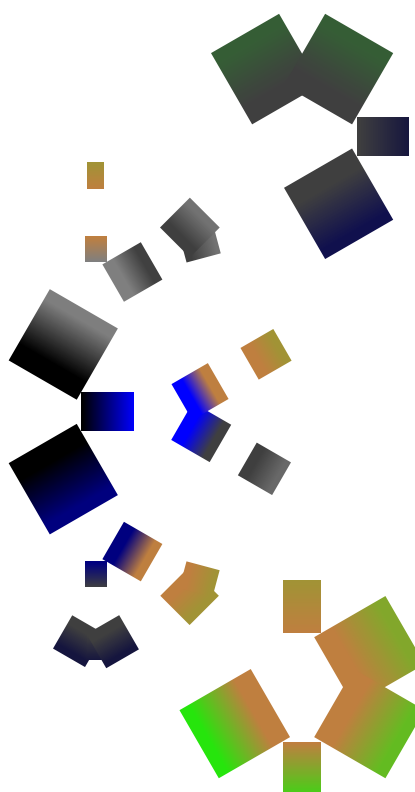


Welcome to CLAWRIM

The Computing Lab for Advanced Water Resources Informatics and Modeling (CLAWRIM) is [Dr. Huidae Cho](#)'s research group in [the Department of Civil Engineering](#) at [New Mexico State University](#) (NMSU). Their research focuses around the broad applications of Geographic Information Systems (GIS) and computational methods to water resources informatics and modeling. They use this wiki site to share project information and document their research for internal collaboration.



Research opportunities in CLAWRIM

- [Research opportunities in CLAWRIM](#)

Scholarships

- [Scholarships](#)

CLAWRIM seminar series

- TBD [Students are welcome!](#)

Current projects

- [CONUS-scale longest flow path algorithm](#)
- [PARETO](#)
- [grass_ose](#)
- [Northern New Mexico watershed modeling](#)
- [New Mexico culvert capacity analysis](#)
- [New Mexico hydrologic modeling](#)
- [Runoff forecasting](#)
- Quantifying the effects of watershed restoration as a flood mitigation approach with [Emaz Arshad](#)
- [Efficient delineation of a large number of watersheds](#)

Past projects

- [Fast flow accumulation](#)
- [Water balance analysis for Seoul](#)
- [Google Summer of Code 2021 Parallelization of existing modules for GRASS GIS](#)
 - Funded by [Google](#)
- [ProjPicker](#): Spatial query of coordinate reference systems
 - Funded by [IESA](#)
- [Efficient longest flow path algorithm](#)
- [GFC canopy assessment](#)
 - Funded by [the Georgia Forestry Commission](#)
 - [Phase 1](#) with [Owen Smith](#) and [Jennifer McCollum](#)
 - [Phase 1.5](#) with [Owen Smith](#)
 - [Phase 2](#) with [Owen Smith](#)
- [Open source canopy classification](#) with [Owen Smith](#)
 - A special topic in GIS for spring 2020
 - Idea proposed and implemented by [Owen Smith](#)

Projects cancelled

- [Traffic simulation](#)
- [Streamflow data model](#)
- [Stream health assessment tool](#)
- Impacts of deforestation on water resources in the Lake Lanier watershed
- [UNG stormwater modeling](#) with [Christopher Pugel](#)
 - Idea proposed by [Huidae Cho](#)
- [Topographic index enhanced with soil moisture](#)
 - A special topic in GIS for spring 2020
 - Idea proposed by [Huidae Cho](#) and partially implemented with [Tyler Henderson](#)

Software

- [MEFA](#): Memory-efficient flow accumulation

- [GetOSM](#): OpenStreetMap tile downloader
- [ProjPicker](#): Spatial query of coordinate reference systems
- [r.accumulate](#): An efficient flow accumulation addon for [GRASS GIS](#)
- [Coronavirus Disease 2019 \(COVID-19 or 2019-nCoV\) Cases](#)
- [CanoClass](#): An open-source Python module for canopy classification using [scikit-learn](#)
- [CanoPy](#): A Python module for canopy classification using [Feature Analyst](#)
- [Digip](#): A digital image processing Python module
- [The Automated Floodway Optimizer for HEC-RAS \(AFORAS\)](#)
- [Isolated-Speciation-based Particle Swarm Optimization \(ISPSO\)](#)
- [The Web-based Hydrologic Modeling System \(WHydroMod\) v0.1 for Texas](#)
- [Let-It-Rain](#): A Poisson Cluster Stochastic Rainfall Generator
- [GRASS GIS](#) for MS Windows
 - [Latest daily build for advanced users](#)
 - [Latest daily build for beginners](#)

