

Jordan Donovan

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WORK EXPERIENCE

US Army Engineer Research and Development Center (ERDC)

- **Senior ML Research Scientist** *Oct. 2022 – PRESENT*
 - Pioneered research of neural network parameters to increase efficiency of training and inference ten-fold.
 - Led project to design and implement an automated machine learning (AutoML) system lowering the barrier of entry for non-experts while also significantly improving the efficiency and accuracy of resulting algorithms.
- **Senior ML Research Engineer** *Oct. 2018 – Oct. 2022*
 - Designed, implemented, and deployed real-time ML model for multi-modal object detection on robot increasing efficiency (by 10x) and accuracy (by 30%).
- **Senior Software Engineer (Full Stack)** *Oct. 2016 – Oct. 2018*
 - Led a team of six to develop innovative mobile applications and web portals to aid in national hurricane relief, wildlife preservation, and wildfire prevention efforts increasing response time by 300%
- **Software Engineer (Full Stack)** *June 2015 – Oct. 2016*
 - Implemented python, C#, C++, and JavaScript code in creating mobile applications for federal asset management increasing efficiency within this mission by 7x

EDUCATION

- University of Vermont, Burlington, VT — Ph.D. (CompSci)** *Aug. 2021 – May 2026*
 - Dissertation centers around improving efficiency and accuracy of all neural network models across all domain spaces with broad impacts to research and engineering
- Mississippi State University, Starkville, MS — MSc (CompSci)** *Aug. 2016 – Dec. 2019*
 - Thesis explored revealing black box mechanisms of neural networks in deciphering patterns with regards to computer vision tasks thus informing future AI designs
- University of Mississippi, Oxford, MS — BSc (CompSci)** *Aug. 2011 – May 2015*

SKILLS

Machine Learning: Deep learning, Computer Vision, NLP, Transfer Learning, Decision Trees, Ensemble Methods, MLPs, RNNs, CNNs, ViTs, Transformers, LLMS, DDP

Programming: Python (Pandas, Numpy, PyTorch, OpenCV, Scikit-Learn, Tensorflow, Caffe, Matplotlib, Hugging Face, Scipy), C++, C#, R, SQL, JavaScript

Tools: AWS (SageMaker), Docker, Jupyter, Visual Studio, Anaconda, Google Colab, Wandb.ai, Git, Linux CLI, Qt

Jordan Donovan - CV

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APPOINTMENTS

US Army Engineer Research and Development Center

June 2015 - Present

- Senior ML Research Scientist (2022 - Present)
- Senior ML Research Engineer (2018 - 2022)
- Senior Full Stack Software Engineer (2016 - 2018)
- Software Engineer (2015 - 2016)

EDUCATION

University of Vermont, Burlington, VT — Ph.D. (CompSci)

Aug. 2021 - May 2026

- **Dissertation:** Improving efficiency and accuracy of all neural network models across all domain spaces with broad impacts to research and engineering
- **Advisors:** Nick Cheney and Josh Bongard

Mississippi State University, Starkville, MS — MSc (CompSci)

Aug. 2016 - Dec. 2019

- **Thesis:** explored revealing black box mechanisms of neural networks in deciphering patterns with regards to computer vision tasks thus informing future AI designs
- **Advisor:** Chris Archibald

University of Mississippi, Oxford, MS — BSc (CompSci)

Aug. 2011 - May 2015

PROJECTS / GRANTS

Total Participated in: 3M

Total Led (PI / PM): 2.75M

- Mobile Information Collection Application (MICA) (2015 - 2016) (\$500K)
- Asset Management Mobile Application (AMMA) (2016-2018) (\$500K)
- Operation Blueroof (Hurricane Response) (2017-2018) (\$1.2M)
- Robotic Engineer Operations Multi-Modal AI (2018-2022) (\$2.5M)
- Semi-Autonomous Methods for Novel Neural Network Designs (2023) (250K)
- Improving Neural Network Efficiency and Performance through Intelligent Selection of Parameter Subsets (2024) (250K)
- Construction Management Builder AI (2025) (500K)
- Stepping Stones for Improved Optimization of Neural Networks (2026) (300K?)
- AI for Defect Detection in Additive Manufacturing with OSD ManTech (2027) (1.2M?)

