Eric Pulick

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Education

University of Wisconsin - Madison — Madison, WI
Ph.D. in Industrial & Systems Engineering — *Expected May 2026*

University of Wisconsin - Madison — Madison, WI
M.S. in Industrial & Systems Engineering, GPA 4.00/4.00 — *August 2024*

University of Michigan — Ann Arbor, MI
M.S.E. in Mechanical Engineering, GPA 4.00/4.00 — *April 2016*

University of Michigan — Ann Arbor, MI
B.S.E. in Mechanical Engineering, summa cum laude, GPA 3.94/4.00 — *April 2015*

Research Experience

Graduate Research Assistant — 2021 – Present
Industrial & Systems Engineering, University of Wisconsin - Madison — *Madison, WI*

Treatment Recommendation Algorithms for Clinical Deterioration

- Built novel recurrent neural network architectures using PyTorch for predicting lifesaving treatments for hospital patients experiencing clinical deterioration.
- Established benchmark performance of proposed methods using a gold-standard, chart-reviewed multi-center dataset and characterized differences with respect to classical machine learning algorithms implemented using XGBoost and scikit-learn.
- Manuscript under review at the Journal of Medical Internet Research - Artificial Intelligence.

Adaptive Control Algorithms for Substance Use Disorder (SUD) Treatment Selection

- Created an adaptive control framework for SUD treatment selection.
- Modeled patient engagement as a linear dynamic process with unknown parameters. Patient parameters are learned using maximum likelihood estimation and are used as inputs to novel treatment selection algorithms.
- Manuscript accepted and to appear at the 2025 IEEE Conference on Decision and Control.

Personalized Prediction Models for Alcohol Use Disorder (AUD)

- Built a personalized state-space model structure for predicting alcohol lapse for individuals recovering from AUD.
- Derived expectation-maximization algorithm to learn patient model parameters as maximum a posteriori estimates from mood surveys submitted daily as part of study. Implemented fitting algorithm in R. Personalized models shown to outperform state-of-the-art population level machine learning models.
- Manuscript published at the Journal of Medical Internet Research - Formative Research.

Comparing Reinforcement Learning and Human Learning

- Designed experimental game environment to study differences in human learning and reinforcement learning (RL) and inform how RL tools are best deployed alongside humans in real-world tasks.
- Constructed and performed experiments to study how the structure of a learning task affects learning performance for humans and various reinforcement learning algorithms. Implemented Q-learning and policy-gradient based methods in PyTorch and explored the impact of hyperparameter structure through ablation studies.
- Manuscript published in IEEE Access.

Research Assistant — 2014 – 2016
Center for Complex Systems, University of Michigan — *Ann Arbor, MI*

Influence of Media on Political Polarization

- Created an agent-based model using NetLogo to explore the interplay between direct, human-to-human interaction and media influence on political idea spread. Numerous mechanisms for each were modeled to assess their impact in driving idea consensus or polarization.
- Manuscript published in the Journal of Artificial Societies and Social Simulation.

Professional Experience

Systems/Software Engineer 2018 – 2021
Bosch *Plymouth, MI*

- Developed software for automotive brakes products in autonomous vehicle applications, with an emphasis on hydraulic and system health monitoring functions.
- Led rollout of new tools and methods to improve the organization's handling of requirements and software testing.

Graduate Rotational Engineer 2016 – 2018
Bosch *various locations*

Rotational development program for MS graduates. Four half-year assignments in various Bosch functions.

- **Rotation 4 - Software Engineer,** Abstatt, Germany
  Created Matlab tooling for 're-use' analysis to assess software re-usability across different brake product customer projects.
- **Rotation 3 - Technical Project Manager,** Plymouth, MI
  Coordinated internal development of Bosch braking solutions for GM Epsilon platform vehicles (e.g. Chevrolet Malibu, Buick Lacrosse) across various model years.
- **Rotation 2 - Government Affairs Analyst,** Washington, D.C.
  Provided white papers on legislative topics relevant to Bosch products and organized annual international Bosch government affairs conference.
- **Rotation 1 - Research Engineer,** Farmington Hills, MI
  Designed experiments investigating effects of direct injection fuel spray parameters on soot production and created model for minimizing emissions. Built data visualization tool in Matlab for optimizing engine emissions across different tested calibration parameters.

Mechanical Engineering Intern Summer 2015
Burns & McDonnell *Kansas City, MO*

- Designed and documented a lubrication oil system for a plant flue gas recirculation blower.
- Performed detailed heat transfer analysis to size insulation for plant ash recycling silo.

Manufacturing Intern Summer 2014
GE-Hitachi Nuclear Energy *Wilmington, NC*

- Spearheaded architecture and planning of tooling management project.
- Designed SQL database capable of tracking shop tooling usage, ultimately capable of integration into a full-fledged manufacturing requirements planning (MRP) system.

