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Research Interest

Remote Sensing (Radar and Optical), Climate Change, Extreme Weather, Floods, Geographic Information Systems and Technology, Aerial Photogrammetry, Machine Learning

Engaging with radar remote sensing, particularly InSAR, has constituted my primary research pursuit. My proficiency lies in extracting precise Digital Elevation Models (DEMs) from Sentinel-1 imagery. This has necessitated adept data processing via the SNAP software and ArcMap, coupled with data analysis and visualization using Matlab/Python. My prior research endeavors encompassed a thorough examination of errors associated within InSAR-derived DEMs.

At present, my doctoral research navigates hydrological predicaments through the prism of remote sensing techniques. The crux of my inquiry resides in dissecting the interplay between climate change, anthropogenic change, hydrological cycles, and the prevalence of flash flood incidents across U.S. urban domains over the preceding 40-50 years. The core proposition posits that the confluence of climate dynamics and human-induced alterations has amplified the occurrence and severity of flash floods. The objective of this research is to unravel the bedrock mechanisms precipitating flood events and thereby augment societal resilience in countering the ramifications of natural adversities.

Education

Doctorate 2022 - Present	Water Resources/Environmental Science and Engineering, WRESE University of Wyoming (Wyoming Geographic Information Science Center, WyGIS) GPA: 4.0/4.0
Master 2019 - 2021	Master of Science Program in Remote Sensing Science and Technology National Central University (Center for Space and Remote Sensing Research) GPA: 4.1/5.0
Bachelor 2016 - 2019	Department of Land Economics (Geomatics Group) National Chengchi University GPA: 3.78/5.0

Publications

Thesis	Wu, Y.-Y., Ren, H., 2021, Exploration for Visual and Numeric Interpretation of SAR-based Digital Elevation Models (Master's Thesis, National Central University). National Digital Library of Theses and Dissertations in Taiwan. https://hdl.handle.net/11296/kmmbuz.
Peer-Review	Wu, Y.-Y. & Madson, A., 2024, Errors Sources of Interferometric Synthetic Aperture Radar. <i>Remote Sensing</i>, 16(2): 354. https://doi.org/10.3390/rs16020354. Wu, Y.-Y., Ren, H., & Madson, A., 2023, A Discussion on The Goldstein Filtering Parameters within The SNAP Software. <i>IGARSS 2023 - 2023 IEEE International Geoscience and Remote Sensing Symposium</i>, pp. 7985-7988, doi: 10.1109/IGARSS52108.2023.10282000. Wu, Y.-Y., Ren, H., 2022, Discussion on Parameters of Goldstein Filtering Function of the SNAP Software, <i>Journal of Photogrammetry and Remote Sensing</i>, 27(4): 213-236. (Original in Mandarin) Wu, Y.-Y., Ren, H., 2021, Relationship Between Errors of SAR-based Digital Elevation Models and Influencing Factors. In <i>2021 IEEE International Geoscience and Remote Sensing Symposium IGARSS</i>, pp. 4292-4295. Wu, Y.-Y., Ren, H., 2021, Regression Analysis of Errors of SAR-based DEMs and Controlling Factors. <i>The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences</i>, 43: 51-57. Wu, Y.-Y., Lin, S.Y., Ren, H., 2020, Evaluation of the Factors Influencing InSAR Digital Elevation Model - Case Study on Image Selection and Multi-look Processing, <i>Journal of Photogrammetry and Remote Sensing</i>, 25(2): 115-128. (Original in Mandarin)

