Vibhor Agarwal

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Education

2021	**The Ohio State University**, Columbus, OH Ph.D. in Geodetic Science Dissertation: *Machine Learning Applications for Downscaling Groundwater Storage Changes Integrating Satellite Gravimetry and Other Observations*
2018	**The Ohio State University,** Columbus, OH M.S. in Geodetic Science
2014	**Indian Institute of Technology (ISM),** Dhanbad, India Integrated M.Sc. Tech in Applied Geology Thesis: *Area and mass changes of Siachen glacier (East Karakoram) using remote sensing*.

Appointments

Aug 2022-	**Visiting Assistant Professor** Department of Earth Sciences, The College of Wooster, OH Research focus: Modeling the dynamic behavior of the glaciers in the Karakoram using Sentinel-2 high-resolution data.
Mar 2021- Aug 2022	**Postdoctoral Researcher** Department of Geology and Environmental Geosciences, University of Dayton, OH Research Area: Spatio-temporal evolution of Himalayan glaciers using optical remote sensing big data.
2017-2020	**Graduate Teaching Assistant** School of Earth Sciences, The Ohio State University (OSU)
2016-2017	**University Fellow** Division of Geodetic Science, The Ohio State University

Publications

Published

Research Papers

1. **Agarwal, V.**, Agarwal, V., Akyilmaz, O., Shum, C. K., Feng, W., Yang, T. Y., Forootan, E., Syed, T. H., Haritashya, U. K., & Uz, M. (2023). Machine learning based downscaling of GRACE-estimated groundwater in Central Valley, California. *Science of The Total Environment*, *865*, 161138. https://doi.org/10.1016/J.SCITOTENV.2022.161138
2. Khan, M.M.H., Ahmed, N.S., Ghafoor, U., …, **Agarwal, V.**, …, & Datta, R. (2022). Synchronization of Boron application methods and rates is environmentally friendly approach to improve quality attributes of Mangifera indica L. On sustainable basis. *Saudi Journal of Biological Sciences*, *29(3),* 1869–1880. https://doi.org/10.1016/J.SJBS.2021.10.036
3. **Agarwal, V.**, Bolch, T., Syed, T. H., Pieczonka, T., Strozzi, T., & Nagaich, R. (2017). Area and mass changes of Siachen glacier (East Karakoram). *Journal of Glaciology, 63*(237), 148-163. https://doi.org/10.1017/jog.2016.127

Preprints

1. **Agarwal, V.**, Akyilmaz, O., Shum, C.K., Feng, W., Haritashya, U.K. Chen, W. (2022). Machine Learning application for modeling high-resolution groundwater storage variations in North China Plain, 19 Sept. *PREPRINT (Version 1) available at Research Square* https://doi.org/10.21203/rs.3.rs-2062965/v1. *To be submitted to Natural Resources Research*

In preparation

1. **Agarwal, V.**, Haritashya, U.K., Vries, M.V.W., Kargel, J., Shugar, D.H., Chen, Y., Garg, S. Assessing evolution of Himalayan glaciers due to climate and other morphological factors. *In preparation for Science of The Total Environment*.

Book chapters

1. Zaman, M., Hassan, S., Fatima, S., Hamid, B., Farooq, S., Qayoom, I., Alim, H., **Agarwal, V.**, & Sayyed, R. Z. (2022). Biosurfactants Production and Applications in Food. Microbial Surfactants, 133–149. https://doi.org/10.1201/9781003247739-7

