

SUMMARY	<b>Computer Scientist</b> working in <b>Machine Learning</b> with 10+ years of research experience.		
INTERESTS	Machine Learning, Deep Learning, Natural Language Processing		
EDUCATION	<b>Northwestern University</b> , Evanston, Illinois USA		
	Ph.D., Computer Science		Sep '19
	Master of Science, Computer Science		
	<b>Birla Institute of Technology &amp; Science</b> , Pilani, Rajasthan India		
	Master of Engineering, Software Systems		May '12
	Bachelor of Engineering, Chemical Engineering		
PROGRAMMING SKILLS	Experienced: Python, Keras/Tensorflow, Scikit-Learn, Dash/Plotly, Matplotlib/Seaborn, Pandas, XG-Boost, Selenium		
	Familiar: SQL, Shapley, NLTK, HuggingFace, Gensim, Spacy, CatBoost/LightGBM, PySpark, PyTorch/FastAI, HTML/CSS		
PROFESSIONAL EXPERIENCE	<i>Machine Learning Scientist</i> , <b>American Family Insurance</b> , Madison, Wisconsin		
	● Developing ML-based safe driving behavior algorithms in collaboration with major US automaker		
	● Created insurance-based language models for predicting claims fraud		
	● Developed SARIMAX, LSTM and ES-RNN forecasting financial metrics for next calendar year		
	● Developed an ML decision system for predicting motor vehicle violation risk		
	<i>Data Science Intern</i> , <b>Northwestern Mutual</b> , Milwaukee, Wisconsin		Jun - Aug '18
	● Developed distributed OCR algorithms for detecting responses from scanned questionnaires		
	● Designed a noise reduction algorithm to de-noise scanned and photocopied questionnaires		
	<i>Research Intern</i> , <b>Boeing Cybersecurity</b> , Sunnyvale, California		Jun - Sep '13
	● Generated synthetic user profiles with different demographic and interest features for analyzing ads across profiles		
	● Developed a machine learning model for predicting user demographics and interests from ads		
	<i>Research Assistant</i> , <b>Northwestern University</b> , Evanston, Illinois		Sep '12 - Aug'19
RESEARCH PROJECTS	● Chemical Property Prediction using Molecular Fingerprints (Tensorflow, Scikit Learn)		
	◇ Developed a multi-input input neural network architecture by merging different molecular representations (SMILES and fingerprints) for predicting chemical properties and reduced the mean absolute error by half compared to state-of-the-art architectures (CheMixNet architecture)		
	◇ Designed Bagged Ensemble models for predicting power conversion efficiency of solar cells using chemical fingerprints, and achieved mean absolute percentage error between 1.5-2 %		
	◇ Developed a transfer learning solution to predict solar cell properties with mean absolute percentage error below 1 % (SINet architecture)		
	● Developed Predictive Model for Additive Manufacturing (Tensorflow, Keras)		
	◇ Created time series models for temporal analysis of temperature and heat flux data		
	◇ Investigated Recurrent Neural Network models to predict point-wise temperature information for accelerating additive manufacturing simulations		
	◇ Developed an iterative real-time predictive model using bagged decision trees		
	● Ensemble Learning-based Guided Optimization for Aircraft Design (MATLAB, Python)		
	◇ Created intelligent sampling algorithms to explore the constrained search space for candidate microstructures		
	◇ Developed Feature Ranking-based Technique for Search Space Reduction of Constrained Non-Convex Optimization		
	◇ Achieved 100x more solutions compared to state-of-the-art methods that can accelerate the design-to-experiment life-cycle		
	● Classification of Anonymous Posts using Recurrent Neural Networks (Keras, Scikit Learn)		
	◇ Developed customized vector model using crowd-sourced (Urban Dictionary) & psycho-lingual (LIWC) dictionaries		
	◇ Explored Word2vec, GloVe and FastText embedding schemes (Gensim)		
	◇ Attained prediction accuracy of 79.8 % and 78.1 % using ensemble and LSTM models respectively		

