

# Anamika Shreevastava

NASA POSTDOCTORAL FELLOW, JET PROPULSION LAB



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## Education

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- 2016 – 2020    **Purdue University, IN, USA**  
Ph.D. in Civil and Environmental Engineering  
Interdisciplinary Graduate Program in Ecological Sciences and Engineering  
Thesis: *Dynamics of fractal intra-urban heat islets*  
Advisor: Prof. Suresh Rao
- 2014 – 2016    **Purdue University, IN, USA**  
M.S. in Architectural Engineering  
Research: *Estimating anthropogenic heat flux from building energy usage for different Urban Land Cover Land Use types at city-scale*
- 2010 – 2014    **Indian Institute of Technology, Roorkee, India**  
B. Tech. in Civil Engineering  
Thesis: *Designing an intensive urban storm-water drainage network and a compact, cost-efficient wastewater treatment plant for the IIT Roorkee campus.*

## Fellowships and Awards

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- NASA Postdoctoral Fellow at JPL**    2021
- ASP Postdoctoral Fellowship at NCAR, Boulder (declined)**    2020
- Complexity Science postdoc position at MIT Senseable City Lab (declined)**    2020
- NASA Earth and Space Science Fellowship**    2017 – 2020
- Won the competitive 3-year fellowship awarded to doctoral candidates.
  - Member of NASA's Land Cover Land Use Change (LCLUC) Team.
- American Meteorological Society's Best Student Presentation Award**    2017
- US Green Building Council's LEED Accredited Professional**    2016 – 2018
- Specialized in the design and construction phases of green buildings serving the commercial, residential, education and healthcare sectors.

## International Research Collaborations

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- NOAA's Center for Remote Sensing and Earth System Technology**    2019 – ongoing
- Currently working in collaboration with NOAA-CREST on understanding the impact of heat waves on intra-urban heat islets using the Weather Research Forecast (WRF) model.
- Synthesis of Complex Networks**    2017 – 2020
- Core member of the international research collaboration between Helmholtz Centre for Environmental Research (UFZ), Magdeburg; Technical University (TU), Dresden; University of Florida, Gainesville; Korea University, Seoul; University of Western Australia, Perth; and Purdue University, West Lafayette.  
<https://www.ufz.de/cawr/index.php?en=43129>
- World Urban Database and Portal Access Tool (WUDAPT)**    2015 – 2017
- Worked with Prof. Jason Ching and Prof. Gerald Mills who lead WUDAPT to develop Local Climate Zone (LCZ) maps for Indian cities during Master's research.
  - Studied the role of spatial heterogeneity in the correlation of remotely sensed Land Surface Temperature and LCZ. Research findings were presented by Prof. Jason Ching at the 3rd WUDAPT workshop in Hong Kong (Dec 2015) and published in Bulletin of the American Meteorological Society.

## Journal Publications

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- 1 **Shreevastava, A.**, Rao, P. & McGrath, G. (2019). Emergent self-similarity and scaling properties of fractal intra-urban heat islets for diverse global cities. *Physical Reviews E*. doi:10.1103/PhysRevE.100.032142
- 2 **Shreevastava, A.**, Bhalachandran, S., McGrath, G., Huber, M. & Rao, P. (2019). Paradoxical impact of sprawling intra-urban heat islets: Reducing mean surface temperatures while enhancing local extremes. *Scientific Reports*. doi:10.1038/s41598-019-56091-w
- 3 Bhalachandran, S., Chavas, D., Marks Jr, F., Dubey, S., **Shreevastava, A.** & Krishnamurti, T. (2019). Characterizing the energetics of vortex scale and subvortex scale asymmetries during tropical cyclone rapid intensity changes. *Journal of the Atmospheric Sciences*. doi:10.1175/JAS-D-19-0067.1
- 4 **Shreevastava, A.**, Rao, P. & McGrath, G. (2018). Spatial analysis of the surface urban heat island. *Land Surface and Cryosphere Remote Sensing*, 10777. doi:10.1117/12.2501441
- 5 Ching, J., Mills, G., Bechtel, B., ..., **Shreevastava, A.** et al. (2018). WUDAPT: An urban weather, climate, and environmental modeling infrastructure for the anthropocene. *Bulletin of the American Meteorological Society*, 99(9), 1907–1924. doi:10.1175/BAMS-D-16-0236.1

