Prateek Arora

Postdoctoral Researcher, Department of Civil and Environmental Engineering, University of California, Berkeley

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SUMMARY

Prateek Arora, Ph.D. in Civil Engineering, specializes in structural engineering, probabilistic hazard modeling, and disaster risk analysis. Prateek is committed to advancing methods to assess natural hazard risks, inform resilient strategies for critical infrastructure, and support effective emergency response. Prateek brings experience in research, teaching, consulting, and cross-disciplinary collaboration aimed at developing more resilient cities.

APPOINTMENTS

University of California, Berkeley August 2025 - Present
Postdoctoral Researcher, Advisor: Dr. Luis Ceferino *Berkeley, CA*

- Developing optimization frameworks for resource allocation and post-disaster retrofits using digital twins.
- Consulting for a utility company in San Francisco for power outage risk models for earthquakes and designing resilience strategies for critical infrastructure.

New York University Jan 2021 - August 2025
Research Assistant *New York, NY*

- Developed probabilistic methods for quantifying hurricane-induced power outages during early warning.
- Conducted research on the resilience and economic benefits of the adoption of renewables during a hurricane emergency.
- Selected as Coalition of Disaster Resilient Infrastructure Fellow; 15 out of 160 selected research proposals.
- Published research in peer-reviewed journals as first author; presented at international conferences, and gave invited talk.
- Taught a graduate class of 13 students and an undergraduate class of 16 students.

Rivera Consulting Group, Inc. May 2020 - December 2020
Staff Engineer *San Francisco, CA*

- Designed structural connections and coordinated with architects and building engineers for design requirements.
- Conducted analysis for retrofit of existing Steel-Frame, Unreinforced Masonry, and Wood-Frame Buildings.

Thornton Tomasetti, Inc. June 2019 - September 2019
Structural Engineering Intern *San Francisco, CA*

- Prepared reports for gravity and lateral loading for high-rise buildings according to building codes.
- Reviewed structural shop drawing submittals from contractors to ensure the structural requirements.

CSIR-Structural Engineering Research Centre July 2017 - December 2017
Research Intern, Structural Health Monitoring Laboratory *Chennai, India*

- Applied robust statistical methods to account for environmental variability in damage localization.
- Published research article in a peer-reviewed journal on damage identification in bridge structures with limited sensors.

Mormugao Port Trust May 2016 - July 2016
Summer Intern, Civil Engineering Department *Goa, India*

- Performed Costing and Estimation for a Railway Signaling Building at Mormugao Port.
- Prepared the report of construction, which included placement of formwork and detailing of steel reinforcement.

EDUCATION

New York University, NY, Ph.D. Candidate, Civil and Urban Engineering, GPA:4/4 *August 2025*

Thesis: Probabilistic Modeling for Power Outages and Adoption of Renewables for Enhancing Power Infrastructure Resilience to Extreme Events, Advisor: Dr. Luis Ceferino
NYU Urban Doctoral Fellow, NYU School of Engineering Fellow, Visiting Student Researcher at UC Berkeley (2024)

Stanford University, CA, M.S. in Structural Engineering, GPA:3.99/4 *March 2020*

KC Mahindra scholarship for graduate studies

BITS Pilani, Pilani Campus, India, B.E. (Hons.) in Civil Engineering, GPA:9.54/10.0 *June 2018*

Ranked 1st in Civil Engineering class of 90 students

HONORS, AWARDS, AND ACHIEVEMENTS

Best Paper Award, ASCE EMI Objective Resilience Student Competition 2025
Recognized for research leveraging AI and remote sensing for power infrastructure resilience.

Coalition of Disaster Resilient Infrastructure Fellowship, $15,000 2022
Resilience of Power Grid with Renewables to Hurricanes in a Changing Climate.

New York University Tandon School of Engineering Fellowship 2021
Doctoral Studies in the field of Disaster Risk and Resilience of Urban Environments.

New York University Urban Doctoral Fellowship, $3,000 2021
Fellowship awarded to 12 Doctoral Students across NYU working towards the development of Urban Cities.

K.C. Mahindra Fellowship, $2,000 2018
Fellowship to 82 out of 1200 applicants from India to pursue graduate studies in the USA.

O.P. Jindal Engineering and Management Scholarship 2016
Awarded for academic and leadership excellence.

Merit Scholarship, BITS Pilani 2017-18
Awarded to the top 3% of students across all disciplines.

National Standard Examinations in Chemistry (INChO) 2013
Ranked among the top 300 students in India eligible for the Indian National Chemistry Olympiad.

National Standard Examinations in Physics (IAPT) 2013
Ranked among the top 1% of students in Rajasthan State.