- K.Ness, **A. Paul**, L. Sun and Z. Zhang. "Towards a generic physics-based machine learning model for geometry invariant thermal history prediction in additive manufacturing", *Journal of Materials Processing Technology*, 2022 (Special Issue on AI in Advanced Manufacturing)
- Z.Yang, Y.Mao, D.Jha, **A. Paul**, W. Liao, A. Choudhary and A. Agrawal. "Generative Adversarial Networks and Mixture Density Networks based Inverse Modeling for Microstructural Materials Design", *Science Advances* (under review)
- A.Dimri, **A.Paul**, D.Girish, P.Lee, S.Afra and A. Jakubowski. "A Multi-input Multi-label Claims Channeling System Using Insurance-Based Language Models Expert Systems With Applications", *Expert Systems With Applications* (under review)
- R.Richards, and **A. Paul**. "An Attention-driven LSTM Network for High Throughput Virtual Screening of Organic Photovoltaic Candidate Molecules", *Solar Energy*, 2021
- A. Paul**, W. Liao, A. Choudhary and A. Agrawal. "Harnessing Psycho-lingual and Crowd-Sourced Dictionaries for Predicting Taboos in Written Emotional Disclosure in Anonymous Confession Boards", *Journal of Health Informatics Research*, 2021
- Z.Yang, D. Jha, **A. Paul**, W. Liao, A. Choudhary and A. Agrawal. "A General Framework Combining Generative Adversarial Networks and Mixture Density Networks for Inverse Modeling in Microstructural Materials Design", *NeurIPS Workshop on Machine Learning for Engineering Modeling, Simulation and Design*, 2020
- D.Jha, L.Ward, **A. Paul**, W. Liao, A. Agrawal, A. Choudhary and C. Wolverton."ElemNet: Deep Learning the Chemistry of Materials From Only Elemental Composition", *Nature Scientific Reports*, 2018
- A. Paul**, M.Mozaffar, Z. Yang, W. Liao, A. Choudhary, J.Cao and A. Agrawal."A real-time iterative approach for temperature profile prediction in additive manufacturing processes", *6th IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, 2018
- A. Paul**, D.Jha, R. Al-Bahrani, W. Liao, A. Choudhary and A. Agrawal."Transfer Learning Using Ensemble Neural Nets for Organic Solar Cell Screening", *International Joint Conference on Neural Networks*, 2019
- A. Paul**, A. Furmanchuk, W. Liao, A. Choudhary and A. Agrawal. "Property Prediction of Organic Donor Molecules for Photovoltaic Applications using Extremely Randomized Trees", *Journal of Molecular Informatics*, 2019
- A. Paul**, P. Acar, W. Liao, A. Choudhary, V.Sundararaghavan and A. Agrawal. "Microstructure Optimization with Constrained Design Objectives using Machine Learning-Based Feedback-Aware Data-Generation", *Journal of Computational Materials Science*, 2019
- A. Paul**, D.Jha, R. Al-Bahrani, W. Liao, A. Choudhary and A. Agrawal."CheMixNet: Mixed DNN Architectures for Predicting Chemical Properties using Multiple Molecular Representations", *NeurIPS Workshop on Machine Learning for Molecules and Materials*, 2018
- M.Mozaffar, **A. Paul**, R. Al-Bahrani, S. Wolff, A. Choudhary, A. Agrawal, K. Ehmann and J.Cao."Data-Driven Prediction of the High-Dimensional Thermal History in Directed Energy Deposition Processes via Recurrent Neural Networks", *Manufacturing Letters*, 2018
- J.Birnholtz, N.A.R. Merola, and **A. Paul**. "Is it Weird to Still Be a Virgin?: Anonymous, Locally Targeted Questions on Facebook Confession Boards", *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*. ACM, 2015.
- R. Liu, D. Palsetia, **A. Paul**, R. Al-Bahrani, D. Jha, W. Liao, A. Agrawal and A. Choudhary. "Pinter-Net: A Thematic Label Curation Tool for Large Image Datasets", *Proceedings of the Workshop on Open Science in Big Data at IEEE Bigdata Conference*, 2016.

#### FELLOWSHIPS

McCormick Dean's Commendation Fellowship	'18 Spring
Predictive Science and Engineering Design Fellowship	'16-'17
Segal Design Fellowship	'14-'15
Walter P. Murphy Fellowship	'12-'13

#### SELECTED TEACHING AND LEADERSHIP

<i>Teaching Assistant &amp; Guest Lecturer, Northwestern University</i>	Jan'14- Jun'19
<ul style="list-style-type: none"> <li>◊ Prepared and delivered weekly lectures for 20-50 students</li> <li>◊ Courses: Social Media Mining, Data Structures , Introduction to Programming (Python)</li> </ul>	
<i>President/Vice-President/Treasurer, Northwestern Toastmasters</i>	Sep '15 -May '18
<ul style="list-style-type: none"> <li>◊ Lead the Northwestern chapter of Toastmasters with over 30 graduate students, post doctoral fellows from 10 different departments</li> <li>◊ Co-wrote proposal to The Graduate school and obtained 3000 USD to fund programming</li> </ul>	
<i>Co-Facilitator, Northwestern Dialogue Group</i>	Oct '16 - Sep '17
<ul style="list-style-type: none"> <li>◊ Facilitated dialogue in safe spaces for cultural exchange across international and domestic students</li> <li>◊ Organized social events to enhance group cohesion</li> </ul>	