APARNA RADHAKRISHNAN
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BIO

Ms. Aparna Radhakrishnan is affiliated with Princeton University's Cooperative Institute for Modeling the Earth System (CIMES. The Cooperative Institute for Modeling the Earth System (CIMES) is a collaboration between Princeton University and the National Oceanographic and Atmospheric Administration's (NOAA) Geophysical Fluid Dynamics Laboratory (GFDL) to carry out research in earth system sciences.

Ms. Radhakrishnan's projects and research areas fall under computational modeling and data management, with specific focus on software workflows, open-source frameworks and community collaborations for climate data analysis.

Since 2009, Ms.Radhakrishnan has contributed to the success of the overarching NOAA goals to understand climate variability and change to Enhance Society's ability to plan and respond (Ack. CIMES annual reports), by her active engagement with the Modeling Systems Division and the Diagnostics and Evaluations Team at NOAA's Geophysical Fluid Dynamics Laboratory. Her vast and diverse technical experience in projects such as Coupled Model Intercomparison projects, past efforts on ExArch-NSF funded "User-developed climate analytics on federated archives", statistical downscaling have all stood as a motivation for her present efforts towards scalable climate analytics.

Ms. Radhakrishnan's current research efforts focus on researching data management practices for a wider impact on climate research, in addition to identifying and promoting usable techniques for climate analysis for a diverse group of users. Here are a few technologies and terminologies that Ms.Radhakrishnan works on: cloud computing, machine learning workflows, containerization, dask scalable analytics, data standards and data citations.

Ms. Radhakrishnan enjoys teaching and considers it the most effective form of learning. Ms. Radhakrishnan believes that the most challenging problems do not necessarily have the most complicated solutions.

BIBLIOGRAPHY

- Google scholar link Citations: (621 citations from 2013- Present)

SELECT ARTICLES AND TALKS

- (Invited talk) Aparna Radhakrishnan, Wenhao Dong, "A walkthrough of the MDTF framework, Unified Forecast Systems Webinar Series, Dec 2021
- (Invited talk) Aparna Radhakrishnan, "Pangeo and ESGF in the cloud", 24th Working Group on Coupled Modeling, Dec 2021.
- V.Balaji, A.Radhakrishnan (2021), Climate in the Cloud: Democratizing access to climate projections" V. Balaji and Aparna Radhakrishnan, OAR Cloud Tiger.
- Aparna Radhakrishnan, V.Balaji, Thomas Jackson, Maike Sonnewald, *Building blocks for exascale computing*, Presented at 6th ENES HPC Workshop, 2020.
- Invited talk: **Aparna Radhakrishnan** et al, "Towards Reproducible Research", DockerCon 2019 conference, San Francisco, CA.
- V. Balaji, Karl E. Taylor, Martin Juckes, Michael Lautenschlager, Chris Blanton, Luca Cinquini, Sébastien Denvil, Paul Durack, Mark Elkington, Francesca Guglielmo, Eric Guilyardi, David Hassell, Slava Kharin, Stefan Kindermann, Bryan N.Lawrence, Sergey Nikonov, **Aparna Radhakrishnan**, Martina Stockhause and Dean Williams (2018) *Requirements for a global data infrastructure in support of CMIP6*, **Journal: GMD CMIP6 Special Issue**

- **Aparna Radhakrishnan**, V.Balaji, Luca Cinquini, Serguei Nikonov,Hans Vahlenkamp,Ryan Abarnethey,Kharan Bhatia , Deploying ESGF Node as Docker containers on Google Cloud: A GFDL experience, Presented at the American Geophysical Union 2018, Washington, D.C

- **Aparna Radhakrishnan**, Larry Wayne Horowitz, V.Balaji, Alistair Adcroft, John P Krasting, Serguei Nikonov, Erik Mason, Roland Schweitzer, Denis Nadeau, *Quality Controlling CMIP6 datasets at GFDL*, Presented at the American Geophysical Union 2017, New Orleans.

- KW Dixon, JR Lanzante, MJ Nath, K Hayhoe, A Stoner, **A Radhakrishnan**, V.Balaji,(2016) *"Evaluating the stationarity assumption in statistically downscaled climate projections: is past performance an indicator of future results?"* **Journal: Climatic Change**

- **Radhakrishnan, A**., V. Balaji, R. Schweitzer, S. Nikonov, K. O'Brien, H. Vahlenkamp, E. Burger (2016), *Earth System Model Development and Analysis using FRE-Curator and Live Access Servers: On-demand analysis of climate model output with data provenance, abstract IN13D-02,* presented at American Geophysical Union Fall Meeting, San Francisco, CA 2016

- **A Radhakrishnan**, EE Mason, AR Langenhorst, V Balaji, S Nikonov (2014), *From" Inspiration-driven" Research to" Industrial-strength" Research: Applying User-developed Climate Analytics at Large scale*, abstract #IN53E-04, presented at American Geophysical Union, Fall Meeting, San Francisco, CA 2014

- **Aparna Radhakrishnan**; Galina Guentchev; Luca Cinquini; Roland Schweitzer; Serguei Nikonov; V. Balaji (2013), *Downscaling Climate Data from Distributed Archives,* abstract #IN23A-1414, presented at American Geophysical Union, Fall Meeting, San Francisco, CA 2013.