JOURNAL PUBLICATIONS

[**J7.**] **Arora, P.**, Ceferino, L. and Dobler, G.: A Novel Framework for Detecting Disaster-Induced Power Outages Globally via Satellite Observations, [Preprint], `https://doi.org/10.31224/5148`, 2025

[**J6.**] **Arora, P.** and Ceferino, L.: The Feasibility of Energy Communities for Hurricane Resilience, [Preprint], `https://doi.org/10.31224/3899`, 2024

[**J5.**] **Arora, P.** and Ceferino, L.: A Quasi-Binomial Regression Model for Hurricane-Induced Power Outages during Early Warning, *ASCE–ASME Journal of Risk and Uncertainty Analysis in Engineering Systems*, `https://doi.org/10.1061/AJRUA6.RUENG-1215`, 2024

[**J4.**] Lakshmi, K., **Arora, P.** and Rama Mohan Rao, A.: A Global-Local Damage Diagnostic Approach for Large Civil Structures with Very Limited Sensors, *International Journal of Structural Stability and Dynamics*, `https://doi.org/10.1142/S0219455424502705`, 2024

[**J3.**] Pachev, B., **Arora, P.**, del-Castillo-Negrete, C. et al.: A Framework for Flexible Peak Storm Surge Prediction, *Coastal Engineering*, `https://doi.org/10.1016/j.coastaleng.2023.104406`, 2023

[**J2.**] **Arora, P.** and Ceferino, L.: Probabilistic and Machine Learning Methods for Uncertainty Quantification in Power Outage Prediction due to Extreme Events, *Natural Hazards and Earth System Sciences*, 23, 1665–1683, `https://doi.org/10.5194/nhess-23-1665-2023`, 2023

[**J1.**] Singh, M., Yadav, S., Hussain, S., **Arora, P.** and Srivastava, A.: Reliability-Based Mix Design of Marble Dust Incorporated Concrete and Its Assessment Using the Concept of Performance Index, *Structural Concrete*, `https://doi.org/10.1002/suco.202100501`, 2022

CONFERENCE PAPERS AND PRESENTATIONS

[**C4.**] **Arora, P.**, Ceferino, L.: A Novel Framework for Detecting Disaster-Induced Power Outages Globally via Satellite Observations and Physics-Guided AI, *ASCE Engineering Mechanics Institute (EMI) Conference*, Anaheim, CA, USA, 2025.

[**C3.**] **Arora, P.**, Ceferino, L.: A Performance-Based Probabilistic Framework to Model Risk to Power Systems from Hurricanes, *14th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP14)*, Dublin, Ireland, 2023.

[**C2.**] **Arora, P.**, Ceferino, L.: Could Rooftop Solar Panels and Storage Have Enhanced the Electricity Resilience During Hurricane Isaias (2020)?, *14th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP14)*, Dublin, Ireland, 2023.

[**C1.**] Athira, G., Sanket, R., Aniruddha, T., **Arora, P.**, and Bahurudeen, A.: Assessment of Sustainable Alternative Cementitious Materials Using Characterisation Techniques, *Proceedings of Civil Engineering Conference – Innovation for Sustainability (CEC-2016)*, NIT Hamirpur, India, Sept. 9–10, 2016, pp. 430–445.

TECHNICAL REPORTS

[**T3.**] Wolohan, K., Mosalam, K., Jana, A., Bektas, N., Erazo, K., Garcia, S., Kyprioti, A., Wang, C., Romão, X., Petreski, B., Xu, S., Diekmann, A., Dang, H., **Arora, P.**, Lahna, T. (2024). "StEER: 2024 Hualien City Earthquake Annotated Media Repository", in *StEER – 2024 Hualien City, Taiwan Earthquake*. DesignSafe-CI. `https://doi.org/10.17603/ds2-4xv5-qc41`

[**T2.**] Cortes, M., **Arora, P.**, Ceferino, L., Ibrahim, H., Istrati, D., Reed, D., Roueche, D., Safiey, A., Tomiczek, T., Zisis, I., Alam, M., Kijewski-Correa, T., Prevatt, D., Robertson, I. (2022). "StEER: Hurricane Ian Preliminary Virtual Reconnaissance Report (PVRR)", in *StEER – Hurricane Ian*. DesignSafe-CI. `https://doi.org/10.17603/ds2-kc9k-s242`

[**T1.**] Alam, M., Rodgers, J., Pilkington, S., **Arora, P.**, Gurley, K., Robertson, I. (2022). "StEER: Typhoon Merbok Preliminary Virtual Reconnaissance Report (PVRR)", in *StEER – 17 September 2022 Typhoon Merbok*. DesignSafe-CI. `https://doi.org/10.17603/ds2-4az4-v122`

