Udit Bhatia

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Education

2014 – Present

🔖 **M.S. & Ph.D. (Integrated), Northeastern University, Boston** in Interdisciplinary Engineering. Core Department: Civil & Environmental Engineering. (Expected Graduation : December 2018) [GPA 4/4].

Relevant Courses *(Instructor)* : Network Science *(Albert-Lázló Barabási)*; Introduction to Machine Learning *(Jennifer Dy)*; Critical Infrastructure Resilience *(Stephen Flynn & Auroop Ratan Ganguly)*; Applied Time-series & Spatial Statistics *(Auroop Ratan Ganguly)*; Remote Sensing of the Environment *(Edward Beighley)*;Advanced Spatial Systems *(Glenn Hazelton)*

2008 – 2012

🔖 **Bachelor of Technology, National Institute of Technology, Hamirpur, India** in Civil Engineering *(rank 1 of 67): Director Medal*

🔖 **Indian Institute of Technology, Bombay, India** Industrial Research & Research Consultancy Center Internship Award.

Dissertation

🔖 **Recovery of lifeline infrastructures perturbed by hydroclimate extremes.**
Advisor : Auroop Ratan Ganguly *(Northeastern University)*
Committee Members : Ralph Edward Beighley *(Northeastern University)*; David Dzombak *(Carnegie Mellon University)*; Stephen Flynn *(Northeastern University)*; Tarik Gouhier *(Northeastern University)*; Lina Sela *(University of Texas at Austin)*

Research Publications

Textbook (Published) & Related Interview

1 **Bhatia**, **Udit**, Auroop R Ganguly, and Stephen Flynn. *Book Interview: Critical Infrastructures Resilience: Policy and Engineering Principles*. Vol. 6. 3. Mary Ann Liebert, Inc., publishers 140 Huguenot Street, 3rd Floor New Rochelle, NY 10801 USA, 2018, pp. 173–175.

2 Ganguly, Auroop R, **Udit Bhatia**, and Stephen E Flynn. *Critical Infrastructures Resilience: Policy and Engineering Principles*. Routledge, 2018.

Textbook Projects (In progress): Peer-Reviewed & under contract

1 **Bhatia**, **Udit** and Auroop R Ganguly. *Time Series and Geospatial Data Science: An Interdisciplinary Methods Perspective [Publisher: Springer]*.

2 Ganguly, Auroop R, **Udit Bhatia**, and Carlos Nobre. *Climate Science and Engineering Adaptation [Publisher:Springer]*.

Journal Articles (Published)

1 Clark, Kevin, **Udit Bhatia**, Evan A Kodra, and Auroop R Ganguly. 'Resilience of the US National Airspace System Airport Network'. In: *IEEE Transactions on Intelligent Transportation Systems* (2018).

2 Clark, Kevin, **Udit Bhatia**, Matthias Ruth, and Auroop R Ganguly. 'Developing policies which optimize long-term service for vulnerable infrastructure. Transportation Policy; In review'. In: *Transportation Policy* (2018).

3 **Bhatia**, **Udit**, Devashish Kumar, Evan Kodra, and Auroop R Ganguly. 'Network science based quantification of resilience demonstrated on the Indian Railways Network'. In: *PloS one* 10.11 (2015), e0141890.

Journal Articles (In review)

1 **Bhatia**, **Udit** and Auroop R Ganguly. *Reducing the irreducible uncertainty in return periods of 21st-century precipitation extremes*. 2018.

2 **Bhatia**, **Udit**, Tarik Gouhier, and Auroop R Ganguly. *Universal and Generalizable Restoration Strategies for Degraded Ecological Networks: In review*. 2018.

3 **Bhatia**, **Udit**, Lina Sela, and Auroop R Ganguly. *Complementary Value of Network Science and Optimization to Post-Perturbation Infrastructures Recovery: In review*. 2018.

4 Fard, Babak, Hanieh Hassanzadeh, Mary E Warner, **Udit Bhatia**, and Auroop R Ganguly. *Integrated climate risk assessment: A practical application for informing action plan to heatwave threat to public health. Climate Risk Management: In review*. 2018.

United Nations Assessment Report

1 Ganguly, Auroop R, Evan Kodra, **Udit Bhatia**, Mary Elizabeth Warner, Kate Duffy, Banerjee Arindam, and Sangram Ganguly. *Understanding and interpreting data for climate adaptation and mitigation*. Climate 2020, United Nations Association of the United Kingdom., 2018.