- **(Invited Talk: Aparna Radhakrishnan**, V Balaji (2012*). Presentation on Climate Analysis on Global CMIP5 Data,* presented at ExArch workshop, Oct 2012, Windsor, UK

- Balaji V; Ansari S; **Radhakrishnan .A** (2011), *Deploying user-developed scientific analyses on federated data archives***,** abstract IN41C-01, presented at American Geophysical Union, Fall Meeting, San Francisco, CA 2011

- Presenter on NOAA/GFDL's Model Development Database Interface, May 2011. Global Organization for Earth System Science Portals, Asheville

- Krasting, J. P.; Balaji, V.; Langenhorst, A. R.; Nikonov, S.; **Radhakrishnan. A** Stouffer, R. J (2010), *NOAA-GFDL's Workflow for CMIP5/IPCC AR5 Experiments***,** abstract #IN14B-06 presented at American Geophysical Union, Fall Meeting, San Francisco, CA 2010,

PROFESSIONAL AND COMMUNITY SERVICE and affiliations

- Member, OAR Data Management Working Group and NOAA DOI Task Team
- Mentor, CIMES internship program
- Member, American Geophysical Union (Session chairing and Peer/Expert reviewer)
- Co-chair, Pangeo/ESGF Cloud Data Working Group
- Member, GFDL Modeling Systems Division
- Member, Earth Science Women Network (ESWN)
- Former chair, NOAA GFDL Diagnostics and Evaluation Group
- Former member and mentoring chair, Toastmasters club, Columbus.
- Inaugural Chair, GFDL Diversity Equity Inclusion (DEI) community forum
- Former Member, GFDL DEI committee.
- Member, Climate Forecast Conventions Metadata
- Member, Earth System Grid Federation
- Teaching, NOAA GFDL Summer school
- Child learning opportunities through Children's books

PROFESSIONAL ACTIVITIES
09/19 to Present
Princeton University/ Cooperative Institute for Modeling the Earth System
Professional Specialist

- Actively exploring capabilities for data citations in collaboration with the GFDL community and other lNOAA abs.
- Jointly leading technical efforts supporting Amazon Sustainability Data Initiative for CMIP6, in collaboration with the ESGF and Pangeo.
- Co-chair ESGF/Pangeo cloud data working group
- Co-PI and Technical lead for Model Diagnostic Task Force phase-3 development
- Collaborator on DOE funded DREAM effort: ESGF-publication prototyped in Google cloud
- Prototyped first application of Docker containerization for GFDL climate analysis
- Working on developing and promoting new workflows incorporating newer data exploration and analysis techniques : cloud-based, container-based and dask parallel computation integrated workflow, etc.
- Working collaboratively on dask integration for machine learning methods on high-resolution CMIP6 output for identifying ocean related ENSO in CMIP6 models.
- Designed and developed micro tools to facilitate CMIP6 quality assurance
- Lead developer at GFDL to develop tools to establish CMIP/CF compliance for CMIP6; streamlined PrePARE and CF checking in the workflow via tracker, Model Development Database Interface, LAS integration in HPC tape.
- Served as GFDL data citation officer for CMIP6 collaborating with DKRZ orchestrating the data citation process.

PAST ACTIVITIES
Engility/SAIC
Customer: NOAA GFDL
Senior Data Scientist **08/09 to 09/19**
Visualization and Climate Analysis Tools Development

- Design and Development of Visualization Features on Model Development Database Interface.
- Active Developer in Google Cloud Project collaborative efforts.
- Collaboration with NOAA/PMEL on the use of Live Access Servers, Dockers.
- Provided initiatives and design strategy on leveraging the use of cross-laboratory tools for Quality Control and Data Analysis.
- Led design and development of software workflow using Python, R and NCO utilities-- for Empirical Statistical Downscaling at GFDL for the Perfect Model experimental design, in collaboration with the GFDL ESD team and University of Texas
- Design and implementation of a template-based approach to facilitate climate analyses on global data archives using Python, Ferret, CDO, and Java on Linux platforms under the auspices of ExArch-NSF funded initiative with centers across the world and Princeton University.
- Generation of climate products using Java-based Live Access Servers using OPeNDAP and THREDDS.
- Actively led development of CMIP5 workflow and led coordination of CMIP5 technical aspects in terms of testing, processing and data publication from the Modeling Systems Division.
- Aided in development of metadata management services and database schema design for MySQL relational database (Curator) as part of the team for performance tuning and improved metadata access.
- Took the lead in designing and developing use-cases and testing framework for the Curator Database based utilities for CMIP5.
- Actively engaged in data publishing and data standardization activities for climate model output
- Managed and tracked metadata collection on 500 climate variables communicating with scientific users from various realms as part of the efforts that encompass the Intergovernmental Panel on Climate Change.
- Developed and maintained Fortran/Shell script/Python wrappers using Climate Model Output Rewriter API.
- Worked on Data Size estimation projects for IPCC AR5.
- Developed geospatial and temporal sub-setting utilities based on CDAT, python.
- Designed and Implemented python-MySQL based tools to generate THREDDS XML/NcML based metadata
- Catalogs for data visualization on Live Access Servers, in collaboration with NOAA (PMEL) for Ensemble Climate Data Assimilation projects.
- Designed and Developed automated scripts in Python, NCO, documenting provenance for published empirically statistically downscaled output.
- Integrated automated data processing/transfer tools in the specific workflows using Java, python, transfer protocols (gridFTP/rsync/scp) and MySQL.

