MICHAEL W. HOPWOOD

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OVERVIEW

- Over 6 years of experience in applied and research **machine learning (ML)** roles, on both solo and team projects
- Productionized models that have impacted half a billion users, improving user experience and revenue
- Released two open-source python packages, one which is released in collaboration with a U.S. national laboratory**;** published 15+ journal and conference papers; 5+ oral presentations (speech and panels)

EXPERIENCE

MICROSOFT   Jul.2023 –

Data Scientist II

- Machine learning for core search at Bing Search using large language models (LLMs) and distilled small language models (SLMs), leading to improved search result page
- Projects include query intent modeling, content regulization, query index extension

AMAZON   Aug.2022 – Nov.2022

Data Scientist Intern

- Designed & trained novel graph neural network models with goal of reducing the amount of abuse on amazon.com
- Released internal package for training and productionizing customized graph neural networks

MICROSOFT   May.2022 – Aug.2022

Data Scientist Intern

- Designed and productionized ML models trained using custom loss functions for Bing search optimization, specifically focused on optimizing rendered page layout of search result
- Model results impact millions of people daily and achieved 2-3% revenue improvements

TESLA   Jan.2022 – May.2022

Data Scientist, Intern

- Designed ML models for *time series prediction* of energy charge demand for supercharger sites across the world
- Models achieved over 20% better performance than previous production models, translating to *millions of dollars saved* for the company in its infrastructure planning efforts

SANDIA NATIONAL LABORATORIES   Aug.2020 – Jan.2022

Research & Development Intern

- Answered failure classification tasks via *customized deep learning*, physics-based simulations, and NLP; CICD GitHub project management setup and maintenance
- Published papers, gave conference presentations, and released an open-source python package

DATA SCIENCE DEPARTMENT, UCF   Aug.2020 – Jan.2022

Graduate Research Assistant

- Designed *graph neural networks* for applications on social networks, power systems, and quantum mechanics; Advised undergraduate statistics & computer science students on data science projects
- Published papers and gave conference presentations

FLORIDA SOLAR ENERGY CENTER   Mar.2018 – Jul.2020

Undergraduate Research Assistant

- Utilized ML to detect and classify failures in solar fields; held quarterly Department of Energy stakeholder meetings
- *Data engineering* tasks to securely channel data across multiple networks without any loss of data

OSIsoft, LLC   May.2018 – Aug.2018

Academic Intern

- Generated python API which interfaced to a proprietary archive with a *.NET backbone*
- Ensured the health of a *real-time data management* infrastructure by monitoring the flow of data across platforms

MATERIAL ENGINEERING DEPARTMENT, UCF — Oct.2017 – Mar.2018
Undergraduate Research Assistant

- Studied the effects of modular defects on solar cells using support vector machines; accumulated and archived all failures discovered in solar cells to date

PHYSICS DEPARTMENT, UCF — Aug.2017 – Dec.2017
Physics Teaching Assistant

- *Prepared and taught lectures* to 90+ students; held office hours and exam reviews

STARTUP EXPERIENCE

SAPIEN TECHNOLOGIES, LLC — Sep.2020 – Mar.2021
ML Engineer

- Productionized *Bayesian ML* for economic market trend analysis
- Developed a live algo-trading bot which traded investor capital

REVOLUTION MEDICINE — Nov.2020 – Dec.2020
Data Scientist

- Developed *ML assistant to aid doctors* with deducing best pharmaceutical intervention for a patient given genome and demographic using peer-review journal papers
- Product is being rolled out alongside the startup's hardware product

QUIRK TECHNOLOGIES, LLC — Feb.2019 – Mar.2020
Engineer Intern

- Designed 3D models for a manufacture-grade point-of-sales product
- Added new features to *business analytics* pipeline to provide growth tactics for businesses

SCIENTIFIC JOURNAL PUBLICATIONS (check scholar for latest)