Abstracts/ Expanded Abstracts

- Wu, Y.-Y.,** Madson, A., 2023, Link between Increasing Precipitation Extremes and Flood Events – Regional Case Study in Louisville, Kentucky. In: International Geoscience and Remote Sensing Symposium, IGARSS 2023, in person, 16-21 July 2023, Pasadena (CA), USA.
- Wu, Y.-Y.,** Tai, Y.H., Ren, H., 2021, Comparison of Different Coherence Thresholds for Phase Unwrapping of Sentinel-1 Imagery. In: International Symposium on Remote Sensing, ISRS 2021, online, 26-28 May 2021.
- Wu, Y.-Y.,** Ren, H., 2021, Study on the Relationship between SAR-based Digital Elevation Models and Water Vapor Contents and Surface Deformation. EGU General Assembly 2021, online, 19–30 Apr 2021, EGU21-16161.
- Wu, Y.-Y.,** Lin, S.Y., 2019, Assessment of interferometric SAR-based digital elevation models. In: The 40th Asian Conference on Remote Sensing, ACRS 2019, Daejeon, South Korea.
- Chen, C.H., Lin, L.S., Wang, W.J., **Wu, Y.-Y.,** 2019, Using the corrector surface models to mitigate the systematic errors between the announced orthometric heights in different years. In: The 40th Asian Conference on Remote Sensing, ACRS 2019, Daejeon, South Korea.
- Chen, C.H., Lin, L.S., Wang, W.J., **Wu, Y.-Y.,** Deng, H.C, 2019, Study on mitigating the systematic errors between the announced orthometric heights in different years by corrector surface models. In: The 38th Conference on Surveying and Geomatics, SG38, Taoyuan, Taiwan.
- Wu, Y.Y.,** Lin, S.Y., 2019, Assessment of interferometric SAR-based digital elevation models. In: International Symposium on Remote Sensing, ISRS 2019, Taipei, Taiwan.

Skills

Development	Python 3.5, Matlab, R
Software	ESRI ArcMap 10.3, ESA SNAP, L3Harris ENVI, ERDAS, Pix4D
License	Drone Piloting sUAS (Small Unmanned Aircraft Systems) Polit Certificate Issued by the Federal Aviation Administration (FAA) on July 2023 Credential ID: 4836178
Extracurricular Courses	Fourier Transform Master the Fourier transform and its applications (online, Udemy) SAR/InSAR Synthetic Aperture Radar: Hazards (online, edX, certificate) 2022: InSAR Processing and Analysis (online, ISCE+, UNAVCO) Python Introduction to Python (online, datacamp, certificate) Intermediate Python (online, datacamp, certificate) Python Data Science Toolbox Part 1&2 (online, datacamp, certificate) Data Manipulation with Pandas (online, datacamp, certificate) Joining Data with Pandas (online, datacamp, certificate) Introduction to Data Visualization with Matplotlib/Seaborn (online, datacamp, certificate) Intermediate Data Visualization with Seaborn (online, datacamp, certificate)
Language	Mandarin (mother tongue), English (C1, IELTS)

Professional Development

Hackweek	2023.10 GeoSmart Hackweek 2023 Location University of Washington, Seattle, WA Description Participated in a selective week-long immersive programming hackweek which focused on applications of machine learning in hydrology and cryosphere Science. I was in the team crunchy-snow in which we leveraged neural networks to improve the accuracy of snow-depth retrieval from Sentinel-1 synthetic aperture radar (SAR) backscatter data, addressing the limitations of current algorithms in capturing complex relationships with terrain, vegetation, and SAR backscatter physics.
Bootcamp	2023.08 ARCC Graduate Computing Bootcamp Location University of Wyoming, Laramie, Wyoming Description Participated in a rigorous three-day cluster computing training program hosted by the ARCC (Advanced Research Computing Center). Acquired advanced skills in leveraging high-performance computing resources, including hands-on experience with cutting-edge tools and techniques. Developed proficiency in Linux-based systems, explored Dask for parallel computing, and enhanced machine learning expertise using scikit-learn within a cluster environment.

Summer School	2023.08	NSF I-GUIDE Summer School Location UCAR, Boulder, Colorado Description Participated in a selective week-long immersive program for geospatial data science using cloud- and high-performance computing. Contributed to the completion of a team-based project on <i>Investigating Hydrological Responses and Shrinkage Patterns of the Great Salt Lake</i> .
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Research Experience

Research Projects	2023.08 - present	High resolution upland and riverbank erosion monitoring to inform best management practices that seek to reduce sediment accumulation at the Willwood Dam Project Host Prof. Dr. Austin Madson (University of Wyoming)
	2023.01	Leveraging spaceborne and airborne data products to investigate large scale wildland fire fuel loads in the American West Project Host Prof. Dr. Austin Madson (University of Wyoming)
	2020.09 - 2021.02	Comparison of Super-Resolution Techniques for Optical Satellite Imagery Project Host Prof. Dr. Hsuan Ren (National Central University)
	2018.09 - 2019.02	Theoretical Consideration of Systematic Error Elimination of GPS Height Conversions Project Host Prof. Dr. Lao-Sheng Lin (National Chengchi University)
	2017.02 - 2018.12	Resilient Governance Based on Ethnology and Social Ecosystem-Dialogue between Ethnology and Spatial Information Science Project Host Prof. Dr. Shih-Yuan Lin (National Chengchi University)