OPEN-SOURCE DATA AND COMPUTATIONAL RESOURCES

[**O3.**] **Arora, P.**, Ceferino, L. (2025). "Power Outage Prediction Utilizing Satellite-based Nightlights Decay," in *Power Outage Prediction Utilizing Satellite-based Nightlights Decay [Version 2]*. DesignSafe-CI. `https://doi.org/10.17603/ds2-a8cv-yc65`

[**O2.**] **Arora, P.**, Ceferino, L. (2024). "Hurricane Risk Analysis of Power Failures," in *Hurricane Risk Analysis of Power Systems [Version 4]*. DesignSafe-CI. `https://doi.org/10.17603/ds2-a510-6f83`

[**O1.**] Pachev, B., Del-Castillo-Negrete, C., **Arora, P.**, Dawson, C., Valseth, E. (2023). "Reduced Order Models for Peak Storm Surge in Texas and Alaska," in *ADCIRC Reduced Order Modeling*. DesignSafe-CI. `https://doi.org/10.17603/ds2-85j6-k851`

WORKSHOP AND SUMMER SCHOOL PARTICIPATION

University of Washington NSF-Funded RAPID Facility Workshop, July 2025. Participated in the NSF RAPID Workshop focused on advancing field reconnaissance, data collection, and resilience modeling for natural hazard response.

Extremes Workshop, Colorado School of Mines (NSF-Funded), November 2024. Attended the interdisciplinary workshop on modeling and analysis of extreme events; engaged in discussions on uncertainty quantification, resilience assessment, and multi-hazard frameworks.

Uncertainty Quantification Summer School, University of Southern California, August 2024. Completed intensive training on uncertainty modeling, Bayesian inference, and stochastic methods for civil and environmental systems.

DesignSafe Hackathon, Texas Advanced Computing Center (NHERI), July 2022. Developed a neural network-based storm surge forecasting model; collaborated with UT Austin researchers to publish a journal article contributing to the field of natural hazard prediction.

North American Regional Science Council Summer School, July 2022. Selected as one of 12 participants for the program on climate change adaptation; engaged in planning exercises to enhance New York City's resilience to storm and flood events.

TALKS AND OTHER PARTICIPATION

Arora, P. (2024). *Power Outage Modeling and Adoption of Renewables Toward Power Resilience During Extreme Weather Events.* Lightning Talk and Poster presented at the Extremes Workshop, Colorado School of Mines, November 2024.

Ceferino, L., & Arora, P. (2023). *Evaluating the Resilience of Hospitals and Power Systems to Earthquakes and Hurricanes.* Invited Talk presented at Thornton Tomasetti, New York, NY, 2023.

Invited Participant on the culmination of the fellowship project, Sixth International Conference on Disaster Resilient Infrastructure (ICDRI), 2024.

GRANT WRITING EXPERIENCE

NSF FIRE: Fire Science Innovations through Research and Education, submitted, 2025

NSF MATH-DT: Scalable Bayesian Online Learning for Digital Twins in Power Network Resilience against Sequential Extreme Events, awarded, 2025

Bakar Fellows Program, UC Berkeley: OutageIQ-Intelligent Systems for Power Infrastructure Risk Management for Climate and Disaster Resilience, 2025

Pacific Gas & Electric Company: Statistical Modeling of Power Outages in the Humboldt Region, awarded, 2024

New York City Housing Authority: Climate-Induced Power Outage Recurrence Intervals for Resilience Hubs, 2023

Coalition of Disaster Resilient Infrastructure: Resilience of Power Grid Infrastructure with Renewables to Extreme Events in a Changing Climate, Co-PI, awarded, 2022

RESEARCH PROJECTS

Digital Twin for Power System Resilience under Sequential Extreme Events August 2025 - Present
Postdoctoral Research, Advisors - Dr. Luis Ceferino, Dr. Ziqi Wang, and Dr. Michael Lindsey *UC Berkeley, CA*

- Bayesian updating of structural properties of power poles based on sensor measurements.
- Online updating of the digital twin to optimize the dispatch of repair crews.

Power System Recovery Modeling during Earthquake August 2025 - Present
Postdoctoral Research, Advisor - Dr. Luis Ceferino *UC Berkeley, CA*

- Agent-based model to identify the recovery sequence of power outages, improving recovery time prediction for customers.
- Modeling the interdependencies of critical infrastructure for comprehensive modeling of power outage recovery.

Hazard Analysis and Urban Utilities Management under Extreme Events January 2021 - August 2025
Ph.D. Project, Advisor - Dr. Luis Ceferino *New York University, NY*

- Study on the feasibility of adoption of solar panels during hurricanes, involving modeling hurricane hazard, quantification of available solar availability through empirical models, and fragility analysis of power infrastructure.
- Predicting the power outages due to high winds of a hurricane using machine learning methods.
- Utilized remote sensing and AI to develop a power outage model using satellite-based nightlights observation.

