Huidae Cho, Ph.D., PE (MD), M.ASCE, CFM, GISP
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I Education

- **Doctor of Philosophy**, Civil Engineering — August 2008
  Texas A&M University, College Station, Texas
  Area: Metaheuristic Optimization and Uncertainty Analysis
  Dissertation: On the Predictive Uncertainty of a Distributed Hydrologic Model
- **Master of Science**, Civil Engineering — February 2001
  Kyungpook National University, Daegu, South Korea
  Area: Geographic Information System (GIS) and Numerical Modeling
  Thesis: Development of a GIS Hydrologic Modeling System by Using the Programming Interface of GRASS GIS
- **Bachelor of Science**, Civil Engineering — February 1999
  Kyungpook National University, Daegu, South Korea

II Professional Experience

- **Associate Professor** — August 2022–Present
  Department of Civil Engineering, New Mexico State University, Las Cruces, New Mexico
- **Assistant Professor of Geospatial Science and Computing** — August 2018–August 2022
  Institute for Environmental and Spatial Analysis, University of North Georgia, Oakwood, Georgia
- **Non-Resident Senior Fellow** — June 2019–December 2019
  Korean Institute of Civil Engineering and Building Technology, Goyang, South Korea
- **Senior Geospatial Engineer** — September 2017–July 2018
  MapAnything, Atlanta, Georgia
- **Part-Time Assistant Professor** — January 2015–May 2018
  Department of Civil and Construction Engineering, Kennesaw State University, Marietta, Georgia
- **Water Resources Engineer / GIS Developer** — September 2008–September 2017
  Dewberry, Fairfax, Virginia, Atlanta, Georgia
- **Research Assistant** — January 2004–May 2008
  Department of Civil Engineering, Texas A&M University, College Station, Texas
- **Lead Software Developer** — December 2000–July 2003
  Cemtlomedia, Daejeon, South Korea
- **Lecturer** — February 2000–October 2000
  Computer Center, Kyungpook National University, Daegu, South Korea

- **GIS Developer** June 1999–December 1999
  General Information Center, Daegu, South Korea

III Research Interests and Expertise

- Application of Big Data Analytics and GIS to Smart Infrastructure
- Impacts of Climate Change on Infrastructure and Urban Hydrology
- Hydroinformatics
- Machine Learning and Data Science
- Metaheuristic Optimization and Uncertainty Analysis
- Software Development and Internet of Things (IoT)

IV Teaching

- **Associate Professor** August 2022–Present
  New Mexico State University, Las Cruces, New Mexico
  - CE 483 – Surface Water Hydrology
  - CE 503 – Special Design and Analysis Program
  - CE 531 – Open Channel Hydraulics
  - CE 582 – Statistical Hydrology
  - CE 599 – Master's Thesis
  - CE 600 – Doctoral Research
- **Assistant Professor of Geospatial Science and Computing** August 2018–August 2022
  University of North Georgia, Oakwood, Georgia
  - ENST 2030 – Environmental Studies & Sustainability
  - ENVS 2111K – Physical Environmental Science
  - GEOG 1111K – Introduction to Physical Geography
  - GISC 2011/L – Geographic Information Science
  - GISC 3200K – Programming for Geospatial Science & Technology
  - GISC 4360K – Digital Image Processing
  - GISC 4500K – Application Development
  - GISC 4530K – Geospatial Web Application Development
  - GISC 4800K – Geospatial Intelligence (Co-lectured)
  - GISC 4903 – Special Topics in GIS
  - GISC 5200K – Programming for Geospatial Science & Technology (Graduate Level)
- **Part-Time Assistant Professor** January 2015–May 2018
  Kennesaw State University, Marietta, Georgia

- CE 4703 – Engineering Hydrology (Guest Lecturer, Fall 2020)
- CE 6303 – Water Resources Management (Graduate Level, Guest Lecturer, Spring 2018)
- ENGR 3343 – Fluid Mechanics
- ENGR 3345 – Fluid Mechanics Laboratory

