Harsh Anand

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Contact Information

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Education

University of Virginia, Virginia, USA

- Doctor of Philosophy in Systems Engineering, GPA: **4/4** May'2021 – May'2024 (Expected)
  (Data Science and Operations Research concentration)
- Topic: *Data-driven strategies for enhanced community resilience against hurricanes*
- Committee: Negin Alemazkoor (Primary Advisor), Majid Shafiee-Jood (Secondary Advisor), James H. Lambert (Chair), Samarth Swarup, Mani Rouhi Rad

The Pennsylvania State University, Pennsylvania, USA

- Master of Science in Data Analytics, GPA: **4/4** 2019 – 2021
- Thesis: *Energy Infrastructure Resilience and Economic Impacts: Modeling, Data Analytics, and Metrics*
- Committee: Mohamad Darayi (Advisor), Colin J. Neill (Chair), Raghvinder S. Sangwan, Satish M. Srinivasan, and Ashkan Negahban

Manipal University, Karnataka, India

- Bachelor of Technology in Information Technology, GPA: **3.67/4** 2011 – 2015
  (Computer Science concentration)

Research Interest

- **Methodological domains**: machine learning, deep learning, reinforcement learning, system modeling and simulation, data-driven decision making, mathematical modeling and optimization
- **Application domains**: energy systems, interdependent infrastructure systems, healthcare, computational sustainability, freight transportation, climate change

Research Experience

Doctoral Researcher - **University of Virginia**, VA, USA May'2021 – Present

Graduate Researcher - **The Pennsylvania State University**, PA, USA Nov'2019 – May'2021

Research Assistant – **Dept. of Information Technology, MIT, Manipal**, India 2013 – 2015

Research Intern – **Indian Institute of Technology (IIT), Guwahati**, India Summer 2013

Professional Experience

Data Science Intern - **Swiss Re**, New York, NY, USA Jun'2020 – Aug'2020

Senior Data Scientist - **Kearney**, Mumbai, India Jan'2017 – May'2021

Machine Learning Engineer - **A.I. Research Lab, TCS**, Kochi, India Aug'2015 – Nov'2016

Data Science Intern, Semantic Search - **DataWeave Inc.**, Bangalore, India Jan'2015 – Jun'2015

Teaching Experience

Lab-instructor and Grader - SDS (DS 1001: Foundation of Data Science) Ongoing

Co-instructor and TA - School of Data Science (DS 4002: Data Science Projects) Ongoing

Teaching Assistant - School of Data Science (DS 6030: Statistical Learning) Spring 2023

Teaching Assistant - School of Data Science (DS 4002: Data Science Projects) Fall 2022

Teaching Assistant - School of Data Science (DS 6030: Statistical Learning) Summer 2022

Teaching Assistant - School of Data Science (DS 6030: Statistical Learning) Spring 2022

Technical Skills

- *Advanced Data Science*: Machine Learning, Deep Learning, Reinforcement Learning, Uncertainty Quantification, Meta-Learning, Transfer Learning

- *Data Analytics*: Data Mining, Predictive and Prescriptive Modeling, Quantitative Analysis, Parametric & Non-Parametric Statistical Modeling, Causal and Bayesian methods, Time-series forecasting, Design of Experiments, A/B Testing, ANOVA, Bootstrapping, Data Structures and Algorithms
- *Programming Languages*: Python, R, SQL, Java
- *Development*: TensorFlow, PyTorch, Spark (PySpark, Spark SQL), Hadoop, MapReduce, Graph DB, HBase, Neo4j, CI/CD Jenkins
- *Project Management*: Project Planning, Agile Development, Leadership, Problem Solving
- *Visualization/Others*: Power BI, Tableau, Elastic Search, Excel (Advanced), AIIMS, Minitab, KNIME, Alteryx, AWS, IBM Bluemix, Palantir Foundry