CERTIFICATIONS

- NVIDIA Generative AI with Diffusion Models (NVIDIA, 2024) (Certificate Received)
- Data Science in Python (ITL, 2019) (Certificate received)
- NVIDIA Deep Learning for Visualization (NVIDIA, 2019) (Certificate Received)
- NVIDIA Deep Learning for Natural Language Processing (NVIDIA, 2019) (Certificate Received)
- Dynamic Presentation Skills (ITL, 2017) (Certificate Received)
- Security + (ITL, 2016) (Certificate Received)
- Leadership Development Program I (2019)

WORKSHOPS

- ERDC Reinforcement Learning Workshop (ITL, 2024)

- ERDC Artificial Intelligence and Machine Learning Workshop (ITL, 2023)
- Amazon AI/ML in AWS Cloud Immersion Training (Craig Halsey, AWS, 2023)
- Machine Learning for Everyone: May The Fourth Be with You! (Mark Tschopp, US Army Research Laboratory, 2023)
- Ludobots – Evolutionary Robotics Simulation (online by Dr. Josh Bongard, 2020)
- CES Foundation (ITL, 2019)
- Introduction to Deep Learning (ITL, 2018)
- Introduction to TensorFlow (ITL, 2018)
- Introduction to Deep Reinforcement Learning (ITL, 2018)
- Technical Writing (ITL, 2018)
- Technology Transfer (ITL, 2017)

HONORS AND AWARDS

- Dept. of the Army Achievement Medal for Civilian Service (ITL 2016)
- USACE CIO Information Management / Information Technology (IM/IT) Technical Support Team of the Year (ITL, 2018)
- FEMA Certificate of Appreciation for Hurricane Response Efforts (ITL 2017)
- Dept. of the Army Achievement Medal for Civilian Service (ITL 2016)

PUBLICATIONS

- Donovan, J., “Perturbations to DNN Initializations Improve Optimization Efficiency and Performance by Avoiding Vanishing Gradients” (revising)
- Donovan, J., Ramesh, D. (2024) “Inducing Diversity in Auto-ML Improves Viability” Journal of DoD Research and Engineering, FLEX-4: Semi-Autonomous Methods for Novel Neural Network Designs (submitted)
- Hadia, X., Price, S., Donovan, J. (2023) “Semantic Segmentation: Pixelwise Classification” ERDC Library, REO
- Donovan, J. (2022). “Brainiac+: Evolving Multiple Variables within the Brain of a Quadruped” ERDC Library, RIENO.
- Donovan, J. (2022). “Innovations of Cellular Automata” ERDC Library, RIENO.
- Donovan, J. (2022). “Novelty and Discovery within Cellular Automata” ERDC Library, RIENO.
- Donovan, J. (2022). “Novel Feature Detectors in CNNs” ERDC Library, RIENO.
- Donovan, J. (2022). “Evolutionary Selection Criteria and Performance in NAS-Bench-101” ERDC Library, RIENO.
- Donovan, J. (2019). “Understanding State-of-the-art Material Classification Through Deep Visualization.” MS Thesis
- Donovan, J. (2019). “Understanding State-of-the-art Material Classification Through Deep Visualization.” *ERDC Library*, RIENO.
- Donovan, J. (2019). “Material Classification for Robotic Integrated Engineer Operations.” ERDC Library, RIENO.
- Donovan, J., Pettitt, J. “Mobile Information Collection Application: User Manual” *ERDC Library*, MICA.
- Donovan, J., Pettitt, J. “Mobile Information Collection Application: Installation Manual” *ERDC Library*, MICA.

TECHNICAL PRESENTATIONS

- “Initialization Techniques for Neural Networks. Can we do better?”, Neurobotics Laboratory Periodic Meet. University of Vermont, Virtual, October 2024.