V Grants and Fellowships

Funded

- New Mexico Statewide Drought Vulnerability Analysis Under Future Climate Change Scenarios Using a Physically-Based Coupled Model. **PI**. $40,000 Granted by the New Mexico Water Resources Research Institute (NM WRRI) as Part of the U.S. Geological Survey's (USGS) 104B Grant Program, August 2023.
- Growing GRASS OSE for Worldwide Access to Multidisciplinary Geospatial Analytics. Co-Submitted with North Carolina State University, Arizona State University, and Yale University. **Co-PI**. Total $1,499,988 Granted by the National Science Foundation (NSF) Pathways to Enable Open-Source Ecosystems (POSE) Program Award 2303651, August 2023.
- Leveraging PARETO for Rare-Earth Elements and Critical Minerals (REE/CM) Recovery from Produced Water and Seismicity Response Optimization. **PI**. Total $160,000 Granted by KeyLogic as Part of a Department of Energy (DOE) National Energy Technology Laboratory (NETL) Strategic Analysis (SA) Contract. August 2023.
- Water and Community Resilience Through Spatial Integration of Ecohydrological Processes and Traditional Sociocultural Knowledge. **SP**. Total $1,600,000 Granted by the NSF Dynamics of Integrated Socio-Environmental Systems (DISES) Program 2308358, August 2023.
- New Mexico Department of Transportation (NMDOT) Culvert Asset Management Plan (CAMP) Phase 2. **Co-PI**. Total $924,998 Granted by NMDOT, May 2023.
- Georgia Statewide Canopy Assessment Phase 2: Canopy Change 2009–2019 Project, UNG Canopy Phase 2–25279. **PI**. $7,851 Granted by the Georgia Forestry Commission, November 2020.
- Georgia Statewide Canopy Assessment Phase 1.5: Canopy Analysis 2019 Project, UNG Canopy Phase 1.5–25278. **PI**. $16,978 Granted by the Georgia Forestry Commission, April 2020.
- Georgia Statewide Canopy Assessment Phase 1: Canopy Analysis 2009 Project, UNG Canopy Phase 1–15377. **PI**. $19,000 Granted by the Georgia Forestry Commission, September 2019.
- Department Head Fellowship. $3,000 Granted by the Zachry Department of Civil Engineering at Texas A&M University, August 2007.
- National Grant for Graduate Students, Korea Science and Engineering Foundation Grant M06-2003-000-10064-0. $60,000 Granted by the Korean Ministry of Science & Technology, July 2003.

Unfunded

- Confidential Project Information. Co-Submitted to the U.S. Department of Agriculture (USDA) National Institute of Food and Agriculture (NIFA), July 2023.
- The Development of Technologies for Optimal Operation of Hyper-Connected Flood Protection Facilities in Response to Abnormal Flooding. Project Budget $5,000,000. Co-Submitted with the Korea Institute of Civil Engineering and Building Technology to the Korea Environmental Industry and Technology Institute, January 2022.
- Intelligent Water System: On-Site Sensory Station Network with Machine Learning Backend for Illicit Discharge Detection and Monitoring. Project Budget $752,883. Co-Submitted with Kennesaw State University and the University of Georgia to the Environmental Protection Division of the Georgia Department of Natural Resources, April 2020.

VI Research and Projects

Research Projects

- CanoClass: An Open-Source Canopy Classification System Using Machine-Learning Techniques Within a Python Framework
- Land Surface Modeling for Optimal Operation of Water Reuse Infrastructure During Future Drought Conditions Under Climate Change
- Land Surface Modeling for Optimal Operation of Dam Infrastructure Using Satellite Data Assimilation Techniques
- AFORAS: Floodway Optimization Using the HEC-RAS Application Programming Interface (API)
- Application of Multi-Modal Optimization for Uncertainty Estimation of Computationally Expensive Hydrologic Models
- Efficient Uncertainty Analysis of TOPMODEL Using Particle Swarm Optimization
- Development of a Metaheuristic Optimization Algorithm for Multi-Modal Problems
- Analytical Quantification of Uncertainty in Extreme Flow Estimation near a Gage with Historical Records
- r.accumulate: Efficient Computation of the Longest Flow Path for a Large Number of Watersheds
- WHydroMod: Development of a Web-Based Hydrologic Modeling System for Texas
- Let-It-Rain: Development of a Web-Based Regionalized Stochastic Point Rainfall Generator and Its Applicability in Runoff and Flood Modeling
- Development and Application of a Storm Identification Algorithm That Conceptualizes Storms by Elliptical Shape
- Impacts of Climate Change and Historical Land Cover Change on Water Resources

