RAJ SAHA

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Education

2011 **Ph.D., Physics**, *University of North Carolina at Chapel Hill*

2006 **M.S., Astronomy**, *University of North Carolina at Chapel Hill*

2003 **B.S., Physics**, *Bates College*

Experience

2022- **Research Manager**
Data and Insights, The New York Times

2022- **Lecturer in Applied Machine Intelligence**
The Roux Institute, Northeastern University. Portland, ME

2021-2022 **Senior Data Scientist**
Running Tide Technologies. Portland, ME

2016-2021 **Interdisciplinary Lecturer in Environmental Geophysics**
Departments of Physics & Astronomy, Earth and Climate Sciences, Bates College

2015-2016 **Visiting Assistant Professor**
Departments of Physics & Astronomy, Earth and Climate Sciences, Bates College

2014-2015 **Visiting Scientist**
Tata Institute of Fundamental Research, Bangalore, India

Ed Lorenz Postdoctoral Fellow in the Mathematics of Climate Change
Mathematics and Climate Research Network
2013-2014 *School of Mathematics, University of Minnesota*
2011-2013 *Department of Mathematics, Bowdoin College*

Relevant Work & Projects

2021-2022 **Computer Vision Algorithms**. Developed vision algorithms to estimate the size and mass of submerged macro-algae (kelp) in the ocean. Optimization for telemetry data.

2018-2022 **Computer Vision/Bioluminescence.** Collaboration with biologists at University of Kansas and UCSD to analyze field data using custom computer vision algorithms.

2019 **Juried Art Exhibit**. *All the Great Trees*, Creative Portland Gallery.

2016-2020 **Visual Mathematics.** Developed and taught new courses in dynamical systems theory and mathematical modeling based on visual and high level construction of feedback connections. Also developed numerous visualizations of complex systems, and concepts in dynamical systems.

2011-2014 **Site and data portal design.** Designed website and climate data portal for the Mathematics and Climate Research Network.

2007-2009 **Satire Newsletter.** Founded a graduate student satire newsletter called the Rϕtten Fish.

2006 **webLabs.** Built a web-based lab report submission, grading and archiving app. This was commissioned and used by UNC's physics department for several years.

2005 **Photo-documentary** work portraying first generation South Asian Americans. Runner-up in Duke Center for Documentary Studies competition, 25-under-25.

2004-2005 **IT and Data Officer.** Designed the website and grants application portal for the Graduate and Professional Student Federation at UNC Chapel Hill.

Technical Skills

Mathematical modeling: Machine Learning, Computer Vision, Evolutionary Algorithms, climate and dynamical systems models, Statistical Models.

Data Visualization: Static and dynamic visualizations using Python, Plotly, Dash, Mathematica, Tableau, ArcGIS, GeoPandas, Folium, Bokeh.

Programming / Database: Python, R, Mathematica, Matlab, SQL, Javascript.

Ray Tracing / 3D: Blender, Fusion 360, Panda3D.

Graphics: Illustrator, Photoshop.

Publications

Saha, R.; Rivers, T., *A Computer-Vision algorithm for tracking and analyzing motion and behavior of bioluminescent organisms.* **Under Prep**

2020 Greer, Meredith; **Saha, R.**; Gogliettino, Alex; Yu, Chialin; Zollo-Venecek, Kyle, *Emergence of oscillations in a simple epidemic model with demographic data. Royal Society Open Science*, Royal Society Open Science, 7:191187, doi:10.1098/rsos.191187

2018 **Saha, R.**, *The Permafrost Bomb is Ticking*, Retrieved from Yale Climate Connections, https://www.yaleclimateconnections.org/2018/02/the-permafrost-bomb-is-ticking/.

2016 Roberts, A. and **Saha, R.**, *Relaxation oscillations in an idealized ocean circulation model*, Climate Dynamics, 48: 2123. doi:10.1007/s00382-016-3195-3.

2015 **Saha, R.**, *Millennial-scale oscillations between sea ice and convective deep water formation*, Paleoceanography, 30, 1540–1555, doi:10.1002/2015PA002809.

2011 Rial, J. and **Saha, R.**, *Modeling Abrupt Climate Change as the Interaction Between Sea Ice Extent and Mean Ocean Temperature Under Orbital Insolation Forcing*, Abrupt Climate Change: Mechanisms, Patterns, and Impacts, American Geophysical Union, Washington, D. C.. doi:10.1029/2010GM001027.

2010 **Saha, R.** and, Deardorff, D. *WebLabs - a way to submit lab reports online.* American Association of Physics Teachers, Washington, D.C.

2009 Rial, J. and **Saha, R.**, *Understanding Abrupt Climate Change: The Importance of Orbital Insolation.* Climate Change Congress Meeting, Copenhagen. Vol. 1, pp 94-97. doi:10.1088/1755-1307/6/1/012013.

2008 Rial, J. and **Saha, R.**, *Stochastic Resonance, Frequency Modulation and the Mechanisms of Abrupt Climate Change in the Arctic*, First International Symposium on Arctic Research.

Service & Educational Outreach

2018 **Co-chair for the Bates College climate activism.** A workshop series with Alice Doughty (Geology) and Francis Eanes (Environmental Studies).

2017 **Bates Diversity in STEM Initiative Committee**, to propose targeted programs for increasing retention and performance of underrepresented minority students in STEM fields. *Bates College.*

2017 **Student Research Committee** at Bates to award student research grants and senior awards for academic excellence. *Bates College.*

2015-2016 **Science Expo** with the Lewiston Middle School and Harward Center for Community Partnerships. *Bates College.*

2011-2012 **Climate and Environmental Module Design for Intro Calculus Courses**. Mathematical Biosciences Institute, *Bates College.*

2004-2006 **webLABS**: Created automatic student lab report submission and grading tool. Presented at the American Physics Teachers' Association.