APARNA R. PHALKE

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Self-motivated and passionate scientist with excellent skills in agricultural livelihood systems, remote sensing, land use modeling, cloud computing, global food security, policy analysis, team management, leading science

EDUCATION

University of Wisconsin-Madison, Nelson Institute for Environmental Studies, USA August 2021 Ph.D., Environment and Resources Program | Major GPA 4/4

- NASA research Fellow, Dissertator Fellowship award, Conference paper presentation awards
- Mapped world's first field-scale global croplands at large area using satellite remote sensing, cloud and AI (croplands.org)

Asian Institute of Technology, School of Engineering and Technology, Bangkok, Thailand May 2012 Master of Engineering, Remote Sensing and Geographical Information System | Major GPA 4/4

- AIT graduate student fellowship, Department distinguished graduate award
- First female General Secretary and President of AIT graduate student organization

Marathwada Agricultural University, Parbhani, India May 2009 Bachelor of Technology, Agricultural Engineering | Major GPA 4/4

- General secretary of University Agroneer student organization; Best scientific demo award for irrigation-based technology application for high crop yield at national level competition, College topper award

RESEARCH EXPERIENCE

NASA SERVIR Science Coordination Office and Earth System Science Center, UAH

Agriculture, Food Security and Water thematic lead, Research Scienstist II, Huntsville AL **Sept. 2021 – current**

- Working with hub partners and stakeholders to understand thematic needs and fill the gaps through coordination with applied science team, direct science support or cross-collaborations.
- leading scientific initiatives which support SERVIR's global thematic portfolio. For fiscal year 2022-23 top here activities area - 1. Intercomparisons of crop yield models in Eastern and Southern Africa; 2. Crop area and yield mapping in Bhutan; 3. Impact of Ukraine war on food security of SERVIR regions.
- Worked on crop yield intercomparison, crop type mapping and crop yield prediction modeling project plans. This research will work on monitoring croplands and its production across SERVIR regions.
- Presented thematic research work in international conferences I am I collaborated and co-developed with SERVIR hubs for global initiatives listed in (1).
- Provided backstopping to the applied science team (AST) project to help SERVIR hubs agricultural monitoring activities to analyze food security.
- Represented SERVIR Agricultural and Food Security portfolio internationally and at SERVIR hub service launch events such as in AGU conference, PECORA conference, ICT for Ag hub-driven international conference, NISAR workshop and conference and Soil fertility launch service at SERVIR Amazon, NASA's capacity building program reviews, NASA's applied science program reviews.
- Supported/led the existing partnership of SERVIR in the Agricultural, Food Security and Water theme. I am also leading dialogs between NASA's other programs working on agricultural, food security and water thematic activities such as NASA Harvest, NASA Agriculture and Water Resources.
- Provided technical and scientific support to projects other than core activities such as studying use of GEDI data for crop types at SERVIR, TensorFlow working group.
- led project specific calls whenever needed, coordinated AST thematic teams, coordinated global thematic calls for SERVIR's Agriculture, Food Security and Water theme, coordinated hubs thematic teams for specific projects/services.
- identified growth areas and new partnerships in my thematic focus.

- assessing technical needs with SERVIR West Africa hub through "Agricultural Monitoring Task Group" as a new coordination effort.
- contributed to scientific publications related to the scientific initiatives listed above.
- Advising two fellow and one researcher for their research

Nelson Institute for Environmental Studies, UW Madison in collab. with **NASA and USGS**
Lead researcher, Research Assistant, NASA Research Fellow, Madison WI **Aug. 2013 – current**

- Developed methods to better understand how human's use the land sustainably, particularly for agricultural activities using satellite remote sensing, geospatial tools, machine learning and econometric models; investigated the various ways in which remotely sensed observations can improve crop area estimates from individual fields to entire countries and relate these estimates to government-led agricultural support programs in Eastern Mediterranean
- Developed and implemented algorithms and models for satellite image based cropland mapping in Europe, Middle-east, Russia and Central Asia covering 30% of global net croplands with average 90% accuracy (highest so far) (https://nelson.wisc.edu/news/story.php?story=3307)
- Processed large satellite data (several terabytes) using google earth engine and NASA Earth Exchange (NEX) cloud services; played instrumental role in design, coding, computing, analyzing, and synthesizing satellite derived datasets (https://news.wisc.edu/mapping-cropland-uw-madison-plays-critical-role-in-best-ever-map/, https://www.usgs.gov/news/new-map-worldwide-croplands-supports-food-and-water-security)
- Published three research papers in international peer-reviewed journal (130+ citations till-date; two additional papers in-review); Organized workshops; Wrote algorithm and user documentations; Presented work in international conferences

Food and Agricultural Organization of the United Nations in collab. with **Asian Institute of Technology**
Research Scientist, Bangkok, Thailand **Jun 2012-Aug 2013**

