

Siddharth Chaudhary, Ph.D.

NASA-Interagency Implementation and Advanced Concepts Team
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Summary / Skills

Remote Sensing | Geospatial Analytics | Machine Learning | Big Data Analytics | Database Management | Data Visualization | Proposal Writing | Budget Planning | Project Management | Leadership | Communication

Professional Experience

Research Scientist Earth System Science Center, University of Alabama in Huntsville Nov. 2022 - Present

Deputy Information System Manager U.S. Greenhouse Gas Center April 2023 - Present
The mission of the GHG Monitoring and Information Center is to extend accessible and integrated GHG data and modeling capabilities from the U.S. Government and non-public sources for scalable impact. Responsible for leading project management activities including managing project resources in support of the Information System Manager. Maintaining a technical depth of the project and understanding cross-functional connections with other projects in support of the Information System Manager

Data Informatics Lead NASA Commercial Smallsat Data Acquisition (CSDA) Nov.2022 - Present
Focusing on increasing the use and utility of commercial constellations of small satellites for earth science research and application.

Post-Doctoral Research Associate Washington State University (Pullman, WA) Jun. 2020 – Nov. 2022
Led a team of 4 to apply the high-spatial-resolution surface meteorological data and remote sensing data for agroecosystem modeling. Research projects help identify the evolving landscape of land use patterns, weather and climate-related risks to specialty crop production, and water supply and demands. Key insights gathered help in adapting the current strategies and building mitigation strategies to build regional resilience to climate variability.

Completed Projects:

- Deploying satellite-imagery-based machine-learning models for large-scale mapping of tillage practices: Compile a ground-truth dataset and develop and evaluate a prototype satellite-imagery-based machine-learning platform to classify eastern Washington State fields into three classes of tillage practices. The platform will be used to capture a snapshot of acreage under different tillage practices, as well as monitor change over time. We will primarily focus on dryland and irrigated wheat growing areas in eastern Washington State
- Improving the Potential for Nutrient Recovery to Contribute to Improved Nutrient Export and Nutrient Management by Dairies: Use a remote-sensing approach to elucidate nitrogen uptake curves for irrigated western Washington crops
- Skagit Basin Supply and Demand Analysis: Provide a holistic exposition of water resource availability and use in the Skagit Basin
- Fruit and Vegetable Supply Chains Climate adaptation and mitigation opportunities: To develop a protocol to assess the climate change impact on fruit and vegetable production and potential adaptations, including possible shifts in production areas in the United States.

Guest Lectures:

- 552 Advanced Biological Systems Engineering: Agroecosystems Data & Modeling (Fall 2020)
- Data Wrangling and Visualization (Summer 2022)

Teaching:

- 505 Topics in Computational and Analytical Methods for Scientists (Fall 2022)
- 552 Advanced Biological Systems Engineering: Agroecosystems Data & Modeling (Fall 2022)

Mentorship:

- [Ayaka Smart](#), AgAID Intern | Emory University, Atlanta, GA
- [Sienna Alicea](#), National Science Foundation REU Intern | North Central College, Naperville, IL
- [Brandt Geist](#), National Science Foundation REU Intern | Cornell University, Ithaca, NY

Tech Lead

Phandeeyar, Myanmar/ USA Jun. 2019 – Jun. 2020

Led a team of 5 and worked with key stakeholders, mainly local NGOs, CSOs, and Government Partners to leverage the power of data to meet their goals. This includes problem scoping, goal definition, and evaluating the maturity data, and producing valuable insights from this data. Communicate the power of data science projects with the data community through lectures and talks. Work collaboratively with the media outlets, researchers, or developers from the Tech for Change Team to produce stories and products.

Completed Projects:

- Setting up Media Lab to support local media to thrive in Myanmar and train the journalist to produce data-driven stories.
- Data Tada program, Tada meaning “bridge” in Burmese, seeks to empower CSOs, NGOs, and government partners across these data silos to foster data-driven social innovation
- Social Network Analysis of Hate Speech Actors on Facebook
- Dr. Thuta Chatbot Informational chatbot and Facebook page aims to provide the public with timely information about the novel coronavirus and tips for staying healthy and safe during this pandemic

Graduate Student Researcher

Asian Institute of Technology, Thailand Jan. 2017 – Dec. 2018

- Designed methodologies to determine traces of chemicals used as a part of IED present on ground surface using hyperspectral remote sensing, and developed a fast, non-contact and non-destructive technology.
- Erasmus+ Capacity Building in Higher Education: Innovation on Remote Sensing Education and Learning (IRSEL)
- Deployed and maintained automated telemetry weather stations and worked on relational databases using MySQL, PostgreSQL. The automated telemetry station measured several weather parameters like temperature, humidity, atmospheric pressure, precipitation, wind speed, and direction

Advisors: Dr. Sarawut Ninsawat, Dr. Tai Nakamura

Research Intern

Stockholm Environment Institute, Bangkok, Thailand Oct.2018 – May. 2019

Created a google earth engine script to undertake river morphological analysis for Myanmar and quantified different river morphological change parameters for inclusion in the planned tool under the SERVIR-Mekong project.

