Medicine (AIM) Lab***  *The University of British Columbia* | *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

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| **Graduate Student** | Sept 2019 - April 2020 |
| ***Engineers in Scrubs program***  *The University of British Columbia* | *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

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| **Fermentation Engineer** | Jan - Sept 2017 |
| ***The Biofoundry***  *The University of British Columbia* | *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

**Work Experience**

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| **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

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| **Production Technician** | Oct 2017 - Dec 2018 |
| ***New Beta Innovation Ltd.*** | *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)

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| **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

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| **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

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| **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

**Awards**

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| 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**

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| **Graduate Teaching Assistant** | Sept - Dec 2020 |
| *The University of British Columbia* | *Vancouver, Canada* |

* Statistical Methods for Evaluating Medical Technologies

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

**Committee Membership and Leadership**

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| **Trainee Education Committee** | April 2021 - Dec 2021 |
| *Gynecological Cancer Initiative (GCI) Trainee* | *British Columbia, 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

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| **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**

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| **Homeless Shelter Volunteer** | Oct 2017 - Feb 2020 |
| *Union Gospel Mission* | *Vancouver, Canada* |

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| **Construction and Farming Volunteer** | Feb - May 2019 |
| *WWOOF Japan* | *Fujinomiya, Ishigaki, and Kasumigaura, Japan* |

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| **Recreational Program Volunteer** | Oct 2017 - Jan 2019 |
| *Burnaby General Hospital - Fellburn Care Center* | *Burnaby, Canada* |

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| **Undergraduate Research Assistant** | Feb - Aug 2015 |
| *Kastrup Lab* | *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