# Blake VanBerlo

*Updated November 16, 2023*

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## 1 Research interests

Computer vision, explainable artificial intelligence, self-supervised learning, reinforcement learning, medical imaging

## 2 Education

**University of Waterloo** — Waterloo, Canada
PhD, Computer Science — 09/2020 – 12/2024 (expected)
Supervisors: Dr. Jesse Hoey & Dr. Alexander Wong
*GPA: 94.75%*

**Western University** — London, Canada
BESc, Software Engineering — 09/2013 – 04/2017
*GPA: 93.92%*

## 3 Publications

### 3.1 Articles

[1] **VanBerlo, B.**, Li, B., Hoey, J., & Wong, A. Self-Supervised Pretraining Improves Performance and Inference Efficiency in Multiple Lung Ultrasound Interpretation Tasks. (2023). arXiv preprint arXiv:2309.02596.

[2] **VanBerlo, B.**, Li, B., Hoey, J., & Wong, A. A Survey of the Impact of Self-Supervised Pretraining for Diagnostic Tasks with Radiological Images. (2023). arXiv preprint arXiv:2309.02555.

[3] **VanBerlo, B.**, Li, B., Wong, A., Hoey, J., & Arntfield, R. Exploring the Utility of Self-Supervised Pretraining Strategies for the Detection of Absent Lung Sliding in M-Mode Lung Ultrasound. (2023). Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops, 3076-3085. *(Impact Factor[1] = 4.06, h5-index = 389, #1 in Engineering & Computer Science on Google Scholar)*

[4] **VanBerlo, B.**, Li, B., Wong, A., Hoey, J., & Arntfield, R. Exploring the Utility of Self-Supervised Pretraining Strategies for the Detection of Absent Lung Sliding in M-Mode Lung Ultrasound. (2023). Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)

[1] Impact factors were retrieved from Scopus.

Workshops, 3076-3085. *(Impact Factor[2] = 4.06, h5-index = 389, #1 in Engineering & Computer Science on Google Scholar)*

[5] Dave, C., Wu, D., Tschirhart, J., Smith, D., **VanBerlo, B.**, ... & Arntfield, R. (2023). Prospective Real-Time Validation of a Lung Ultrasound Deep Learning Model in the ICU. Critical Care Medicine, 51(2), 301-309. *(Impact Factor = 22.49, h5-index = 94, #3 in Critical Care on Google Scholar)*

[6] VanBerlo, B., Smith, D., Tschirhart, J., **VanBerlo, B.**, Wu, D., ... & Arntfield, R. (2022). Enhancing Annotation Efficiency with Machine Learning: Automated Partitioning of a Lung Ultrasound Dataset by View. Diagnostics, 12(10), 2351. *(Impact Factor = 3.912, h5-index = 53, #7 in Nuclear Medicine, Radiotherapy & Molecular Imaging on Google Scholar)*

[7] **VanBerlo, B.**, Wu, D., Li, B., Rahman, M. A., Hogg, G., VanBerlo, B., ... & Arntfield, R. (2022). Accurate assessment of the lung sliding artefact on lung ultrasonography using a deep learning approach. Computers in Biology and Medicine, 148, 105953. *(Impact Factor = 7.469, h5-index = 76)*

[8] Arntfield, R., Wu, D., Tschirhart, J., **VanBerlo, B**., Ford, A., ... & Millington, S. (2021). *Automation of Lung Ultrasound Interpretation via Deep Learning for the Classification of Normal versus Abnormal Lung Parenchyma: A Multicenter Study.* Diagnostics, 11(11), 2049. *(Impact Factor = 3.912, h5-index = 53, #7 in Nuclear Medicine, Radiotherapy & Molecular Imaging on Google Scholar)*

[9] Arntfield, R., **VanBerlo, B.**, Alaifan, T., Phelps, N., White, M., ... & Wu, D. (2021). *Development of a convolutional neural network to differentiate among the etiology of similar appearing pathological B lines on lung ultrasound: a deep learning study.* British Medical Journal Open, 11(3), e045120. *(Impact Factor = 2.86, h5-index = 115, #19 in Health & Medical Sciences (general) on Google Scholar)*