Conference Presentations

1. Shum, C.K., Zhang, Y., **Agarwal, V.**, Akyilmaz, O., & Forootan, E. (2021) Satellite gravimetry-based system for water resources and natural hazards monitoring. In *Turkish National Geodetic Commission's Scientific Meeting 2021* (Online).
2. **Agarwal, V.**, Akyilmaz, O., Shum, C.K., Uz, M., Feng, W., Forootan, E., Chen, W., & Zhang, Y. (2020) Downscaling Aquifer Storage Changes from GRACE, and Other Data Using Artificial Neural Network. In *36th International Geological Congress (IGC). New Delhi, India*. March 2-8, 2020. (*Cancelled due to COVID-19*)
3. **Agarwal, V.,** Akyilmaz, O., Shum, C.K., Feng. W., Zhang, C., Zhang, Y., & Uz, M. (2019) Estimation of High-Resolution Aquifer Storage Coefficients Via Artificial Neural Networks and Using GRACE and Other Datasets. In *27th General Assembly of IUGG. Montreal, Canada*. 11-18 July, 2019.
4. Feng, W., Shum, C.K., Akyilmaz, O., **Agarwal, V.**, Forootan, E., Zhang, C., … & Schumacher, M. (2019) Monitoring and Potential Downscaling of Aquifer Groundwater Storage Changes Using Space Gravimetry. In *16th Annual Asia Oceania Geosciences Society. Singapore*. 28 July-2 August 2019.
5. Shi, Y., Jia, Y., Shum, C. K., **Agarwal, V.**, Akyilmaz, O., & Uz, M. (2019). Monitoring Great Lakes Coastal Wetland Water Level Fluctuations Using SAR Data. In *IAGLR 62nd Annual Conference on Great Lakes Research. Brockport, NY*. 10-14 June, 2019.
6. **Agarwal, V.**, & Malhotra, A. (2013). Subsidence in Bokaro City, India Observed from Space. In *75th EAGE Conference & Exhibition incorporating SPE EUROPEC 2013. London, UK*. 10-13 June, 2013.

Posters

1. **Agarwal, V.**, Haritashya, U.K., Wyk de Vries, M.S.V., Kargel, J.S. (2021). Multi-decadal Dynamically Coupled Glacier and Proglacial Lake Development in Central and Eastern Himalaya. In *AGU Fall Meeting Abstracts 2021, virtual.* 13-17 December 2021.
2. **Agarwal, V.**, Akyilmaz, O., Shum, C.K., Feng, W., Forootan, E., Haritashya, U.K., & Syed, T.H. (2021). Machine Learning approach to study groundwater depletion in Central Valley, California using GRACE and other hydrological data. In *IAG 2021 Assembly*, Virtual. 13-15 July, 2021.

3. Gupta, H., **Agarwal, V.,** Agrawal, J., & Syed, T.H. (2015) Generation of High-Resolution DEM of Gangotri Glacier Using Remote Sensing Techniques on ASTER Imagery. *77th EAGE Conference & Exhibition, Madrid, Spain*; 12-15 June, 2015.

Contributions to grants

1. Contributed as Postdoc to The Science of Terra, Aqua, and Suomi-NPP NASA grant titled “Multispectral Satellite Detection of Mountain Hazards and Characterization of Disaster Process Chains and Webs”.
2. Contributed with initial research findings for the NSF Partnerships for Innovation (PFI) proposal “Gravity Satellite Observation System for Water Resources Management (GO-Water)” (*NSF PFI-TT Grant# 2044704)*. The PI is my Ph.D. advisor Prof C.K. Shum.
3. Contributed research to the funded NASA project “Improved quantification of global mountain glacier mass balance estimates” (*NASA Grant# NNX13AQ89G)*. The PI was my Ph.D. advisor Prof C.K. Shum.

Teaching and mentoring

Teaching

Experience of teaching diverse student population. All my courses have assignments, quizzes, and exams for continuous student assessments. Provide experiential learning opportunities through field trips, real world classroom projects along with geospatial techniques.

2022 **Visiting Assistant Professor, The College of Wooster** (In-person)
Modern Climate Change: Teach climate change science; design lab exercises to enhance the computational abilities of the students. Involve students in classroom discussions on IPCC reports.

Introduction to GIS: Teach the concepts of GIS, lead hands-on class exercises in ArcGIS Pro 3.0, design class projects. 18 students from different majors.

2022 **Instructor, OhioView outreach program** (Virtual)
Tutorial on the application of Google Earth Engine cloud computation tool for satellite image processing.

2021 **Guest lectures**, Machine Learning and Remote Sensing, The Ohio State University (In-person)

Lecture on Machine Learning theory, hands-on application of Google Earth Engine for land cover classification, design assignments to complement classroom learning. Graduate and undergraduate students.

2021 **Guest lecture**, Machine Learning, University of Dayton (Virtual)
Lecture on Machine Learning theory and applications in earth science for undergraduate students.

2021 **Instructor, OhioView outreach program** (Virtual)
Tutorial on the application of Google Earth Engine cloud computation tool for land cover classification in regions of Ohio. People with diverse backgrounds from industry and academia participated in the event.

