

SUMMARY	Computer Scientist working in Machine Learning with 8+ years research experience.		
INTERESTS	Machine Learning, Deep Learning, Natural Language Processing		
EDUCATION	Northwestern University , Evanston, Illinois USA		
	Ph.D., Computer Science		Sep '19
	Master of Science, Computer Science		
	Birla Institute of Technology & Science , Pilani, Rajasthan India		
PROGRAMMING SKILLS	Master of Engineering, Software Systems		May '12
	Bachelor of Engineering, Chemical Engineering		
	Proficient: Python, Keras/Tensorflow, Scikit-Learn, Dash/Plotly, Matplotlib/Seaborn, Pandas, FastAI, XGBoost/LightGBM, Shapley, NLTK, Gensim, Selenium		
	Familiar: OpenCV, Spacy, PySpark, PyTorch, R, MATLAB, C, C++, Java, LAMP, SQL, weka, HTML/CSS		
PROFESSIONAL EXPERIENCE	<i>Machine Learning Scientist</i> , American Family Insurance , Madison, Wisconsin		Oct'19-
	<ul style="list-style-type: none">• Designing insurance-based language models for predicting claims fraud• Developed SARIMAX and deep learning forecasting financial metrics for next calendar year• Develop a machine learning system for estimating motor vehicle violation risk		
	<i>Data Science Intern</i> , Northwestern Mutual , Milwaukee, Wisconsin		Jun - Aug '18
	<ul style="list-style-type: none">• 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> , Boeing Cybersecurity , Sunnyvale, California		Jun - Sep '13
	<ul style="list-style-type: none">• 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> , Northwestern University , Evanston, Illinois		Sep '12 - Aug'19 -
	<ul style="list-style-type: none">• Chemical Property Prediction using Molecular Fingerprints (Tensorflow, Scikit Learn)<ul style="list-style-type: none">◊ 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)		
	<ul style="list-style-type: none">• Developed Predictive Model for Additive Manufacturing (Tensorflow, Keras)<ul style="list-style-type: none">◊ 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		
	<ul style="list-style-type: none">• Ensemble Learning-based Guided Optimization for Aircraft Design (MATLAB, Python)<ul style="list-style-type: none">◊ 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		
RESEARCH PROJECTS	<ul style="list-style-type: none">• Classification of Anonymous Posts using Recurrent Neural Networks (Keras, Scikit Learn)<ul style="list-style-type: none">◊ 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		

SELECT
PUBLICATIONS
(14 OF 21)

- 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", *NIPS Workshop on Machine Learning for Engineering Modeling, Simulation and Design*, 2020
- 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 (under review)*
- 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)*
- 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", *NIPS 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.
- A. Paul**, A. Agrawal, W. Liao and A. Choudhary. "AnonyMine: Mining anonymous social media posts using psycho-lingual and crowd-sourced dictionaries", *Proceedings of the Workshop on Sentiment Mining at 22nd Annual ACM Conference on Knowledge Discovery and Data Mining*, 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 & Guest Lecturer, Northwestern University</i>	Jan'14- Jun'19
<ul style="list-style-type: none"> ◊ Prepared and delivered weekly lectures for 20-50 students ◊ Courses: Social Media Mining, Data Structures , Introduction to Programming (Python) 	
<i>President/Vice-President/Treasurer, Northwestern Toastmasters</i>	Sep '15 -May '18
<ul style="list-style-type: none"> ◊ Lead the Northwestern chapter of Toastmasters with over 30 graduate students, post doctoral fellows from 10 different departments ◊ Co-wrote proposal to The Graduate school and obtained 3000 USD to fund programming 	
<i>Co-Facilitator, Northwestern Dialogue Group</i>	Oct '16 - Sep '17
<ul style="list-style-type: none"> ◊ Facilitated dialogue in safe spaces for cultural exchange across international and domestic students ◊ Organized social events to enhance group cohesion 	