[10] **VanBerlo, B.**, Ross, M. A., Rivard, J., & Booker, R. (2021). *Interpretable machine learning approaches to prediction of chronic homelessness.* Engineering Applications of Artificial Intelligence, 102, 104243. *(Impact Factor = 8.635, h5-index = 76, #17 in Artificial Intelligence on Google Scholar)*

[11] Groves, L. A., Li, N., **VanBerlo, B.**, Veinberg, N., Peters, T. M., & Chen, E. C. (2021). *Improving central line needle insertions using in-situ vascular reconstructions.* Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization, 9(4), 363-369. *(Impact Factor = 1.238, h5-index = 22)*

[12] Groves, L. A., **VanBerlo, B.**, Veinberg, N., Alboog, A., Peters, T. M., & Chen, E. (2020). *Automatic segmentation of the carotid artery and internal jugular vein from 2D ultrasound images for 3D vascular reconstruction.* International Journal of Computer Assisted Radiology and Surgery, 15(11), 1835-1846. *(Impact Factor = 3.772, h5-index = 49)*

[13] Groves, L. A., **VanBerlo, B.**, Peters, T. M., & Chen, E. C. (2019). *Deep learning approach for automatic out-of-plane needle localisation for semi-automatic ultrasound probe calibration.* Healthcare Technology Letters, 6(6), 204-209. *(Impact Factor = 2.577, h5-index = 27)*

### 3.2 Extended Abstracts

[1] VanBerlo, B., Smith, D., Tschirhart, J., **VanBerlo, B.**, Wu, D., ... & Arntfield, R. (2022). Enhancing Annotation Efficiency with Machine Learning: Automated Partitioning of a Lung Ultrasound Dataset

[2] Impact factors were retrieved from Scopus.

by View. Medical Imaging Meets NeurIPS workshop, 36th Conference and Workshop on Neural Information Processing Systems *(peer reviewed)*

[2] **VanBerlo, B.**, Wu, D., Li, B., Rahman, M. A., Hogg, G., VanBerlo, B., ... & Arntfield, R. (2022). Accurate assessment of the lung sliding artefact on lung ultrasonography using a deep learning approach. Medical Imaging Meets NeurIPS workshop, 36th Conference and Workshop on Neural Information Processing Systems *(peer reviewed)*

[3] **VanBerlo, B.**, Wu, D., Tschirhart, J., Ford, A., Ho, J., ... & Arntfield, R. (2021). *Automation of Lung Ultrasound Interpretation via Deep Learning for the Classification of Normal versus Abnormal Lung Parenchyma: A Multicenter Study.* Medical Imaging Meets NeurIPS workshop, 35th Conference and Workshop on Neural Information Processing Systems *(peer reviewed)*

## 4 Honours & Scholarships

### 4.1 Accepted

| | |
|---|---|
| Vanier Canada Graduate Scholarship (NSERC) | 2023 |
| Ontario Graduate Scholarship (Masters) (Government of Ontario) | 2022 |
| President's Graduate Scholarship (University of Waterloo) | 2020-2022 |
| David R. Cheriton Graduate Scholarship Masters (University of Waterloo) | 2020-2022 |
| NSERC Alexander Graham Bell Canada Graduate Scholarship - Masters (NSERC) | 2020-2021 |
| Vector Scholarship in AI (University of Waterloo) | 2020-2021 |
| R Mohan Mathur Gold Medal for Software Engineering (Western University) | 2017 |
| Schulich Leader Scholarship (Western University) | 2013-2017 |
| Dean's Honour List (Western University) | 2013-2017 |
| I.E.E.E. Award (Western University) | 2016 |
| Bizmo Award for Volunteerism (Western University) | 2016 |
| Steinmetz-Woonton Scholarship (Western University) | 2015 |

### 4.2 Declined

| | |
|---|---|
| Canada Graduate Scholarships - Doctoral (NSERC) | 2023 |
| Ontario Graduate Scholarship (Doctoral) (Government of Ontario) | 2023 |