Peer-reviewed Publications

8. **Anand, Harsh**, Nateghi, Roshanak and Alemazkoor, Negin (2023), "Bottom-up Forecasting: Applications and Limitations in Load Forecasting using Smart Meter Data," *Data-Centric Engineering*, 4, e14
7. **Anand, Harsh**, Shafiee-Jood, Majid, and Alemazkoor, Negin (2023). "Perspicuity of Evacuation Behavior in Communities During Hurricanes Using Large-Scale Mobility Patterns and Communal Characteristics," *2023 57th Annual Conference on Information Sciences and Systems (CISS)*, Baltimore, MD, USA, 2023, pp. 1-6
6. Sharma, Rahul*, **Anand, Harsh***, Badr, Youakim and Qiu, Robin (2021). "Time-to-Event Prediction using Survival Analysis for Alzheimer's Disease Progression," *Alzheimer's & Dementia: Translational Research & Clinical Interventions*, 7:e12229 (*Equal contribution)
5. **Anand, Harsh** and Darayi, Mohamad (2021). "A Probabilistic Approach to Modeling Power Network Component Importance Considering Economic Impacts," *Proceedings of the 2021 IISE Annual Conference*, 1010-1015
4. **Anand, Harsh** and Darayi, Mohamad (2021). "Power Network Component Vulnerability Analysis: A Machine Learning Approach," *Procedia Computer Science*, 185, 73-80
3. Jaiswal, Devendra, **Anand, Harsh**, Srinivasan, Satish and Darayi, Mohamad (2021). "A Data-Driven Model to Generate Disruptive Scenarios for Infrastructure Resilience Studies," *Procedia Computer Science*, 185, 248-255
2. Saxena, Akshay, **Anand, Harsh**, Pradhan, Tribikram and Mishra, S. R. (2015). "A Hybrid Chaining Model with AVL and Binary Search Tree to Enhance Search Speed in Hashing." *International Journal of Hybrid Information Technology*, 8(3), 185–194
1. Pradhan, Tribikram, **Anand, Harsh** and Goyal, Akul (2014). "THA - A Hybrid Approach for Rule Induction System using Rough Set Theory, Genetic Algorithm and Boolean Algebra." *Global Journal of Researches in Engineering: Numerical Methods*, 14(1), 11

Under review

4. **Anand, Harsh**, Alemazkoor, Negin, and Shafiee-Jood, Majid, "*HEvOA*: A comprehensive database of hurricane evacuation orders in the United States from 2016 to 2022," submitted to *Nature Scientific Data*
3. **Anand, Harsh**, Shafiee-Jood, Majid, Rouhi Rad, Mani, and Alemazkoor, Negin, "Evaluating the Effectiveness of Hurricane Evacuation Orders by Leveraging Large-scale Human Mobility Patterns," submitted to *Nature Scientific Report*
2. Gollapalli, Madhuri, **Anand, Harsh**, Srinivasan, Satish M., "Characterizing Diseases using Genetic and Clinical Variables: A Data Analytics Approach," presented at *International Conference on Intelligent Biology and Medicine* and accepted for publication at Quantitative Biology
1. Ma, Xiaoyuan, Pierce, Eric, **Anand, Harsh**, Aviles, Natalie, Kunk, Paul and Alemazkoor, Negin, "Early Prediction of Response to Palliative Chemotherapy in Patients with Stage-IV Gastric and Esophageal Cancer," accepted for publication at *BMC Cancer*

In preparation Manuscripts

2. **Anand, Harsh** and Darayi, Mohamad, "Infrastructure Systems Resilience using Machine Learning Techniques: A Literature Review," draft in preparation for submission to *Sustainability*
1. **Anand, Harsh** and Darayi, Mohamad, "Modeling and Analyzing Energy Infrastructure Resilience considering Economic Impact," draft in preparation for submission to *Energy Policy*

Book Chapter

1. **Anand, Harsh**, and Alemazkoor, Negin, "Long-term impact of climate change on power grids." In Advancing the Resilience of the Power Grid under a Changing Climate, chapter draft in preparation for book publishing under IEEE and Wiley