- Bonney, Kirk Layne, **et al.** "pvOps: a Python package for empirical analysis of photovoltaic field data." *Journal of Open Source Software* 8.SAND-2023-13746J (2023). https://www.osti.gov/biblio/2311477
- **Hopwood, Michael.** *One-class systems seamlessly fit in the forward-forward algorithm.* Arxiv (2023). https://arxiv.org/abs/2306.15188
- **Hopwood, Michael,** Lekha Patel, and Thushara Gunda. *Classification of Photovoltaic Failures with Hidden Markov Modeling, an Unsupervised Statistical Approach*. Energies 15.14 (2022): 5104. https://doi.org/10.3390/en15145104
- **Hopwood, Michael,** et al. *Physics-Based Method for Generating Fully Synthetic IV Curve Training Datasets for Machine Learning Classification of PV Failures*. Energies 15.14 (2022): 5085. https://doi.org/10.3390/en15145085
- **Hopwood, Michael,** and Thushara Gunda. *Generation of Data-Driven Expected Energy Models for Photovoltaic Systems*. Applied Sciences 12.4 (2022): 1872. https://doi.org/10.3390/app12041872
- Mantzaris, Alexander V., **et al.** *Tagasaurus, a tool to assist manual image tagging and the creation of image collections.* Software Impacts 10 2021: 100157. https://doi.org/10.1016/j.simpa.2021.100157
- Mantzaris, Alexander V., **et al.** *Introducing tagasaurus, an approach to reduce cognitive fatigue from long-term interface usage when storing descriptions and impressions from photographs.* Technologies 9.3 (2021): 45. https://www.mdpi.com/2227-7080/9/3/45
- **Hopwood, Michael**, et al. *Exploring the value of nodes with multicommunity membership for classification with graph convolutional neural networks*. Information 12.4 (2021): 170. https://www.mdpi.com/2078-2489/12/4/170
- **Hopwood, Michael**, Phuong Pho, and Alexander Mantzaris. *Exploring the strength of weak ties to direct active learning for community label prediction*. No. SAND2021-4095C. Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), 2021. https://www.osti.gov/servlets/purl/1862776
- **Hopwood, Michael**, et al. *Neural network-based classification of string-level IV curves from physically-induced failures of photovoltaic modules*. IEEE Access 8 (2020): 161480-161487. https://ieeexplore.ieee.org/abstract/document/9186596

SCIENTIFIC PRESENTATIONS AND PUBLISHED PROCEEDINGS (check scholar for latest)

- **(Oral & panel awarded) Hopwood, Michael**, Lekha Patel, and Thushara Gunda. *Probabilistic detection of high-dimension failures in complex systems: A case study of photovoltaics*. No. SAND2021-10806C. Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), October 2021. INFORMS Annual Meeting, Anaheim, California https://www.osti.gov/servlets/purl/1886187
- **(Oral awarded) Hopwood, Michael**, Phuong Pho, and Alexander V. Mantzaris. *Exploring a link between network topology and active learning*. 2021 Twelfth International Conference on Ubiquitous and Future Networks (ICUFN). IEEE, 2021. (Published proceedings) https://ieeexplore.ieee.org/abstract/document/9528662
- **(Oral awarded)** Mendoza, Hector, **Michael Hopwood**, and Thushara Gunda. *pvOps: Improving operational assessments through data fusion*. 2021 IEEE 48th Photovoltaic Specialists Conference (PVSC). IEEE, 2021. https://www.osti.gov/servlets/purl/1872512
- **(Oral awarded) Hopwood, Michael**, Hector Mendoza, and Thushara Gunda. *Generating actionable information through the fusion of text and timeseries data: A case study of extreme weather effects at Photovoltaic plants*. No. SAND2020-12816C. Sandia National Lab.(SNL-NM), Albuquerque, NM (United States), 2020. American Geophysical Union, Fall Meeting 2020. https://ui.adsabs.harvard.edu/abs/2020AGUFMIN0140003H/abstract
- **(Oral awarded, best paper awarded) Hopwood, Michael,** et al. *An assessment of the value of principal component analysis for photovoltaic IV trace classification of physically-induced failures*. 2020 47th IEEE Photovoltaic Specialists Conference (PVSC). IEEE, 2020. https://ieeexplore.ieee.org/abstract/document/9300601
- **(Poster)** Gabor, Andrew M., **et al.** *The impact of cracked solar cells on solar panel energy delivery.* 2020 47th IEEE Photovoltaic Specialists Conference (PVSC). IEEE, 2020. https://ieeexplore.ieee.org/abstract/document/9300743
- **(Poster)** Walters, Joseph, **et al.** *Experimental methods to replicate power loss of pv modules in the field for the purpose of fault detection algorithm development*. 2019 IEEE 46th Photovoltaic Specialists Conference (PVSC). IEEE, 2019. https://ieeexplore.ieee.org/abstract/document/8980896

EDUCATION

2020-2023	**DATA SCIENCE (MASTERS)**	**University of Central Florida**
	Department of Data Science and Statistics	
	Dropped out of Ph.D. - Dissertation broadly in Graph Neural Networks with Physics applications	
2020	**MECHANICAL ENGINEERING (B.S.)**	**University of Central Florida**
	Burnett Honors College Mathematics Minor	

TECHNICAL SKILLS

Proficient	Python, SQL, C#, Azure ML, AWS
Basic	R, SAS, Matlab, GCP, MS Power BI, C
Machine Learning	PyTorch & Tensorflow, deep tree models, graph neural networks, ensembles, active learning, hyperparameter tuning, one class learning
Data Engineering	Data integrity, data processing, pragmatic statistics reports
Software Development	CI/CD pipelines, unit tests, git

PRESTIGIOUS AWARDS

- **OUC ML Competition, 2021** runner up award for temporal energy modeling with cash prize
- **Best Student Presentation Award** at PVSC47, an international conference, in "Solar Resource for PV and Forecasting"
- Honorable mention in international Mathematical Contest in Modeling 2020
- UCF's Gold Pegasus scholarship, 2016