- Effect of the Temporal Variability of Rainfall Statistics on Stochastically Generated Rainfall Time Series
- Regionalization of the Modified Bartlett-Lewis Rectangular Pulse Stochastic Rainfall Model
- Investigation on the Effect of Spatial Variability of Land Use, Soil Type, and Precipitation on Stream-flows in Small Watersheds
- Control of Nonpoint Source Loads in the Hickory Creek Sub-basin of the Lake Lewisville Watershed as a Component of a Watershed-Based Water Quality Trading Program
- Incentives for Action: Incorporating Trading Options Into Watershed Improvement Plans for Lake Lewisville—Phase II
- Derivation of the Number of Minima of the Griewank Function
- Development of a Graphical User Interface (GUI) for the Unsteady/Uncertainty Water Quality Model (UUWQM)
- Digip: Development of a Digital Image Processing Python Module
- r.topmodel: Integration of a Distributed Hydrologic Model within GRASS GIS
- ProjPicker: Spatial Query of Coordinate Reference Systems
- GRASS GIS Open-Source Software Development Project

Industry Projects

- Development of a Service Cloud Solution for Software as a Service (SaaS) for Customer Infrastructure Management
- Development of Infrastructure Asset Management Systems for Gwinnett County, Georgia
- Stormwater Infrastructure System Assessment for Gwinnett County, Georgia
- Dam Break Risk Assessment for Bartow and Cobb Counties, Georgia
- North Carolina Sea Level Rise Risk Management Study
- Development of the Waterway Debris Removal System for New Jersey Department of Environmental Protection
- Development of an Android Mobile Application for Virtual Flooding in Augmented Reality
- Development of In-House Software for Hydrologic & Hydraulic Modeling and Flood Risk Mapping
- Development of ArcGIS Add-Ins for FEMA Flood Insurance Studies
- 2-Dimensional Hydrologic & Hydraulic Modeling for the Northwest Florida Water Management District
- Development of the Instream Flow Decision Support System for Colorado Water Conservation Board Department of Natural Resources
- Hydrologic & Hydraulic Modeling and Review for FEMA Flood Insurance Studies
- Development of the FEMA GeoDam-BREACH Toolset for Simplified Dam Break Analysis

- Development of the MapViewer Desktop for Visualizing FEMA Digital Flood Insurance Rate Map Data
- Development of the ArcGIS Module for Managing Digital Flood Insurance Rate Map Panels
- Development of Geospatial Web Applications for Disseminating Flood Modeling Information

