Stanford

Aditi Sheshadri

Assistant Professor of Earth System Science and, by courtesy, Senior Fellow at the Woods Institute for the Environment

Bio

BIO

I joined Stanford's Earth System Science department as an assistant professor 2018. Prior to this, I was a a Junior Fellow of the Simons Foundation in New York, and a postdoctoral research scientist at Columbia University’s Department of Applied Physics and Applied Math and the Lamont-Doherty Earth Observatory. I got my Ph.D. in Atmospheric Science at MIT's Department of Earth, Atmospheric, and Planetary Sciences, in the Program for Atmospheres, Oceans, and Climate, where I worked with R. Alan Plumb. I’m broadly interested in atmosphere and ocean dynamics, climate variability, and general circulation.

I'm particularly interested in fundamental questions in atmospheric dynamics, which I address using a combination of theory, observations, and both idealized and comprehensive numerical experiments. Current areas of focus include the dynamics, variability, and change of the mid-latitude jets and storm tracks, the stratospheric polar vortex, and atmospheric gravity waves.

ACADEMIC APPOINTMENTS

- Assistant Professor, Earth System Science
- Center Fellow (By courtesy), Stanford Woods Institute for the Environment
- Member, Bio-X

HONORS AND AWARDS

- Google scholar award, Google (2023)
- Junior Fellow, Simons Society of Fellows (2015-2017)
- Best student presentation award, AMS conference on the middle atmosphere (2015)
- Lord foundation fellowship, Massachusetts Institute of Technology (2012-2013)
- Dean of Science Fellowship, Massachusetts Institute of Technology (2010-2011)
- J.N. Tata Fellowship, J. N. Tata endowment (2007-2008)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Steering committee member, Stratospheric network for the assessment of predictability (2017 - present)

PROFESSIONAL EDUCATION

- Ph.D., Massachusetts Institute of Technology , Atmospheric Science (2015)
- S. M., Massachusetts Institute of Technology , Aeronautics and Astronautics (2009)
- B. E., R. V. College of Engineering , Mechanical Engineering (2007)

Teaching

COURSES

2023-24

- Scientific Basis of Climate Change: ESS 102, ESS 202 (Spr)

2022-23

- Dynamics of the Atmosphere: ESS 348 (Win)
- Scientific Basis of Climate Change: ESS 102, ESS 202 (Spr)
- Topics in Earth System Science: ESS 301 (Aut, Win, Spr)

2021-22

- Climate Models and Data: ESS 171, ESS 271 (Win)
- Scientific Basis of Climate Change: ESS 102, ESS 202 (Spr)

2020-21

- Climate Models and Data: ESS 171, ESS 271 (Win)
- Scientific Basis of Climate Change: ESS 102, ESS 202 (Spr)

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Aman Gupta, Laura Mansfield, Catherine Wilka

Doctoral Dissertation Advisor (AC)

Adam Burnett

Doctoral (Program)

Adam Burnett, Isabella Dula Razzolini, Robert King

Publications

PUBLICATIONS

- **Calibration and Uncertainty Quantification of a Gravity Wave Parameterization: A Case Study of the Quasi-Biennial Oscillation in an Intermediate Complexity Climate Model** *JOURNAL OF ADVANCES IN MODELING EARTH SYSTEMS*
  Mansfield, L. A., Sheshadri, A.
  2022; 14 (11)

- **Machine Learning Gravity Wave Parameterization Generalizes to Capture the QBO and Response to Increased CO2** *GEOPHYSICAL RESEARCH LETTERS*
  Espinosa, Z., Sheshadri, A., Cain, G. R., Gerber, E. P., DallaSanta, K. J.
  2022; 49 (8)

- **Midlatitude Error Growth in Atmospheric GCMs: The Role of Eddy Growth Rate** *GEOPHYSICAL RESEARCH LETTERS*
  Sheshadri, A., Borrus, M., Yoder, M., Robinson, T.
  2021; 48 (23)

- **The Atlantic Jet Response to Stratospheric Events: A Regime Perspective** *JOURNAL OF GEOPHYSICAL RESEARCH-ATMOSPHERES*
  Goss, M., Lindgren, E. A., Sheshadri, A., Diffenbaugh, N. S.
  2021; 126 (7)

- **Tropical cyclone frequency under varying SSTs in aquaplanet simulations** *Geophysical Research Letters*
  Burnett, A. C., Sheshadri, A., Silvers, L. G., Robinson, T.