- Implemented novel methods to map water poverty in Asia-Pacific region using big data and cloud technology; Derived water interventions of small-holder farmers livelihood in Asia-pacific region; Implemented innovative remote sensing and GIS based tools to define hotspots for water interventions; Performed economic analysis for water-fund distribution in Asia-Pacific countries
- Organized workshops and published research articles to share the work with stakeholders

K-water, Government of South Korea Research Organization
Research Intern, Daejeon, South Korea **Jun 2011-Aug 2011**

- Studied and analyzed the water samples and built the E-nose system to analyze the water-quality using sensing technology

Indian Space Research Organization
Research Intern, Nagpur, India **March 2010-Jun 2010**

- Studied GIS tools mainly Prime-Win software product to analyze the land use land change in India

INDUSTRY EXPERIENCE

Harvesting.co
Product Manager, Lead Remote Sensing Scientist, San Francisco, CA **Nov 2017-Nov 2019**

- Led a technical and scientific team to develop AI and cloud based the agricultural intelligence (AgIntel) engine used by financial institutions and farmers for risk assessment
- Conceptualized and strategized the development of tools and products; Established agile methods for implementation of the process; Worked on semantics of product; Wrote and presented product related work
- Performed daily scrums as scrum-master; Implemented the core modules to automate and scale; Planned the MVPs and sketch for future development of product

- Communicated with potential clients from research, environmental, government, technology, and finance industry with a demo of the product and directed the product development for satisfying the client's needs

TEACHING EXPERIENCE

Nelson Institute for Environmental Studies, UW Madison

Lecturer (SA) and Teaching Assistant, Madison, WI **March 2020-May 2020**

Course: EnvSt 978 006 KEE (Environment Conservation Tools Module 3), *Instructor: Arlyne Johnson*

- Assisted professor in building and designing the course material, teaching and graded the assignments and exam papers
- Helped students with Miradi share software-based too

Lecturer (SA) and Teaching Assistant, Madison, WI **March 2020-May 2020**

Course: EnvSt 978 006 KEE (Remote Sensing for Conservation and Management), Instructor: Dr. Sarah Graves

- Assisted professor during the class instructions, graded assignments
- *Presented by research work related to the topic on one of the days of instruction*

Lecturer (SA) and Teaching Assistant Madison, WI **January 2020-March 2020**

Course: EnvSt 978 002 AJJ (Environment Conservation Tools: Grant writing), Instructor: Aleia Mccord

- Assisted professor during class instruction for teaching
- Grading grant writing papers and assignments, audio pitches and help student to submit their grant proposal to National Geography Early Career Grant

Lecturer (SA) and Teaching Assistant Madison, WI **January 2020-March 2020**

Course: EnvSt 978 004 AJJ (Legislative Procedures and Agency based Conservation), *Instructor: Nathan Schulfer*

- Assisted professor during class instruction for teaching, graded student assignments, helped students with assignments and other course related problems

Teaching Assistant, Madison, WI **August 2019-December 2019**

Course: EnvSt556 (Digital Image Processing), Instructor: Dr. Mutlu Ozdogan

- Assisted professor to grade the assignments and helped during class instruction
- Helped students with their assignment and other course related problems on remote sensing and GIS tools

Teaching Assistant, Madison, WI **January 2019-May 2019**

Course: EnvSt900 (Advanced Remote Sensing), Instructor: Dr. Mutlu Ozdogan

- Assisted professor to write the programming based labs and other material, helped students during class instruction and for assignments, graded assignments and final exams

Teaching Assistant, Madison, WI **January 2018-May 2018**

Course: EnvSt506 (Modeling and Analysis of Environmental Systems), Instructor: Dr. Mutlu Ozdogan • Assisted professor to grade the assignments and helped during class instruction

• Helped students with their assignment and other course related problems on modeling software

SKILLS

Remote sensing satellite data related programming using Python, R, Linux, JAVA, ArcGIS, ENVI, .net, NEX, Precision farming, Google Cloud (certified), google earth engine, econometric modeling, socio-economic modeling

EXTRA-CURRICULAR Activities

- International Karate Kick Boxing tournament competition- gold medalist; 36 gold and 20 silver medals in Indian National level Karate competitions; Karate Kick Boxing coach (offered free coaching for thousands woman from developing countries, coaching since age 8)
- Volunteering for helping the small-holder farmers livelihood in India; Volunteering for several NGO's and government organizations for girl's education and well-being in developing countries; Passionate

about learning new languages (can speak fluently in 4 languages and communicate at professional level in 7+)