Quality Engineering Intern Summer 2013
Videojet Technologies *Wood Dale, IL*

- Led investigative team in root-cause analysis to resolve critical product failure.
- Reduced failure rates from over 50% to below 0.1%.

Mechanical Engineering Intern Summer 2012
Videojet Technologies *Wood Dale, IL*

- Collaborated on value analysis/value engineering projects.
- Accounted for improvements estimated at approximately $100,000 in annual savings.

Technical Skills

Languages: Python, R, MATLAB, Julia, Stan
Libraries & Tools: PyTorch, NumPy, Pandas, scikit-learn, Seaborn, Gurobi, JuMP, HTCondor, git, LaTeX

Teaching Experience

Teaching Assistant 2023, 2025
ISYE723 - Dynamic Programming *Madison, WI*

Mathematics of dynamic programming, including model-based and model-free reinforcement learning. Created new homework assignments/solutions and graded assignments. 20-30 students.

Teaching Assistant 2023
ISYE313 - Engineering Economic Analysis *Madison, WI*

Foundations of engineering accounting, including cash flow, discounting, and decision-making frameworks. Prepared new discussion materials, held weekly discussion sections, answered student questions, and graded homework and exams. 50 students.

Graduate Student Instructor 2015–2016

MECHENG 433 – Advanced Energy Solutions *Ann Arbor, MI*

Thermodynamics of modern power generation technologies and analysis of their real-world use. Held office hours, answered student questions, and created supplementary lecture materials and videos for students. 100 students.

Service & Leadership

UW-Madison INFORMS Student Chapter

President

- Led all chapter operations, particularly setting priorities, organizing chapter activities, and managing communication with the Industrial and Systems Engineering department and College of Engineering.

Vice President

- Organized sessions for student development, guest speakers, research presentations, and skills trainings.

Communications Officer

- Managed all communication from the student board to the chapter. Assisted other officers to organize professional and social events for the chapter.

Publications

Pulick, E., Carey, K., Qyli, T., Oguss, M., Picart, J., Penumalee, L., Nezirova, L., Tully, S., Gilbert, E., Shah, N., Ravichandran, U., Afshar, M., Edelson, D., Mintz, Y., & Churpek, M., Treatment Recommendations for Clinical Deterioration on the Wards: Development and Validation of Machine Learning Models, *Manuscript under review at Journal of Medical Internet Research - Artificial Intelligence*

Pulick, E. & Mintz, Y. (2025). An Adaptive Control Approach to Treatment Selection for Substance Use Disorders, *Accepted, to appear at the 2025 IEEE Conference on Decision and Control*, Preprint DOI: arXiv:2504.01221

Pulick, E., Curtin, J., & Mintz, Y. (2025). Idiographic Lapse Prediction with State Space Modeling: Algorithm Development and Validation, *Journal of Medical Internet Research - Formative Research*, DOI: 10.2196/73265

Pulick, E., Menkov, V., Mintz, Y., Kantor, P. B., & Bier, V. M. (2024). Comparing Reinforcement Learning and Human Learning with the Game of Hidden Rules. *IEEE Access*. DOI: 10.1109/ACCESS.2024.3395249

Pulick, E., Korth, P., Grim, P., & Jung, J. (2016). Modeling Interaction Effects in Polarization: Individual Media Influence and the Impact of Town Meetings. *Journal of Artificial Societies and Social Simulation*, 19(2), 1. DOI: 10.18564/jasss.3021

Technical Reports

Bier, V. M., Feldman, J., Gallos, L., Kantor, P. B., Lupyan, G., Mintz, Y., **Pulick, E.**, Sala, F., & Wang, H. (2025). Joint Research on Human and Artificial Intelligence. DOI: 10.31234/osf.io/7xydm_v1

Pulick, E., Bharti, S., Chen, Y., Menkov, V., Mintz, Y., Kantor, P., & Bier, V. M. (2022). The Game of Hidden Rules: A New Kind of Benchmark Challenge for Machine Learning. DOI: arXiv:2207.10218v1

Previous & Invited Talks

Algorithms for Substance Use Disorder Treatment Selection, INFORMS Annual Meeting, Atlanta, GA, 2025

Using State Space Models for Personalized Lapse Prediction, INFORMS Annual Meeting, Seattle, WA, 2024

Comparing Human Learning and Reinforcement Learning, Open Science Grid School, Madison, WI, 2023

Awards

Rea C and David H Gustafson Scholarship - Merit scholarship for outstanding performance within the Industrial and Systems Engineering department, $2,000 award, 2024

Stamps Leadership Scholarship - Merit scholarship awarded to 18 top applicants to U-M, $80,000 total award, 2011–2015