Technical Presentations

6. **Anand, Harsh**, Shafiee-Jood, Majid, Rouhi Rad, Mani and Alemazkoor, Negin (2023). "Evacuation Order Effectiveness And Community Behavior: Enabling Strategic Data-driven Decision Making Through Big Data," Technical Presentation in the session *Machine Learning Applications and Data-centric AI*, INFORMS 2022 Annual Meeting, Indianapolis, October 2022
5. **Anand, Harsh**, Shafiee-Jood, Majid, and Alemazkoor, Negin (2023). "Perspicuity of Evacuation Behavior in Communities During Hurricanes Using Large-Scale Mobility Patterns and Communal Characteristics," Technical Presentation in the session *Applied Machine Learning*, 2023 57th Annual Conference on Information Sciences and Systems (CISS), Baltimore, March 2023
4. **Anand, Harsh**, Shafiee-Jood, Majid and Alemazkoor, Negin, "Enabling Causal Study of Evacuation Orders Effectiveness through Big Data," Presentation in the *2022 Environmental Futures Forum*, Energy Resilience Institute, Charlottesville, October 2022
3. **Anand, Harsh** and Darayi, Mohamad, "A Review On Energy Infrastructure Resilience: Modeling, Metrics And Data Analytics," Technical Presentation in the session *Energy Infrastructure Resilience and Economic Impacts*, INFORMS 2021 Annual Meeting, October 2021
2. **Anand, Harsh** and Darayi, Mohamad, "A Probabilistic Approach to Modeling Power Network Component Importance Considering Economic Impacts," Technical Presentation in the session *Data and System Analytics Application II*, IISE 2021 Annual Meeting, May 2021
1. **Anand, Harsh** and Darayi, Mohamad, "Modeling and Analyzing Energy Infrastructure Resilience considering Economic Impact," Technical Presentation in the session *Equilibrium Modeling of the Environmental and Institutional Aspects of Interregional Electricity Trade*, INFORMS 2020 Annual Meeting, November 2020

Poster Presentations

5. **Anand, Harsh** and Alemazkoor, Negin (2022). "Enabling Causal Study of Evacuation Orders Effectiveness through Big Data," Link Lab - UVA Engineering Poster and Flash Talk
4. **Anand, Harsh** and Darayi, Mohamad (2021). "Modeling and Analyzing Energy Infrastructure Resilience considering Economic Impact," IISE QCRE/DAIS Best Student Poster Session
3. **Anand, Harsh**, Sharma, Rahul and Mungee, Atharva (2020). "Projecting Patterns with Causal Influences in a Dynamic Ecosystem for Retail Sales Forecasting," Penn State Poster Competition, Malvern, PA
2. Mani, Alakesh, **Anand, Harsh** and Venkat, Akula (2020). "A Qualitative Study of Multi-Channel Marketing Campaigns using Market Mix Modeling," Penn State Poster Competition, Malvern, PA
1. **Anand, Harsh** (2020). "Modeling and Analyzing Energy Infrastructure Resilience considering Economic Impact," Penn State Poster Competition, Malvern, PA

Awards and Fellowships

Louis T. Rader Outstanding Graduate Service Award	2023
Pete Cone Memorial Scholarship	2023
International Student Citizen Leaders Fellowship	2022 – 2023
Nominee (top 5% among 800+ TAs across UVA) for Graduate Teaching Award	2023
Link Lab Flash Talk Award	2022
INFORMS ORMS Tomorrow Conference and Travel Award	2021, 2022, 2023
Outstanding Student Award in Data Analytics, Penn State University	2021
Penn State Valedictorian, Class of 2021	2021
The Web Conference 2021 Student Scholarship	2021
Warren V. Musser Fellowship in Entrepreneurial Studies	2020 – 2021
Penn State Chancellor's Scholarship (*Merit Award*)	2019 – 2020
AICTE Scholarship (*Tuition Waiver*), Manipal University	2011 – 2015

