

# Udit Bhatia

✉ [bhatia.u@husky.neu.edu](mailto:bhatia.u@husky.neu.edu)

🌐 <https://web.northeastern.edu/sds/bhatia.html>

🐙 <https://github.com/udit1408>

🌐 <https://www.linkedin.com/in/udit-bhatia-a0986b3a>

## 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-László 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.

## 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 **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 Clark, Kevin, **Udit Bhatia**, Matthias Ruth, and Auroop R Ganguly. *Developing policies which optimize long-term service for vulnerable infrastructure: In review*. 2018.
- 5 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: 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.

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 13<sup>th</sup> Symposium on Societal Applications: Policy, Research and Practice, 98<sup>th</sup> 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 # T6EEE4EUVFSU]