Patent (Pending)

1 **Bhatia**, **Udit**, Devashish Kumar, Evan Kodra, and Auroop R Ganguly. 'System for Networking and Analyzing Geospatial Data, Human Infrastructure, and Natural Elements'. US Patent App. 15/134,518. Oct. 2016.

Peer-reviewed Conference Proceedings

1 **Bhatia**, **Udit**, Samrat Chatterjee, Auroop R Ganguly, Mahantesh Halappanavar, Jianxi Gao, Kevin Clark, Matthew Oster, Ramakrishna Tipireddy, and Rober Brigantic. 'Aviation Transportation, Cyber Threats, and Network-of-Networks: Modeling Perspectives for Translating Theory to Practice(Accepted: to appear)'. In: *2018 IEEE International Symposium on Technologies for Homeland Security (IEEE HST)*. 2018.

2 **Bhatia**, **Udit** and Auroop R Ganguly. 'Extreme Values from Spatiotemporal Chaos: Precipitation Extremes and Climate Variability (Accepted: to appear)'. In: *2018 Seventh Workshop in ICDM, Data Mining in Earth System Science*. 2018.

3 **Bhatia**, **Udit** and Auroop Ganguly. 'The Resilience of Natural-Engineered-Human-Systems'. In: *International Conference on Sustainable Infrastructures. (Excellent Youth Paper Award Candidate)*. 2016.

Peer-reviewed Book Chapters & Encyclopedia Articles

1 **Bhatia**, **Udit** and Auroop R Ganguly. 'Network Science Perspectives on Engineering Adaptation to Climate Change and Weather Extremes'. In: *Large-Scale Machine Learning in the Earth Sciences*. Chapman and Hall/CRC, 2017, pp. 19–30.

2 **Bhatia**, **Udit**, Devashish Kumar, Evan Kodra, and Auroop R Ganguly. 'Water Complexity and Physics Guided Data Mining'. In: vol. 1. Anthem Press, 2017, p. 155.

3 **Bhatia**, **Udit**, Allison Traylor, Catherine Moskos, Laura Blumenfeld, Lindsey Bressler, Tyler Hall, Rachael Heiss, Kevin Clark, Nan Deng, Devashish Kumar, and Auroop Ganguly. 'Climate Hazards and Critical Infrastructures Resilience'. In: *Encyclopedia of GIS*. Springer, 2017, pp. 206–216.

4 Moskos, Catherine, Hayden Henderson, Lindsey Bressler, **Udit Bhatia**, Devashish Kumar, Evan Kodra, and Auroop R Ganguly. 'Informing Climate Adaptation with Earth System Models and Big Data.' In: *Encyclopedia of GIS*. Springer, 2017.

5 Vandal, Thomas, **Udit Bhatia**, and Auroop R Ganguly. 'Statistical Downscaling in Climate with State-of-the-Art Scalable Machine Learning'. In: *Large-Scale Machine Learning in the Earth Sciences*. Chapman and Hall/CRC, 2017, pp. 55–72.

Awards & Publicity

Awards

2016　🔖 **Excellent Youth Paper Award Candidate** , at International Conference on Sustainable Infrastructures,Shenzhen, China organized by U.S. National Academy of Engineers and Chinese Academy of Engineering for paper titled *The Resilience of Natural-Engineered-Human-Systems.*

2014　🔖 **Dean's Fellowship Award**, College of Engineering, Northeastern University, Boston.

2012　🔖 **Best Student Award**, National Institute of Technology, Hamirpur for achievements in academics and extra-curricular activities-2012.

　　　🔖 **Director Medal**, Rank 1 in Civil Engineering Department, National Institute of Technology, Hamirpur.

Publicity

2014-2018　🔖 **Research highlights** in NASA Techbriefs, R&D Magazine, Yahoo! News, Scientific Computing, Paris Guardian, NDTV [India], Zee News [India], Northeastern University News.

Contribution to Grants

Funded-Active/Awarded

2018-2020　🔖 **PNNL LDRD** Interdependent Cyber-based contingency analysis of interdependent transportation and communication networks under uncertainty, Pacific Northwest National Laboratory

2017-2021　🔖 **NSF CRISP type 2** Interdependent Network-based Quantification of Infrastructure Resilience (INQUIRE), National Science Foundation.

2015-2016　🔖 **DHS** Interdependent Task Order: Critical Infrastructures Resilience, Department of Homeland Security.

