

# Willa Potosnak

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[Website](#)

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## Education

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### **Carnegie Mellon University (CMU)**

08/22 - Expected: 05/27

#### **Robotics Institute, School of Computer Science**

Ph.D. in Robotics

Advisor: Dr. Artur [Dubrawski](#)

**Research Interests:** Machine Learning (ML), Physics-Informed Deep Learning, Forecasting

**Relevant Coursework:** Intermediate Statistics, Probabilistic Graphical Models, Advanced Intro to ML

### **Duquesne University, Rangos School of Health Sciences**

05/22

*Summa Cum Laude*

B.S., Biomedical Engineering with Minor in Mathematics

## Research Experience

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### **CMU, Robotics Institute, [Auton Lab](#)**

Advisor: Dr. Artur Dubrawski

#### **Research Intern (hired between RISS summers)**

08/20 - 08/22

- Co-developed the [auton-survival](#) code package with Chirag [Nagpal](#) and demonstrated the application of Propensity Adjusted Treatment Effects and Counterfactual Survival Estimation to provide insight into the effect of geographic region and confounding factors on breast cancer mortality rates.
- Developed ML models using time series patient data recorded during cardiac surgeries. The models demonstrate improved risk predictions for multiple postoperative outcomes, including mortality, compared with the baseline Society of Thoracic Surgeons (STS) models deployed nationally.
- Conducted research on Federated Learning and Knowledge Distillation algorithms to improve ML models for institutional organizations with data privacy and communication bandwidth constraints.

#### **Robotics Institute Summer Scholars ([RISS](#)) Program Researcher**

06/20 - 08/20, 06/21 - 08/21

- Improved the reliability of algorithmic rule learning using non-parametric ML algorithms. Rule learning was demonstrated to identify beneficial model transfer opportunities between healthcare sites.
- Developed a ML model that demonstrates the ability to identify patients at higher risk of postoperative renal failure with the inclusion of patient parameters recorded during operation.

### **Duquesne University Biomedical Engineering Department Lab**

Advisor: Dr. Benjamin Goldschmidt

#### **Assistive Technology Project Co-Lead**

01/19 - 05/19

- Designed and 3-D printed an assistive device to facilitate tasks for those with grip disabilities due to stroke or other hand injuries.
- Designed and printed an assistive device for a disabled faculty member to facilitate instruction with hand-held medical tools.

## Other Lab Experience

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### The Citizen Science Lab

05/19 - 08/19

Curriculum designer and instructor of STEM lessons and experiments for K-12 students.

## Achievements and Awards

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Nominated and accepted to the Undergraduate Consortium (UC) mentorship program at the Thirty-Sixth AAAI Conference on Artificial Intelligence (AI) (AAAI-22).

Student panelist for the 2021 Artificial Intelligence and Data Science Education Leadership meeting hosted by [CSforAll](#) and supported by the White House Office of Science and Technology Policy (OSTP) and the National Science Foundation (NSF).

Awarded one of the [2019 John G. Rangos Prizes](#) for Duquesne curriculum proposal that integrated 3-D printing with prosthetic and assistive technology device design for patients.

## Skills

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Coding Languages/Software: Python, PyTorch, MATLAB, Linux, HTML, Git, LaTeX

3-D Printing: 3-D printer use and maintenance, Autodesk Fusion 360, Ultimaker Cura

## Extracurriculars

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Volunteer co-lead of a CMU Robotics Institute team developing the [RoboticsEd](#) website for a global initiative to make robotics and AI resources more accessible to educators and their students.

Piano (12 years of study); guitar (6 years of study)

Member of the CMU rock climbing and grappling (Brazilian Jiu-Jitsu) clubs

## Publications and Presentations

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### Conference Publications

- C1. Nagpal, C., **Potosnak, W.**, Dubrawski, A. (2022). auton-survival: an Open-Source Package for Regression, Counterfactual Estimation, Evaluation and Phenotyping with Censored Time-to-Event Data. *Proceedings of the 7th Machine Learning for Healthcare Conference, PMLR*, 182, 1-24.  
[\[Paper\]](#) [\[Blog\]](#) [\[Code\]](#)
- C2. **Potosnak, W.**, Caldas, S., Dufendach, K. A., Clermont, G., Miller, J. K., Dubrawski, A. (2022). Robust Rule Learning for Reliable and Interpretable Insight into Expertise Transfer Opportunities. in *Proceedings of the Thirty-Sixth AAAI Conference on Artificial Intelligence*.  
[\[Paper\]](#)
- C3. Rühling Cachay, S., Erickson, E., Buckner, A. F. C., Pokropek, E., **Potosnak, W.**, Osei, S., Lütjens, B. (2020). Graph Neural Networks for Improved El Nino Forecasting. *NeurIPS 2020 Workshop on Tackling Climate Change with Machine Learning*.  
[\[Paper\]](#)

### Conference Presentations

- P1. **Potosnak, W.**, Challu, C., Olivares, K. G., Dubrawski, A. W. (2023). Forecasting Response to Treatment with Deep Learning and Pharmacokinetic Priors. *Machine Learning for Health (ML4H) Findings Track Collection*.  
[\[Paper\]](#) [\[Code\]](#)

- P2. **Potosnak, W.**, Dufendach K. A., Kaczorowski, D., Miller, J. K., Dubrawski, A. (2022). Machine Learning Models with Intraoperative Features Improve Risk Predictions Following CABG. *Society of Thoracic Surgeons Coronary Conference*.  
[\[Abstract\]](#)
- P3. Dufendach, K. A., Nagpal, C., **Potosnak, W.**, Dubrawski, A., Kaczorowski, D., (2022). Novel Machine Learning Technique Defines Patients Who Benefit from Off-Pump CABG. *Society of Thoracic Surgeons Coronary Conference*.  
[\[Abstract\]](#)
- P4. **Potosnak, W.**, Caldas, S., Dufendach, K. A., Clermont, G., Miller, J. K., Dubrawski, A. (2021). Robust Interpretable Rule Learning to Identify Expertise Transfer Opportunities in Healthcare. *NeurIPS 2021 Workshop Bridging the Gap: from Machine Learning Research to Clinical Practice*.  
[\[Workshop details\]](#)
- P5. **Potosnak, W.**, Dufendach, K. A., Wertz, A., Miller, J. K., Kilic, A., Dubrawski, A. (2021 January 29-31). Continuous Intraoperative Data Analysis Using Machine Learning Reveals Multiple Parameters to Predict Post-CABG Renal Failure. *Society of Thoracic Surgeons (STS) 57<sup>th</sup> Annual Meeting*.  
[\[Meeting details\]](#)

### Journal Publications

- J1. **Potosnak, W.**, Dufendach, K. A., Nagpal, C., Kaczorowski, D. J., Yoon, P., Bonatti, J., Miller, J. K., Dubrawski, A. W. (2023) Intraoperative Features Improve Model Risk Predictions Following Coronary Artery Bypass Grafting. *Annals of Thoracic Surgery Short Reports* (Under Review).