Visiting Researcher

National Institute of Informatics, Tokyo, Japan Mar. 2018 – Jun. 2018

Advisor: Dr. Michael E. Houle

Developed a methodology to estimate the intrinsic dimension of hyperspectral remote sensing data.

Visiting Scholar

Indian Institute of Technology, Delhi, India Jan.2015 – Apr. 2015

Developed methodologies to study the impact of climatic variables on the hydrology of a Yamuna river basin for efficient management of water resources. The model simulates the water balance scenarios for the time of 1970-2050 and enables the government and other agencies to develop a long-term strategy in the area like warning systems, change in cropping pattern, water conservation, and change in land use.

Education Qualification

Doctor of Philosophy in Remote Sensing and GIS

2016-2020 Asian Institute of Technology, Thailand

Master of Technology in Geomatics

2013-2015 Indian Institute of Technology, India

Bachelor of Technology in Information Technology

2009-2013 GGSIPU, India

Academic Honors

- Awarded Japan Government Scholarship for Doctoral Degree, 2016-2020
- First Rank with GPA 4.00 from Remote Sensing and GIS, Asian Institute of Technology, Thailand
- Grant for International Geoinformatics Summer School, Wuhan 2019
- Outstanding Participant, International Geoinformatics Summer School, Wuhan 2019
- Grant for Urban Flooding (UR Field Lab),2019
- NII International Internship Program, 2018
- GeoS4S Summer School, Co-Funded by ERASMUS,2017
- Awarded Post- Graduate Research Fellowship, Ministry of Human Resource Development, India, 2013-2015
- Postgraduate Gold Medalist, 2015

Publications

*Extension

- **Chaudhary, S.**, Rajagopalan, K., Kruger, C.E. et al. Climate analogs can catalyze cross-regional dialogs for US specialty crop adaptation. Sci Rep 13, 9317 (2023). <https://doi.org/10.1038/s41598-023-35887-x>
- Lun, N.S.; **Chaudhary, S.**; Ninsawat, S. Assessment of Machine Learning Methods for Urban Types Classification Using Integrated SAR and Optical Images in Nonthaburi, Thailand. Sustainability 2023, 15, 1051. <https://doi.org/10.3390/su15021051>
- Singh, N., Kogan, C., **Chaudhary, S.**, Rajagopalan, K., & LaHue, G. T. (2022). Controlled drainage and subirrigation suitability in the United States: A meta-analysis of crop yield and soil moisture effects. Vadose Zone Journal, 00, e20219. <https://doi.org/10.1002/vzj2.20219>
- Singh, Navdeep et al. (2022), Data from: Controlled drainage and subirrigation suitability in the United States: A meta-analysis of crop yield and soil moisture effects, Dryad, Dataset, <https://doi.org/10.5061/dryad.547d7wmc1>
- Ninsawat, S., Chitsutti, P., **Chaudhary, S.**, Jindasee, P., & Khamyai, T. (2022). Development of Near Real-Time PWV Estimation System for Monitoring the Meteorological Events in Thailand. International Journal of Geoinformatics, 18(3), 38-53.