2021

- **Seasonal and Latitudinal Variability of the Gravity Wave Spectrum in the Lower Stratosphere** *JOURNAL OF GEOPHYSICAL RESEARCH-ATMOSPHERES*
  Lindgren, E. A., Sheshadri, A., Podglajen, A., Carver, R. W.
  2020; 125 (18)
- **The role of wave-wave interactions in sudden stratospheric warming formation** *Weather and Climate Dynamics*
  Lindgren, E. A., Sheshadri, A.
  2020; 1: 93-109
- **Frequency-dependent behavior of zonal jet variability** *Geophysical research letters*
  Lindgren, E. A., Sheshadri, A., Plumb, R. A.
  2020; 47: 1-8
- **The Importance of Greenland in Setting the Northern Preferred Position of the North Atlantic Eddy-Driven Jet** *GEOPHYSICAL RESEARCH LETTERS*
  White, R. H., Hilgenbrink, C., Sheshadri, A.
  2019
- **Model Hierarchies for Understanding Atmospheric Circulation** *REVIEWS OF GEOPHYSICS*
  Maher, P., Gerber, E. P., Medeiros, B., Merlis, T. M., Sherwood, S., Sheshadri, A., Sobel, A. H., Vallis, G. K., Voigt, A., Zurita-Gotor, P.
  2019; 57 (2): 250–80
- **Orography and the Boreal Winter Stratosphere: the Importance of the Mongolian mountains** *Geopysical Research Letters*
  White, R. H., Battisti, D. S., Sheshadri, A.
  2018
- **Sudden stratospheric warming formation in an idealized General Circulation Model using three types of tropospheric forcing** *Journal of Geophysical research: Atmospheres*
  Lindgren, E. A., Sheshadri, A., Plumb, R. A.
  2018; 123
- **The vertical structure of annular modes** *Journal of the Atmospheric Sciences*
  Sheshadri, A., Plumb, R. A., Lindgren, E. A., Domeisen, D. I.
  2018; 75: 3507-3519
- **Propagating Annular Modes: Empirical Orthogonal Functions, Principal Oscillation Patterns, and Time Scales** *JOURNAL OF THE ATMOSPHERIC SCIENCES*
  Sheshadri, A., Plumb, R. A.
  2017; 74 (5): 1345-1361
- **A perspective on climate model hierarchies** *Journal of Advances in Modeling Earth Systems*
  Jeevanjee, N., Hassanzadeh, P., Hill, S., Sheshadri, A.
  2017; 9 (4): 1760-1771
- **Observed Changes in the Southern Hemispheric Circulation in May** *JOURNAL OF CLIMATE*
  Ivy, D. J., Hilgenbrink, C., Kinnison, D., Plumb, R. A., Sheshadri, A., Solomon, S., Thompson, D. W.
  2017; 30 (2): 527-536
- **The Relationship between Age of Air and the Diabatic Circulation of the Stratosphere** *JOURNAL OF THE ATMOSPHERIC SCIENCES*
  Linz, M., Plumb, R. A., Gerber, E. P., Sheshadri, A.
  2016; 73 (11): 4507-4518
- **Sensitivity of the surface responses of an idealized AGCM to the timing of imposed ozone depletion-like polar stratospheric cooling** *GEOPHYSICAL RESEARCH LETTERS*
  Sheshadri, A., Plumb, R. A.
  2016; 43 (5): 2330-2336
- **Seasonal Variability of the Polar Stratospheric Vortex in an Idealized AGCM with Varying Tropospheric Wave Forcing** *JOURNAL OF THE ATMOSPHERIC SCIENCES*
  Sheshadri, A., Plumb, R. A., Gerber, E. P.

2015; 72 (6): 2248-2266

- **Can the Delay in Antarctic Polar Vortex Breakup Explain Recent Trends in Surface Westerlies** *JOURNAL OF THE ATMOSPHERIC SCIENCES*
  Sheshadri, A., Plumb, R. A., Domeisen, D. I.
  2014; 71 (2): 566-573

- **Modeling Traveling Waves using Mode Superposition** *PROCEEDINGS OF THE ASME 29TH INTERNATIONAL CONFERENCE ON OCEAN, OFFSHORE AND ARCTIC ENGINEERING, 2010, VOL 1*
  Jaiswal, V., Sheshadri, A., Vandiver, J. K.
  2010: 521-527

- **AN EXPERIMENTAL EVALUATION OF VORTEX-INDUCED VIBRATION OF A RISER BUNDLE WITH GAPS** *OMAE 2009, VOL 5*
  Vandiver, J. K., Cheng, Y., Jaiswal, V., Sheshadri, A., Yu, A.
  2009: 695-705