INTERNATIONAL JOURNAL PUBLICATIONS

- Md Didarul Islam, Faisal.. **Phalke AR**. Rapid Rice Yield Estimation Using Integrated Remote Sensing and Meteorological Data and Machine Learning. In review. 2023
- Tim Meyer, … **Phalke AR**. Employing the Agricultural Classification and Estimation Service (ACES) for Mapping Smallholder Rice Farms in Bhutan. In review. 2023
- **Phalke AR**, et al. Crop yield model concise review: In prep. 2023
- **Phalke AR**, et al. Intercomparison of crop yield models: In prep.2023
- **Phalke AR** et al., Bhutan crop type mapping, In prep.2023
- **Phalke A,** Anderson ER, Limaye AS, Davenport F, Nakalembe CL, Sahajpal R, Kenduiywo BK, Miller S, Mishra V, Adams EC, Falguni P. Intercomparison of Earth Observation based Crop Yield Forecasting Models in Kenya. InFall Meeting 2022 2022 Dec 12. AGU.
- Jahan N, Akilan T, **Phalke AR.** Machine Learning for Global Food Security: A Concise Overview. In2022 IEEE International Humanitarian Technology Conference (IHTC) 2022 Dec 2 (pp. 63-68). IEEE.
- Tondapu G, Mohammed IN, Bolten JD, Nelson J, Limaye AS, Bhandari B, Delgado FJ, **Phalke A.** LMHDSs: An enhanced data visualization and access web portal for your Soil and Water Assessment Tool (SWAT) model. In Fall Meeting 2022 Dec 15. AGU.
- Jimenez S, Mayer T, **Phalke A.** Crop Type Mapping Case Study in the Lower Mekong Basin based on Transfer Learning Techniques using GEDI and Multispectral Earth Observation Data. InFall Meeting 2022 2022 Dec 14. AGU.
- Bhandari B, Mayer T, GomezMartinez F, Kruskopf M, Maganini M, Jimenez S, Walker KA, **Phalke A.** Mapping Small-holder Rice Farms in Bhutan using Earth Observation Datasets and Machine Learning Model. InFall Meeting 2022 2022 Dec 14. AGU.
- **Phalke AR.** Investigating the Impacts of Support Policies on Agricultural Land Use and Production with Satellite Remote Sensing: A Case Study in the Cross-Border Area Between Turkey and Bulgaria. The University of Wisconsin-Madison; 2021.
- **Phalke, A. R**., Özdoğan, M., Thenkabail, et al.,(2020). Mapping croplands of Europe, Middle East, Russia, and Central Asia using Landsat, Random Forest, and Google Earth Engine. *ISPRS Journal of Photogrammetry and Remote Sensing*, *167*, 104-122. (https://pubs.er.usgs.gov/publication/70211221)
- **Phalke, A. R**., and Mutlu Özdoğan. "Large area cropland extent mapping with Landsat data and a generalized classifier." *Remote Sensing of Environment* 219 (2018): 180-195. (https://doi.org/10.1016/j.rse.2018.09.025) • **Phalke, A. R**., Ozdogan, M., Thenkabail, P., et al. (2017). NASA Making Earth System Data Records for Use in Research Environments (MEaSUREs) Global Food Security-support Analysis Data (GFSAD) 30-m Cropland Extent 2015 Europe, Middle-east, Russia and Central Asia 30m (GFSAD30EMRC). NASA EOSDIS Land Processes DAAC. Retrieved from https://lpdaac.usgs.gov/products/gfsad30eucearumecev001/).
- P**halke A. R**., Ozdogan M., and Thenkabail P., "Mapping croplands using Landsat Data with Generalized Classifier Over Large Areas to Study Global Food Security (2015)", *2nd International Conference on Global Food Security, Ithaca, Cornell.* (10.13140/RG.2.2.13259.21283)
- **Phalke, A. R.**, et al., "Automated wheat area mapping with generalized classifier from 1980 to 2020", in review
- **Phalke, A. R.,** et al., " Impact of policies on agricultural land use land change in the cross-border area of Turkey and Bulgaria: time series study from 1980 to 2020", in-review
- **Phalke, A. R.,** et al., " Wheat yield predictions using machine learning and satellite data in cross-border area of Turkey and Bulgaria", in-review
- Teluguntla, P., Thenkabail, P.S., Xiong, J., Gumma, M.K., Giri, C., Milesi, C., Ozdogan, M., Congalton, R., Tilton, J., Sankey, T.T., **Phalke, A. R.** and Massey, R., 2015. Global Cropland Area Database (GCAD)

derived from remote sensing in support of food security in the twenty-first century: current achievements and future possibilities.

- **Phalke, A. R**., Tripathi, N. and Bharambe, K., "Flood risk modeling in Bangkok province: Thailand (2011)", Proceedings of *10th International Symposium on New Technologies for Urban Safety of Mega Cities in Asia, Chiang Mai, Thailand.*
- Reda, A.G., Tripathi, N.K., Soni, P., Tipdecho, T. and **Phalke, A.R.,** 2013. Temporal climate trend of Ping Basin of Thailand and implications for Mekong Region. *Journal of Earth Science and Climatic Change, 4(4), pp.1-8.*
- Teluguntla, P., Thenkabail, P.S., Xiong, J., Oliphant, A., Gumma, M.K., Congalton, R., Yadav, K., Massey, R., **Phalke, A. R.,** Tilton, J. and Smith, C., 2017. Mapping cropland extent and areas of Australia at 30-m resolution using multi-year time-series Landsat data and Random Forest machine learning algorithm through Google Earth Engine (GEE) Cloud Computing.