Storm Surge Predictions using Neural Networks August 2022 - Present
Research in Collaboration with UT Austin *New York University, NY*

- Understand the importance of hurricane parameters and bathymetry on storm surge predictions.
- Developed a neural network-based storm surge prediction model to significantly reduce computation time compared to high fidelity models such as ADCIRC.
- Develop a global storm surge prediction model to predict storm related surge in different basins.

Data fusion of LIDAR data, and Imagery data for sea waves study April 2019 - December 2019
Advisor - Professor Anne Kiremidjian *Stanford, CA*

- Transforming 2D image data to 3D points based on collinearity condition equations.
- Combining sea wave data from LIDAR, RGB camera, and Infrared camera to identify breaking sea waves.

Structural Health Monitoring July 2017 - December 2017
Structural Engineering Research Centre, Advisor - Dr. A Rama Mohan Rao *Chennai, India*

- Applied method for Damage Identification using Statistical Methods, based on residuals for time-series data using Auto-Regressive Moving Average Model and Kolmogorov Statistical Distance.
- Implemented robust methods to account for variations in SHM data due to different environmental conditions, segregating the outliers in the data from different origins.

TEACHING RESPONSIBILITY

Teaching Assistant August 2023 - December 2023
Engineering Mechanics, New York University *New York,NY*

- Led discussion and tutorial sections for a class of 16 students on structural analysis.
- Conducted weekly office hours to assist graduate students with weekly assignments and class projects.

Teaching Assistant January 2023 - May 2023
Disaster Risk Analysis and Urban Systems Resilience, New York University *New York, NY*

- Developed course material for probabilistic hurricane hazard modeling.

· Led discussion and delivered lectures for a class of 13 students on Disaster Risk Analysis and Urban Systems Resilience.
· Conducted weekly office hours to assist graduate students with weekly assignments and class projects.

Graduate Course Assistant January 2020 - March 2020
Introduction to Performance-Based Earthquake Engineering, Stanford University *Stanford,CA*

· Led discussion sections for a class of 26 students on probabilistic seismic hazard analysis.
· Conducted weekly office hours to assist graduate students with weekly assignments and class projects.

Tutorial Section Leader February 2017 - April 2017
Construction Planning and Technology, BITS Pilani *Pilani, India*

· Delivered a lecture to junior class on designing in Revit Architecture for the Construction Planning and Technology course.

REVIEWER RESPONSIBILITIES

· ASCE-ASME Journal of Risk and Uncertainty Analysis in Engineering Systems
· Journal of Structural Safety and System Reliability
· Frontiers in Energy Research
· ASCE Natural Hazards Review
· International Journal of Disaster Risk Reduction

MENTORSHIP

Graduate Mentor for Capstone Project, New York University January 2023 - May 2023

· Mentored a diverse group of three graduate students for a capstone project at the Center for Urban Science and Progress.
· Team successfully leveraged satellite data with machine learning for power outage predictions for hurricanes.

Summer Undergraduate Research Program, New York University June 2022 - August 2022

· Mentored two undergraduate students to study a power outage prediction tool and the scalability of solar energy.
· Team leveraged the data on real-time power outages and global horizontal solar irradiance.

Mentor to Master's Student, New York University January 2022 - May 2022

· Mentored graduate students to understand the risks to the power system from hurricanes.
· Team leveraged urban nightlight images to identify the power outages.

Seismic Design Competition, Earthquake Engineering Research Institute October 2021 - May 2022

· Mentored undergraduate students for the seismic design competition at the National Engineering Earthquake Conference.
· Led the team for seismic analysis of a high-rise building using structural software ETABS.

POSITION OF LEADERSHIP

President, Civil Engineering Association, BITS Pilani January 2018 - May 2018

Publicity Coordinator, Civil Student Society, BITS Pilani August 2016 - May 2017

CERTIFICATION

FE Civil (NCEES Confirmation ID: 20-166-28)

VOLUNTEER ACTIVITIES

· Volunteer, National Service Scheme (NSS), taught high-school students from rural areas near Pilani.
· Student Member, Indian Concrete Institute, August 2016 – August 2017.
· Volunteer, Blood Donation Camp and *Junoon*, a two-day sports meet organized for specially-abled participants.

REFERENCES

1. **Dr. Luis Ceferino**
Assistant Professor, University of California, Berkeley
Email: ceferino@berkeley.edu

2. **Dr. Gregory Dobler**
Associate Professor, University of Delaware
Email: gdobler@udel.edu

3. **Dr. Eirik Valseth**
Associate Professor, Norwegian University of Life Science
Email: eirik.valseth@nmbu.no