Recent publications

- Huidae Cho, September 2023. [Memory-Efficient Flow Accumulation Using a Look-Around Approach and Its OpenMP Parallelization](#). [Environmental Modelling & Software](#). doi:10.1016/j.envsoft.2023.105771. SCIE, 2022 Impact Factor 4.9.
- Yongchan Kim, Eun-Sung Chung, Huidae Cho, Kyuhyun Byun, Dongkyun Kim, January 2023. [The Future Water Vulnerability Assessment of the Seoul Metropolitan Area Using a Hybrid Framework Composed of Physically-Based and Deep-Learning-Based Hydrologic Models](#). Stochastic Environmental Research and Risk Assessment. doi:10.1007/s00477-022-02366-0. SCIE. 2021 Impact Factor 3.821.
- Huidae Cho, December 2021. [Data-Driven Streamflow Forecasting Using Machine Learning](#). [Proceedings of the US-Korea Conference \(UKC\) 2021](#), 314. Korean-American Scientists and Engineers Association (KSEA). Los Angeles, CA.
- Huidae Cho, Lorena Liuzzo, December 2021. Editorial for Special Issue: “Multi-Source Data Assimilation for the Improvement of Hydrological Modeling Predictions.” [Hydrology](#) 9 (1), 4. doi:10.3390/hydrology9010004. ESCI.
- Owen Smith, Huidae Cho*, August 2021. [An Open-Source Canopy Classification System Using Machine-Learning Techniques Within a Python Framework](#). The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, XLVI-4/W2-2021, 175-182. doi:10.5194/isprs-archives-XLVI-4-W2-2021-175-2021.

Recent presentations

- Huidae Cho, February 6, 2022. [Spatial Query of Coordinate Reference Systems and Its Integration with GRASS GIS](#). Free and Open Source Software Developers' European Meeting (FOSDEM) 2022. Brussels, Belgium (online).
- Huidae Cho, December 16, 2021. Invited Talk: [Data-Driven Streamflow Forecasting Using Machine Learning](#). US-Korea Conference (UKC) 2021—Pursuing Global Health and Sustainability. Korean-American Scientists and Engineers Association (KSEA). Los Angeles, CA.
- Owen Smith, Huidae Cho, September 30, 2021. [CanoClass: Creation of an Open Framework for Tree Canopy Monitoring](#). Free and Open Source Software for Geospatial (FOSS4G) 2021 Conference. The Open Source Geospatial Foundation (OSGeo). Online.
- Vaclav Petras, Veronica Andreo, Martin Landa, Anna Petrasova, Guido Riembauer, Maris Nartiss,

Moritz Lennert, Markus Metz, Stefan Blumentrath, Huidae Cho, Markus Neteler, September 29, 2021. [State of GRASS GIS: The Dawn of a New Era](#). Free and Open Source Software for Geospatial (FOSS4G) 2021 Conference. The Open Source Geospatial Foundation (OSGeo). Online.

- Huidae Cho, Aboalhasan Fathabadi, Seyed Morteza Seyedian, Bahram Choubin, March 22–23, 2021. [Uncertainty Estimation in Hydrologic Modeling Using Bayesian Model Averaging Within the GLUE Framework](#). 2021 Georgia Water Resources Conference (GWRC). Online.
- Huidae Cho, February 7, 2021. [r.accumulate: Efficient Computation of Hydrologic Parameters in GRASS—Improving the Performance of Geospatial Computation for Web-based Hydrologic Modeling](#). Free and Open Source Software Developers' European Meeting (FOSDEM) 2021. Online.

Recent workshops

- Huidae Cho, September 28, 2021. [Physically-Based Hydrologic Modeling Using GRASS GIS r.topmodel](#). Free and Open Source Software for Geospatial (FOSS4G) 2021 Conference. The Open Source Geospatial Foundation (OSGeo). Online.

Other resources

- [Conferences](#)
- [Journals](#)
- [Scientific writing](#)

[projects](#) [seminars](#) [software](#) [students](#)

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