## Conference Presentations

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- 2019/12
- **Shreevastava, A.**, Bhalachandran, S., Ramamurthy, P., and Rao, P.S.C. (2019, December). Impact of heat waves on intra-urban thermal heterogeneity. *Global Environment Change. AGU Fall Meeting, San Francisco, CA.*
  - **Shreevastava, A.**, Bhalachandran, S., McGrath, G.S., Huber, M., and Rao, P.S.C. (2019, December). The paradox of sprawl vs compact urban morphology for mitigating extreme heat in cities. *AGU Fall Meeting, San Francisco, CA.*
- 2018/12
- **Shreevastava, A.**, Rao, P.S.C., and McGrath, G.S. (2018, December). Fractal topography of the intra-urban thermal landscape. *Nonlinear Geophysics. AGU Fall Meeting, Washington, DC.*
- 2018/08
- **Shreevastava, A.**, McGrath, G., Rao, P.S.C. (2018, September). Spatial analysis of the Surface Urban Heat Island. *SPIE Asia-Pacific Remote Sensing Conference, Honolulu, HI.*
- 2017/12
- **Shreevastava, A.**, McGrath, G., Rao, P.S.C. (2017, December). Characterizing the intra-urban spatial structure of High Heat Stress Zones. *Global Environment Change. AGU Fall meeting, New Orleans, LA.*
- 2017/01
- **Shreevastava, A.**, Bhalachandran, S., Garcia-Dorado, I., Aliaga, D., and Niyogi, D. (2017, January) Incorporation of urban form and function for improved correlation between Land Use Types and Land Surface Temperatures. *13th Symposium of the Urban Environment. 97th AMS Annual Meeting, Seattle, WA.*
  - **Shreevastava, A.**, Bhalachandran, S., Krueger, E., Rao, P.S.C., Modak, P., and Niyogi, D. (2017, January) A Resilience Analysis of 100 Climate Proofing Strategies of the C-40 Cities. *97th AMS Annual Meeting, Seattle, WA.*
  - Niyogi, D., Bhalachandran, S., Brousse, O., Jain, M., **Shreevastava, A.**, Jain, A.P. (2017, January) Investigation of the Impact of Urbanization Under the 2015 Delhi Heat Wave Scenario *13th Symposium of the Urban Environment. 97th AMS Annual Meeting, Seattle, WA.*

## Invited Talks and Seminars

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- 2020/02    **Senseable City Lab, MIT**, Cambridge, MA, USA.
- 2020/01    **Winter Workshop on Complex Systems**, Lausanne, Switzerland.
- 2019/08    **Centre for Advanced Spatial Analysis (CASA), University College London (UCL)**, London, UK. *Spatial correlation of inequalities in building energy usage and extreme heat.*
- 2019/04    **NASA Land Cover Land Use Change (LCLUC) Science Team meeting**, Rockville, MD, USA. *Characterizing the spatial complexity of the intra-urban heat islets.*
- 2018/08    **Colorado State University**, Fort Collins, CO, USA. *Fractal topography of the intra-urban thermal landscape.*
- 2018/06    **NASA Ames**, CA, USA. *Fractal topography of the intra-urban thermal landscape.*
- 2018/02    **University of Florida**, Gainesville, FL, USA. *Fractal topography of the intra-urban thermal landscape.*
- 2017/08    **Technische Universität (TU) Dresden**, Dresden, Germany. *Optimizing Thermal Comfort in Fractal Cities.*
- 2016/08    **Helmholtz Centre for Environmental Research (UFZ)**, Magdeburg, Germany. *A resilience analysis of 100 climate proofing strategies by 56 global cities.*
- 2016/06    **Environmental Management Centre (EMC)**, Mumbai, India. *A resilience analysis of 100 climate proofing strategies by 56 global cities.*

## Relevant Graduate Courses

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- Complex Systems**    **Resilient Hybrid Infrastructure Networks, Introduction to Complex Networks, Perspectives of Complex Systems: Theory and Application.**
- Atmospheric Sciences**    **Land Surface Modeling, Environmental Informatics, Boundary Layer Meteorology, Global Change Modeling.**
- Remote Sensing and GIS**    **Geospatial Modeling and Analysis, Geographical Information Systems.**
- Architectural Engineering**    **Building Envelop Design and Thermal Load, Lighting in Buildings, HVAC and Electrical Design, Sustainable Building design.**
- Smart Cities**    **Smart Cities Analytics (Machine Learning algorithms for urban applications), Urban Ecosystem Services.**

## Teaching Experience

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### Graduate Instructor, Purdue University

Spring 2016

- Worked as a mentor for an interdisciplinary graduate class on designing climate resilient cities.
- Taught the workflow of Local Climate Zones mapping - a random-forest based supervised classification for Urban Form and Function using Google Earth and SAGA GIS.

### Graduate Teaching Assistant, Purdue University

Fall 2014, Spring 2015

- Taught two courses on Principles of Geomatics, and Applied Statics over the span of two semesters.
- Responsibilities included Demonstrations, field work, designing lab experiments, holding tutorial sessions and grading.

## Technical Skills

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- Coding**    **R, Python, MATLAB, version control- git.**
- Scripting**    **LaTeX, Bash, JavaScript, HTML, Markdown**
- Geospatial**    **R (using rgeos, rgdal, raster, sp, etc.), Python (using netCDF, wrf-python, xarray, cartopy, etc.) ArcGIS, SAGA-GIS, Google Earth Engine.**
- Computational**    **Weather Research Forecast (WRF), Statistical modeling, Networks modeling, Machine Learning algorithms using Python (using scikit-learn, igraph, pandas, etc.)**