## 5 Teaching

**Sessional Instructor (University of Waterloo)** Winter 2022, Fall 2022

CS486/686: Introduction to Artificial Intelligence ($\times 2$)

Sole instructor for 2 sections per term (148 students total) – delivered lectures; constructed and evaluated assessments; managed teaching assistants.
*Average Student Course Perceptions Rating:* **4.6/5**

**Teaching Assistant (University of Waterloo)** Fall 2020 - Present
CS480/680: Introduction to Machine Learning (×1)
CS486/686: Introduction to Artificial Intelligence (×4)
CS135: Designing Functional Programs (×1)
Graded student assessments; designed and tested programming assignments; held office hours; conducted exam review tutorials

## 6 Research Experience

**Deep Breathe** *Director of Machine Learning*
Principal Investigator: Dr. Robert Arntfield (Western University) Jan 2021 - Present
Automation of lung ultrasound interpretation. Classification of artifacts associated with specific pathological states, such as A lines, B lines, lung sliding.

**Virtual Augmentation and Simulation for Surgery and Therapy Lab** *Research Assistant*
Princial Investigator: Dr. Terry Peters (Western University) Oct 2018 – Aug 2019
Applied deep computer vision methods to facilitate ultrasound needle registration, segmentation of neck vasculature.

**Canadian Surgical Technologies and Advanced Robotics** *Undergraduate Research Assistant*
Princial Investigator: Dr. Roy Eagleson (Western University) May 2016 – Aug 2016
Supported development of visualization systems for augmented reality surgical simulations.

## 7 Industry Experience

**VanBerlo Consulting** London, Canada
Founder January 2020 - Present
Research, development, and deployment of artificial intelligence and/or data science solutions for clients. Educational and speaking engagements. Examples of past projects include prediction of chronic homelessness, municipal water demand forecasting.

**Unity Technologies,** Computer Vision Vancouver, Canada
Machine Learning Developer Intern May 2021 - Aug 2021
Explored sim2real gap for synthetic depth images in pose estimation. Contributed to novel 6D pose estimation algorithm.

**RhinoActive** London, Canada
Software Developer, Co-op Jun 2017 - Aug 2017
Designed and developed mobile applications and websites.

**Diebold Nixdorf** London, Canada
Software Engineer, Co-op May 2015 - Aug 2015
Developed internal utility for analyzing log files in automatic teller machines.

## 8 Presentations

**Exploring the Utility of Self-Supervised Pretraining Strategies for the Detection of Absent Lung Sliding in M-Mode Lung Ultrasound** Jun 2023
Oral presentation at the Deep Learning in Ultrasound Image Analysis workshop
41st Conference on Computer Vision & Pattern Recognition

**Automatic Identification of the Lung Sliding artefact on Lung Ultrasound Examination** Dec 2022
Poster presentation at the Medical Imaging Meets NeurIPS workshop
36th Conference on Neural Information Processing Systems

**Enhancing Annotator Efficiency: Automated Partitioning of a Lung Ultrasound Dataset by View** Dec 2022
Poster presentation at the Medical Imaging Meets NeurIPS workshop
36th Conference on Neural Information Processing Systems

**Automatic Distinction Between Normal and Abnormal Lung Tissue on Ultrasound Examination** Dec 2021
Poster presentation at the Medical Imaging Meets NeurIPS workshop
35th Conference on Neural Information Processing Systems

**Computing in Medicine** Sep 2018
Leader Talk at SLXCA 2018, the national Schulich Leaders conference

## 9 Skills

**Programming**
Proficient in: C++, Python, C#, SQL
Familiar with: Java, C, JavaScript, HTML, CSS, Swift, MATLAB

**Language**
English (native), French (intermediate)

## 10 Hobbies & Interests

**Music**

Keyboardist and backing vocalist with The Butter Babies, an alternative rock band.

Other musical interests: jazz piano, classical piano

**Fitness**

Weightlifting, ice hockey, running.

**Baking**

Avid baker of sourdough bread, cookies, pancakes, pretzels, etc.