- * Yoder J., **Chaudhary S.**, Duarte B., Greene C., Jobe J., LaHue G.T.†, Maroney C., Mauger G., Morgan H., Padowski J., Rajagopalan K., Raymond C., Rogers M., Rossman N., Singh N., Timpane-Padgham B., Wiseman C., and J. Won. 2021. Skagit Water Supply and Demand Synthesis. Story Map Series Prepared for the State of Washington Joint Legislative Task Force on Water Supply.
- **Chaudhary, S.**; Ninsawat, S.; Nakamura, T. Influence of Altitude and Image Overlap on Minimum Mapping Size of Chemical in Non-Destructive Trace Detection Using Hyperspectral Remote Sensing. Appl. Sci. 2021, 11, 2586. doi.org/10.3390/app11062586
- **Chaudhary, S.**; Ninsawat, S.; Nakamura, T. Non-Destructive Trace Detection of Explosives Using Pushbroom Scanning Hyperspectral Imaging System. Sensors 2019, 19, 97. doi.org/10.3390/s19010097
- **Chaudhary, S.**, Agarwal, A., and Nakamura, T.: Rainfall Projection in Yamuna River Basin, India, Using Statistical Downscaling. Water Resources and Environmental Engineering II; 10.1007/978-981-13-2038-5_2
- **Chaudhary, Siddharth**; Panday, Durgaprasad; Khosa, Rakesh. 21.05.2019: Fair and equitable approach using GIS for solving the Krishna River Conflict, India
- **S. Chaudhary**, S. Ninsawat and T. Nakamura (2018) Development of Spectral Library for Trace Detection of Explosives. In: Geoinfotech 2018 conference, 1 – 2 February 2018, Bangkok, Thailand, 4 pages.
- Panday, D. and **Chaudhary, S.**, 2018. Climate Change Impact Assessment on Hydrological Regime of Yamuna River Basin using GIS. International Journal for Research in Applied Science and Engineering Technology, 6(1), pp.1515-1522.

Posters and Presentations

- Amin Norouzi Kandelati, Kirti Rajagopalan, **Siddharth Chaudhary**, Amanda Stahl "Large-scale Mapping of Tillage Practices in Areas With Crop Diversity Using Satellite-imagery-based Machine-learning Classifiers". Oral presentation at the ASABE 2023
- Sienna Alicea, **Siddharth Chaudhary**; Hally Neely; Joaquin Casanova; Nikolla Qafoku; Amanda Stahl; Kirti Rajagopalan "Improving satellite imagery-based estimates of crop residue fractions by correcting for moisture dependency effects". Oral presentation at the 2023 ACS Spring Meeting
- **Siddharth Chaudhary**, Kirti Rajagopalan, Chad E. Kruger, David I. Gustafson, Claudio O. Stockle, Gerrit Hoogenboom, Michael P. Brady, Clyde W. Fraisse. "Climate change implications for fruit and vegetable production in the U.S.: an analog lens. Oral presentation at the 2021 AGU Fall Meeting.
- **Siddharth Chaudhary** " Geospatial mapping of Myanmar Monsoon Flood 2019 using Sentinel-1 Satellite Image". Oral presentation at the 2020 International Conference on Environment and Sustainable Development.
- Grant Connette, Katie Connette, **Siddharth Chaudhary**, and Nirmal Bhagabati. "Roads and Wildlife Habitat: Developing innovative mapping of wildlife corridors and where they overlap with linear infrastructures". Poster presentation at the 2020 International Conference on Environment and Sustainable Development.
- Thanapon Piman, Karthikeyan Matheswaran, Ate Poortinga, Manish Shrestha, **Siddharth Chaudhary**, Aung Myo Khaing, Farurukh Chistie, and Peeran Towashiaporn. "A Catchment scale geomorphological change monitoring and warning system for large rivers in southeast Asia". Poster presentation at the 2018 AGU Fall Meeting.
- **Siddharth Chaudhary**, Sarawut Ninsawat, and Tai Nakamura. "Semi-Automated trace detection of explosives using Hyperspectral Imaging system". Oral presentation at the SCGI GISTDA, 2018.

Services:

- Journal Reviewer for Elsevier Computers and Electronics in Agriculture (IF 8.3)
 - Journal Reviewer for Springer Journal of Nondestructive Evaluation (IF 2.8)
 - Journal Reviewer for Elsevier Smart Agricultural Technology (IF 2.6)
 - Journal Reviewer for Springer Food Analytical Methods (IF 2.9)
 - Hackathons: D1G1TAL AgATHON 2020 (lead organizer)
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Grants

| Role | Agency | Duration | Title |
|-------------------------------------|--------------------------------|------------------|--|
| Key Personel (PI Kirti Rajagopalan) | USDA NIFA AFRI | <i>In Review</i> | Water for extreme weather management in a changing climate: implications for agriculture and the environment |
| Support (PI Kirti Rajagopalan) | USDA NIFA AFRI | <i>In Review</i> | A National Zone Map for When to Put Honey Bee Colonies in Cold Storage |
| Support (Co-PI Kirti Rajagopalan) | USDA Climate smart commodities | <i>In Review</i> | Climate-Smart Processing Potatoes and Fresh Vegetables: Two Pilots in Washington State |
| PI | Microsoft Computing grant | 11/20-06/22 | Automated crop classification using satellite imagery |