- “Semi-Autonomous Methods for Novel Neural Network Designs”, FLEX-4 Seed Research Closeout IPR, ERDC, Vicksburg, MS, October, 2024.
- “Improving Efficiency of AI”, ERDC Coastal Hydraulics Lab Research Forum, ERDC CHL, Vicksburg, MS, September, 2024.
- “Proposal: Improving Neural Network Efficiency and Performance through Intelligent Selection of Parameter Subsets”, ERDC 6.1 Basic Research Review, ERDCWRX, Vicksburg, MS, June, 2024.
- “Semi-Autonomous Methods for Novel Neural Network Designs”, RD24 Transform and Transition, ERDC ITL, Vicksburg, MS, April, 2024.
- “Unsupervised Pre-Training by Evolving for Diverse Features”, Neurobotics Invited Talk, University of Vermont, Burlington, VT, January 2024.
- “Unsupervised Pre-training by Evolving for Diverse Features”, ERDC Artificial Intelligence and Machine Learning Workshop, ERDC ITL, Vicksburg, MS, November, 2023
- “Deep Learning on the HPCMP”, HPC Discovery Day, ERDC ITL, Vicksburg, MS, October, 2023
- “Unsupervised Pre-Training by Evolving for Diverse Features”, Computer Student Research Day. University of Vermont, Burlington, VT, September 2023.
- “Unsupervised Pre-Training by Evolving for Diverse Features”, Association for Computing Machinery (ERDC), ERDC ITL, Vicksburg, MS, August 2023.
- “Poster: Unsupervised Pre-Training by Evolving Diverse Features”, Student Research Conference. University of Vermont, Burlington, VT, April 2023.
- “Unsupervised Pre-Training by Evolving Diverse Features”, Neurobotics Laboratory Periodic Meet. University of Vermont, Virtual, February 2023.
- “Evolution of Diverse Feature Collectors”, Neurobotics Laboratory Periodic Meet. University of Vermont, Virtual, November 2022.
- “Collective Intelligence for Deep Learning”, Neurobotics Laboratory Periodic Meet. University of Vermont, Virtual, October 2022.
- “Brainiac+: Evolving Multiple Variables in a Neural Controller for a Quadruped” Evolutionary Robotics Periodic Meet. University of Vermont, Burlington, VT, May 2022
- "Evolutionary Selection Criteria and Performance in NAS-Bench-101" RD22 Channel 5 - Decision Making – Artificial Intelligence/Machine Learning B under Modernize our Nation’s Infrastructure. Virtual, April 2022.
- "Open-Ended Evolution for Novel AI Models" Neurobotics Laboratory Periodic Meet. University of Vermont, Burlington, VT, April 2022.
- "Novel Feature Detectors in CNNs" Deep Learning Periodic Meet. University of Vermont, Burlington, VT, April 2022.
- "EfficientNet (V1 and V2)" Deep Learning Periodic Meet. University of Vermont, Burlington VT, April 2022.
- "EfficientNet (V1 and V2)" Neurobotics Laboratory Periodic Meet. University of Vermont, Burlington, VT, February 2022.
- "Latest Developments in Cellular Automata" Modeling Complex Systems Periodic Meet. University of Vermont, Burlington, VT, December 2021.
- "Evolutionary Selection Criteria and Performance in NAS-Bench-101" Evolutionary Computation Periodic Meet. University of Vermont, Burlington, VT, December 2021.
- “Real-time Material Segmentation for Robot Operations” RD20 Pecha Kucha-Style presentation. Virtual, October 2020.
- “Real-time Material Segmentation for Robot Operations” Data Science Workshop Poster Session. Virtual, August 2020.
- “FEMS data collection with MICA” ERDC HQ FEMS Demo. Vicksburg, MS, January, 2020.
- “Material Classification for Robotic Integrated Engineer Operations” ITL Symposium Poster Session. Vicksburg, MS, November, 2019.
- “CESAT Mobile Demo” Customer Visit and Technology Demo. Vicksburg, MS, October, 2019.

- “Understanding State-of-the-art Material Classification Through Deep Visualization” Mississippi State University MS Thesis Defense. Mississippi State, October 2019.
- “Real-time object and material classification for Robotic Integrated Engineer Operations” Robotic Integrated Engineer Operations FY 19 Closeout. Vicksburg, MS, September 2019.
- “Mobile Computing Impact and Growth” Gains in Education of Math and Science II. Vicksburg, MS, July 2019.
- “Impact of Mobile Computing in the DoD” University of Louisiana at Monroe Tour. Vicksburg, MS, March 2019.
- “Utility of Mobile Applications: Mobile Information Collection Application” ERDC Tour for Great Lakes and Ohio River Division. Vicksburg, MS, February 2019.
- “Mobile Computing Across ERDC” Innovation Alley. Vicksburg, MS, August 2018. (Need to find presentation and date)
- “Mobile Information Collection Application (MICA)” Little Rock District Data Collection Info Session. Little Rock, AR, June 2018.
- “Hurricane Relief Efforts: A Developer’s Story” Science, Technology, Engineering Workshop. Vicksburg, MS, March 2018.
- “Utility of Mobile Applications: Blueroof Field Management System” ERDC Executive Conference Room Briefing. Vicksburg, MS, November 2017. (Need to finalize date)

TEACHING

- Guest Lecturer - Autonomous Cyber Security (MSU) (2017)
- Guest Lecturer - Graph Theory (MSU) (2017)

SERVICE

- Treasurer Association for Computing Machinery (ACM) (ERDC Chapter) (2023)
- Member ACM (ERDC Chapter)
- Member ACM (SIGEVO Chapter)
- Member MSU Autonomous Cyber Security Learning Group
- UM Provost Scholar
- UM Engineering Scholar

ADVISING AND MENTORING

Mentor and Research Advisor:

- Evan Vera (BSc) - Oak Ridge Institute for Science and Education (2024)
- Dev Ramesh (MSc) - Engineer Research and Development Center (2023-Present)
- Matt Sanders (BSc) - Engineer Research and Development Center (2021-Present)
- Kyler Farrar (BSc) - Engineer Research and Development Center (2019)
- Jared Barney (BSc) - Engineer Research and Development Center (2024-Present)
- Shavan Manusukha (BSc) - Engineer Research and Development Center (2019)

ADDITIONAL INFORMATION

- Github: <https://github.com/jdonovanCS>
- Webpage: <http://jordandonovan.com>
- LinkedIn: <https://www.linkedin.com/in/jordan-donovan-ab2083194>