Teaching/Mentoring Experience

Instructor	2024.01 - 2024.05	Advanced Remote Sensing Lecturer Prof. Dr. Austin Madson (University of Wyoming) Graduate elective course (3 Credit Hours)
Teaching Assistant	2023.08 - 2023.12	Introduction to Remote Sensing Lecturer Prof. Dr. Austin Madson (University of Wyoming) Graduate elective course (3 Credit Hours) Contributed as a Guest Lecturer, delivering lectures on radar remote sensing.
	2023.01 - 2023.05	UAS Photogrammetry and Image Processing Lecturer Prof. Dr. Austin Madson (University of Wyoming) Undergraduate and graduate elective course (3 Credit Hours)
	2022.08 - 2022.12	Introduction to Remote Sensing Lecturer Prof. Dr. Austin Madson (University of Wyoming) Undergraduate elective course (3 Credit Hours)
	2018.09 - 2019.02	Aerial Photogrammetry and Lab Lecturer Prof. Dr. Shih-Yuan Lin (National Chengchi University) Third-year undergraduate required course (54 hours total for one semester)
Mentor	2023.05 - 2023.08	McNair Scholars Program Mentee Louise Deeyn Pankonin Larrew (Undergraduate student, University of Wyoming) Provided dedicated guidance to the mentee in the successful development and refinement of her McNair proposal. Offered expertise in creating maps and organizing contents into a cohesive Story Map. Facilitated the growth of the mentee's Python Programming skills.

Affiliations/Memberships

American Geophysical Union (AGU), Student Member #1532526
Chinese Society of Photogrammetry & Remote Sensing, CSPRS
European Geosciences Union, Student Member # 600277
Institute of Electrical and Electronics Engineers (IEEE) R10 –Asia and Pacific #97768449

Funding and Awards

Award	2024.05	Hydrology Student Service Award Provider Hydrology Science Program, University of Wyoming Funding USD 500
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Award	2023.08	Judges' Award Provider NSF I-GUIDE Summer School, UCAR, Boulder, Colorado Team project Investigating Hydrological Responses and Shrinkage Patterns of the Great Salt Lake Requirement Team project was selected for the Judges' Award in a juried competition Funding Travel, Lodging, and Per Diem Support for I-GUIDE Forum @ Columbia University
Travel Grant	2023.07	Travel Support for 2023 International Geoscience and Remote Sensing Symposium in Pasadena, CA Provider Hydrology Science Program, University of Wyoming Funding USD 1,400
Travel Grant	2022.12	Travel Support for 2022 American Geophysical Union fall meeting in Chicago, IL Provider Hydrology Science Program, University of Wyoming Funding USD 500
Award	2022.12	Master Thesis Award – Honorable Mention Provider Chinese Society of Photogrammetry and Remote Sensing (CSPRS) Funding NTD 10,000
Travel Stipend	2022.07	Travel Support for 2022 NISAR Science Community Workshop Provider UNAVCO Funding USD 600
Scholarship	2020.04	Entrance Scholarship for the 108th Academic Year of the Master of Science Program in Remote Sensing Science and Technology Provider Center for Space and Remote Sensing Research Requirement Top 3 of the entrance selection and upper 10% in the previous education Funding NTD 45,000
Scholarship	2020.03 2020.10	Scholarship for Excellent Students Provider National Central University (NCU) Requirement Students studying in NCU with excellent academic and research performance Funding NTD 20,000 each time
Scholarship	2019.11.21	ZONTA Taoyuan Scholarship Award Provider ZONTA club of Taoyuan Requirement Female students studying in Taoyuan City with excellent academic performance Funding NTD 20,000
Travel Stipend	2019.10	Travel Grant for the attendance of The 40th Asian Conference on Remote Sensing, ACRS2019 Provider Chinese Society of Photogrammetry & Remote Sensing, CSPRS Funding Flight ticket (forth and back) & registration fee
Award	2018.07- 2019.02	National Science Council (NSC) fellowship for excellent students based on my written research proposal Provider Ministry of Science Technology (MOST) #107-2813-C-004-042-E Topic Research on the Procedure of Radar Interferometry to Detect Surface Deformation Supervisor Prof. Dr. Shih-Yuan Lin (National Central University) Funding NTD 6,000/month