Web Development and Quality Control tools.

- Developed and maintained EXT-JS/JSP/Ajax based Model Development Database Interface at GFDL for secure access to experiment data and metadata for Quality Controlling and more.
- Documented use case scenarios and user manuals for web applications to help end users.
- Developed a prototype model for deployment of user-developed climate analytics as a web service using Ferret/Python/Java in collaboration with NOAA/PMEL
- Organized and conducted annual training for scientific users and students on using Curator and Quality Control utilities.

Macrostaff Inc. (NOAA/PMEL), Scientific Programmer **02/09 - 08/09**

Ocean Observing and Monitoring System web application migration and improvements.
(PHP, Matlab, Ferret, PERL)

Real Networks Inc, Systems Engineer Intern (1 year) **07/08 - 07/09**

Database migration and web programming for a Stream Monitoring Application.
(Web development, Sybase, mySQL, PHP, Python, Linux system engineering)

Wayne State University, C&IT, Engineering Intern (1 year) **04/07 - 06/08**

Worked in Design, HelpDesk Support and maintenance of WSU Housing Internet (Meru and Proxim Wireless Network, Cisco Switches), DNS host records (Infoblox) ,Voice over IP Telephony system (Asterisk/Trixbox), data mining and knowledge discovery projects.

EDUCATION

Master of Computer Science, 2006 Wayne State University, Detroit, MI

Bachelors in Computer Science and Engineering, 2002 Anna University, India

TECHNICAL SKILLS

- Operating systems: Linux, Windows, Mac
- Databases: MongoDB, MySQL, PostgreSQL, IBM Cloudscape, Oracle, IBM Watson.
- Programming languages: Python, Java, C/C++, R, Linux Shell scripting, PHP, XML, PERL/FORTRAN.
- Scientific data manipulation and visualization tools: Python/xarray/Dask, Familiar with Ferret, NCL, Grads, CDAT, CDO, NCO, Matlab, Live Access Servers (THREDDS, OPeNDAP distributed protocols), Machine Learning, scikit-learn, Data mining, WEKA.
- Office automation and project management packages: Microsoft Office/OpenOffice, MS Visio, RedMine, Git.
- Networking software: Infoblox
- Telecommunications software: Asterisk VoIP
- Other technologies: Hyper-V Virtualization, Google Cloud, AWS, Pangeo, Dask parallelization, JupyterLab, Docker containers, High Performance Computing working with HPC clusters and supercomputing environment.

PROFESSIONAL AND COMMUNITY SERVICE and affiliations

- Inaugural Chair, GFDL Diversity Equity Inclusion (DEI) community forum
- Former Member, GFDL DEI committee.
- Member, OAR Data Management Working Group and NOAA DOI Task Team
- Mentor, CIMES internship program
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- Former chair, NOAA GFDL Diagnostics and Evaluation Group
- Member, GFDL Modeling Systems Division
- Member, Earth Science Women Network (ESWN)
- Former member and mentoring chair, Toastmasters club, Columbus.

AWARDS AND HONORS

- Recipient of Gold Stevie American Business Awards for Technical Professional of the year 2014.
- Recipient of Academic Scholarship for Graduate Program, WSU
- Outstanding Presentation awards (from HPTi/Engility) for presentations at: NCPP NCAR 2013
- PICScie/Princeton University, NOAA-GFDL AGU 2014, Technical Instructions at GFDL's summer school on Atmosphere Modeling (2012)
- Award for Technical Excellence from HPTG Engility 2014
- Certification in "Practical Machine Learning" from John Hopkins
- Certification in Cloud computing from University of Illinois
- Certification in Python programming from University of Michigan
- Certification in AWS Fundamentals from AWS, 2020
- Certification in Diversity and Inclusion in the workplace from ESSEC Business school (2021), France.
- Google scholar link Citations: (621 citations from 2013- Present)

PERSONAL CORE VALUES

Compassion, Commitment, Courage