In Review

2018　🔖 **AI for Earth (Co-PI)** Climate Adaptation & Resilient Engineering for Urban Sustainability (CARE-4-US)

Mentorship Roles

2014-2018   🔖 **Undergraduate Students:** Catherine Moskos, Hayden Henderson, Laura Blumenfeld, Allison Traylor, Lindsey Bressler, Kara Morgan, Tyler Hall, Shahed Najjar (contributed to series of encyclopedia articles in encyclopedia of GIS); Amina Ly Graduate Student: Summer Zacca

Engagement with Stakeholders

2017   🔖 **Co-mentor and contributor** American Geophysical Union Thriving Earth Exchange's Project, Building Community Resilience to Heat Extremes for town of Brookline, Massachusetts.

2016   🔖 **Co-author** Post-Hazards Lessons learnt from Boston Snowstorms, project funded by Department of Homeland Security.

Talks/Presentations

2018   🔖 **Geographic Information Systems Class**, Northeastern University, Boston. Cascading Interdependencies of Built Systems: Harnessing the power of GIS (Invited)

       🔖 **AMS 2018**, Non-Stationary Weather Extremes and the Resilience of Critical Lifeline Infrastructure Network-of-Networks at 13th Symposium on Societal Applications: Policy, Research and Practice, 98th Annual Meeting of American Meteorological Society.

2017   🔖 **Indian Institute of Technology (IIT), Gandhinagar, India** Climate Adaptation and Resilient Engineering with Hybrid Physics and Data Sciences (Invited)

       🔖 **Stakeholders meeting, Greater Boston** Bhatia, U., and A.R. Ganguly: Resilience of Boston's interdependent public transportation and power distribution network-of-networks to flood surge under high tide and Sandy-like hurricane with sea level rise scenarios,presented at the kickoff meeting for critical infrastructure resilience to infrastructure stakeholders and emergency managers in greater Boston.

2016   🔖 **Indian Institute of Technology (IIT), Roorkee, India** Network Science based quantification of resilience of built and natural systems (Invited).

       🔖 **Indian Institute of Technology (IIT), Kharagpur, India**, Network Science Research Group (Invited)

       🔖 **INFORMS, Nashville-Invited** Network Science Based Quantification of Resilience of Multiscale Infrastructure Systems in Session Network Repair and Resiliency for Service Restoration, The Institute for Operations Research and the Management Sciences Conference (Invited)

       🔖 **Make in India, Hackathon**: Representative of foreign universities at Make in India Hackathon Global Showcase (2016) at Mumbai, India (Invited)

Work Experience

2014 – Present   🔖 **Graduate Research Assistant** Northeastern University, Boston.

2012 – 2014   🔖 **Design Engineer** MECON Limited (Government of India Organization).

2011   🔖 **Founder** GUD Associates: Startup to develop learning modules delivered through remote technologies in India.

Reviewer

2014-2018   🔖 **Refereed Journals** Scientific Reports, Nature Publishing Group; Journal of Computing in Civil Engineering, American Society of Civil Engineers.

🔖 **Books** CRC Press; Taylor & Francis Group

Teaching Experience

Undergraduate Teaching: Northeastern University

2016-2018   🔖 **Co-instructor** Climate Hazards & Resilient Cities or Coastlines; Climate Adaptation & Policy in an Emerging Economy
Study Abroad Program. 2016: India; 2017: Singapore/Jakarta; 2018: Peru/Brazil

2015-2016   🔖 **Teaching Assistant** Probability and Engineering Economy for Civil Engineers (4 credits)

2018   🔖 **Teaching Assistant and curriculum co-developer** Climate Science, Engineering Adaptation, and Policy (4 credits)

Graduate Teaching: Northeastern University

2016-2018   🔖 **Teaching Assistant and curriculum co-developer** Applied Time Series & Spatial Statistics(4 credits)

🔖 **Teaching Assistant and curriculum co-developer** Critical Infrastructure Resilience (4 credits)

Teaching services: Outside Northeastern University

2016   🔖 **Summer Course** on Climate Change & Quantitative Methods: National Institute of Technology, Hamirpur, India

2014   🔖 **Short Course** on Best Practices in Civil Engineering: Steel Structure Design, Professional Institute of Engineering & Technology, Raipur, India

Skills & Certifications

Programming Skills

Coding	🔖 Python, Tensorflow, R, LaTeX, MATLAB, C
Web Dev	🔖 Html
Graphic Design	🔖 Adobe Photoshop, Final Cut Pro, Adobe Illustrator

Certifications: Coursera Inc.

2018   🔖 **Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization.** [Certificate # 5CL4QJFJFBN7]

🔖 **Structuring Machine Learning Projects** [Certificate # Q4T3LJ47BAAM]

2017   🔖 **Neural Networks and Deep Learning** [Certificate # T6EEE4EVVFSU]