Competitions

- Winner – Freestyle O.R. Supreme Case Competition @ 2022 INFORMS — 2022
- Finalist – Duke-UNC-TMC Consulting Case Competition — 2022
- Winner – Freestyle O.R. Supreme Case Competition @ 2021 INFORMS — 2021
- Finalist – Mentor and Participant - 2021 Nittany AI Challenge — 2021
- Third Place – Innovation Design Competition @ 2021 IISE — 2021
- Best Student Pitch - Lion Cage: Annual competition for early-stage entrepreneurs — 2021, 2020
- Winner – Freestyle O.R. Supreme Case Competition @ 2020 INFORMS — 2020
- Judge and moderator - Smart India Hackathon - Sentiment Analysis of Code-Mixed Languages — 2020
- Placed in top 10% for prototyping Video-To-Text Summarizer - 2020 Nittany AI Challenge — 2020
- Runner's Up - Penn State Poster Competition - Retail Sales Forecasting — 2020
- Winner of Wawa - HCL Hackathon: Sales forecasting for Wawa using LSTM and Prophet — 2019
- Ranked top 1% in 4th International Math Olympiad and 13th National Science Olympiad

Leadership

- Chair - Graduate Engineering Student Council, University of Virginia — 2023 – Present
- Chair - Systems Engineering Student Advocacy Committee, University of Virginia — 2023 – Present
- Treasurer and Livability Chair - Link Lab, University of Virginia — 2023 – Present
- Selection Chair - Engineering School, Raven Society — 2023 – Present
- VP of Projects - Graduate Consulting Club, University of Virginia — 2021 – Present
- Chair (Interim) - Graduate Engineering Student Council, University of Virginia — 2022 – May 2023
- Vice-Chair - Graduate Engineering Student Council, University of Virginia — 2022 – 2022
- Livability Liaison - Link Lab, University of Virginia — 2022 – 2023
- International Student Chair (ESE Graduate Student Council), University of Virginia — 2021 – 2023
- Student Senator, School of Graduate Professional Studies, Penn State University — 2019 – 2021
- Global Programs Senate Committee, Penn State University — 2020 – 2021
- Student Council and Curriculum Change Committee, Manipal University — 2012 – 2015
- Class Representative, Manipal University — 2012 – 2015
- Educator for Non-profit, Chala Janjatiya Vikas Sanstha — 2009 – 2019

Professional Services

- Program Committee Member and Reviewer - Manuscript and Posters, **US-RSE Conference** — 2023
- Professional Studies Advocacy (through promo videos) for US Dept. of State, **EducationUSA** — 2023
- Editorial Board Member - **OR/MS Tomorrow, INFORMS** — 2023 – Present
- Writer, eNews Daily and OR/MS Today Coverage - **INFORMS 2022 Annual Meeting** — 2022
- Webmaster - **OR/MS Tomorrow, INFORMS** — 2021 – 2022
- Facilitator, Energy & Infrastructure - **INFORMS 2021 Annual Meeting** — 2021

Reviewer

International Journal of Medical Informatics
Transportation Research Board (TRB)
Digital Transformation and Society
US Research Software Engineer Association
IEEE Intelligent Transportation Systems Society

Session Chair

2021 Complex Adaptive Systems Conference — 2021
Session 4: System Analysis
Session 7: Applications of AI

Session 11: Data Science and Analytics

Other Services

Core Member - Student Health Advisory Committee, University of Virginia	2023 – Present
Waste Action Planning Committee, University of Virginia	2023
Honor and Academic Integrity Committee, University of Virginia	2022
Faculty Search Committee, ESE Dept., University of Virginia	2022
K-12 Outreach - **Starr Hill Pathways Program**, UVA Equity Center	Summer 2022

Affiliations

Transportation Research Board (TRB)
Institute for Operations Research and the Management Sciences (INFORMS)
Institute of Industrial and Systems Engineers (IISE)
The Honor Society of Phi Kappa Phi
Complex Adaptive Systems Conference
The Raven Society - The oldest and most prestigious honorary society at UVA

References

Dr. **Negin Alemazkoor**
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Dr. **Majid Shafiee-Jood**
Research Assistant Professor, Civil and Systems Engineering
The University of Virginia
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Dr. **Mohamad Darayi**
Assistant Professor, Systems Engineering
The Pennsylvania State University
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Industry references are available upon request.