2017-2020 **Graduate Teaching Assistant**, The Ohio State University (In-person and Virtual)
TA for introductory geology courses with enrollment of 30-150 students.

Planet Earth and Dynamic Earth. Led the lab sections in classroom and field settings covering various topics (geology, coastal and fluvial geomorphology, climate change, groundwater, etc.) through one-on-one and group discussions.

Geology of the National Parks: Led the discussions on the class assignments related to geomorphology. Provided support to the course instructor for transitioning to online teaching due to COVID-19.

Mentoring

2022 Currently mentoring an undergraduate student for a senior thesis at The College of Wooster. Will be mentoring an additional junior undergraduate student in Spring 2023. This is a part of mentored undergraduate research at The College of Wooster.

2021 Mentored PhD student at OSU on application of machine learning techniques in groundwater research.

2015 Mentored 3 undergraduate students on remote sensing applications in glaciology which led to a peer-reviewed publication and a conference paper.

Honors and Awards

2021	Junior Heiskanen Award and Certificate from School of Earth Sciences at OSU for excellence in research in geodetic science. (1 awarded per year)
2018-2020	Selected for travel grant from OSU, University of California, Santa Barbara, and University of Washington for attending conferences and bootcamps.
2019	Distinguished Graduate Teaching Award and Certificate from School of Earth Sciences at OSU for excellence in teaching (2-3 students per year).
2016-2017	University Fellowship from OSU Graduate School (<10 % of incoming graduate students to OSU. Tuition and stipend).
2014	Erasmus Mundus Semester abroad scholarship from European Commission for studying courses in environmental engineering at KTH, Stockholm.
2013	Selected for competitive travel Grant from EAGE for attending and presenting at 75th EAGE Conference & Exhibition held in London, UK.
2013	AAPG L. Austin Weeks Grant for excellence in undergraduate research (only 61 geoscience undergraduate students worldwide selected for award).
2011-2014	INSPIRE Fellowship from Department of Science and Technology (DST), Government of India (Awarded only to top 12,000 students of physical science in India)

Technical skills

MATLAB (Expert)	Google Earth Engine (Proficient)
ArcGIS/QGIS (Expert)	R (Proficient)
Erdas Imagine (Basic)	ENVI (Proficient)
Python (Proficient)	

Professional workshops and training

2022	Early Career Geoscience Faculty workshop Workshop to help prepare early career faculty for research, teaching, and mentoring students.

2019 ICESat-2 Hackweek: Workshop featuring tutorials and projects focused on learning Python and cloud computing tools to access and process ICESat-2 and other Remote Sensing data for cryospheric research. Worked as a team member to resolve complex topography over Himalayan glaciers.

2019 Software Carpentry: Workshop focused on computing fundamentals in Python.

2018 Arctic Data Science: Training focused on Data Science and Reproducible Research using R and Git

2017 Polar Geospatial Summer Bootcamp: Training focused on computation and analysis of Remote Sensing Big Data in the Arctic and other regions

Professional memberships and services

Memberships: National Association of Geoscience Teachers (NAGT), American Geophysical Union (AGU), International Association of Hydrological Sciences (IAHS)

Peer-reviewer: IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, PLOS ONE, Land Degradation & Development, Journal of Environmental Quality.

Services:

2019 **Volunteer:** 27th General Assembly of IUGG, Montreal, Canada. Assisted in conducting the oral presentation.

2017 **Advisor:** Advised a group of undergraduate students from OSU during a one-week community service project in Tennessee. The service was focused on environmental conservation projects and understanding Native American culture.

References

	Name and details	Relationship	Contact information
1.	**Shelley Judge** Associate Professor Department of Earth Sciences The College of Wooster Wooster OH	Department Chair, Faculty Mentor	sjudge@wooster.edu (330) 263-2297
2.	**Umesh Haritashya** Professor, Department of Geology and Environmental Geosciences, University of Dayton Dayton OH	Postdoc advisor	uharitashya1@udayton.edu (937) 229-2939
3.	**C.K. Shum** Professor, Distinguished University Scholar, Division of Geodetic Science, School of Earth Sciences, The Ohio State University, Columbus OH	PhD advisor	shum.3@osu.edu (614) 292-7118
4.	**Orhan Akyilmaz** Professor, Department of Geomatics, Istanbul Technical University, Turkey	PhD dissertation committee member, collaborator	akyilma2@itu.edu.tr +90-212-2856566