VII Publications and Presentations

Journal Articles

- Cho, H., 2023. Memory-Efficient Flow Accumulation Using a Look-Around Approach and Its OpenMP Parallelization. Environmental Modelling & Software 167, 105771. doi:10.1016/j.envsoft.2023.105771.
- Kim, Y., Chung, E.-S., Cho, H., Byun, K., Kim, D., 2023. The Future Water Vulnerability Assessment of the Seoul Metropolitan Area Through Accurate River Discharge Prediction Using a Hybrid Modeling Framework Composed of Physically-Based and Deep-Learning-Based Hydrologic Models. Stochastic Environmental Research and Risk Assessment 37, 1777–1798. doi:10.1007/s00477-022-02366-0.
- Cho, H., 2020. A Recursive Algorithm for Calculating the Longest Flow Path and Its Iterative Implementation. Environmental Modelling & Software 131, 104774. doi:10.1016/j.envsoft.2020.104774.
- Cho, H., Park, J., Kim, D., 2019. Evaluation of Four GLUE Likelihood Measures and Behavior of Large Parameter Samples in ISPSO-GLUE for TOPMODEL. Water 11 (3), 447. doi:10.3390/w11030447.
- Cho, H., Yee, T. M., Heo J., 2018. Automated Floodway Determination Using Particle Swarm Optimization. Water 10 (10), 1420. doi:10.3390/w10101420.
- Lee, J., Cho, H., Choi, M., Kim, D., 2017. Development of a Land Surface Model for the Soyang River Basin. Journal of the Korean Water Resources Association 50 (12), 837–847. doi:10.3741/JKWRA.2017.50.12.837.
- Cho, H., Bones, E., 2016. Quantification of Uncertainties in the 100-year Flow at an Ungaged Site Near a Gaged Station and Its Application in Georgia. Journal of Hydrology 539, 640–647. doi:10.1016/j.jhydrol.2016.05.070.
- Kim, D., Cho, H., Onof, C., Choi, M., 2016. Let-It-Rain: A Web Application for Stochastic Point Rainfall Generation at Ungaged Basins and Its Applicability in Runoff and Flood Modeling. Stochastic Environmental Research and Risk Assessment. doi:10.1007/s00477-016-1234-6.
- Heo, J., Yu, J., Giardino, J., Cho, H., 2015. Water Resources Response to Climate and Land-Cover Changes in a Semi-Arid Watershed, New Mexico, USA. Terrestrial, Atmospheric and Oceanic Sciences 26 (4), 463–474. doi:10.3319/TAO.2015.03.24.01(Hy).
- Heo, J., Yu, J., Giardino, J., Cho, H., 2015. Impacts of Climate and Land-Cover Changes on Water Resources in a Humid Subtropical Watershed: A Case Study from East Texas, USA. Water and Environmental Journal 29 (1), 51–60. doi:10.1111/wej.12096.

- Cho, H., Kim, D., Lee, K., 2014. Efficient Uncertainty Analysis of TOPMODEL Using Particle Swarm Optimization. Journal of the Korean Water Resources Association 47 (3), 285–295. doi:10.3741/JKWRA.2014.47.3.285.
- Cho, H., Olivera, F., 2014. Application of Multimodal Optimization for Uncertainty Estimation of Computationally Expensive Hydrologic Models. Journal of Water Resources Planning and Management 140 (3), 313–321. doi:10.1061/(ASCE)WR.1943-5452.0000330.
- Cho, H., Lee, D., Lee, K., Lee, J., Kim, D., 2013. Development and Application of a Storm Identification Algorithm that Conceptualizes Storms by Elliptical Shape. Journal of the Korean Society of Hazard Mitigation 13 (5), 325–335. doi:10.9798/KOSHAM.2013.13.5.325.
- Kim, D., Olivera, F., Cho, H., Lee, S., 2013. Effect of the Inter-Annual Variability of Rainfall Statistics on Stochastically Generated Rainfall Time Series: Part 2. Impact on Watershed Response Variables. Stochastic Environmental Research and Risk Assessment, doi:10.1007/s00477-013-0697-y.
- Kim, D., Olivera, F., Cho, H., 2013. Effect of the Inter-Annual Variability of Rainfall Statistics on Stochastically Generated Rainfall Time Series: Part 1. Impact on Peak and Extreme Rainfall Values. Stochastic Environmental Research and Risk Assessment, doi:10.1007/s00477-013-0696-z.
- Kim, D., Olivera, F., Cho, H., Socolofsky, S., 2013. Regionalization of the Modified Bartlett-Lewis Rectangular Pulse Stochastic Rainfall Model. Terrestrial, Atmospheric and Oceanic Sciences 24 (3), 421–436. doi:10.3319/TAO.2012.11.12.01(Hy).
- Cho, H., Kim, D., Olivera, F., Guikema, S. D., 2011. Enhanced Speciation in Particle Swarm Optimization for Multi-Modal Problems. European Journal of Operational Research 213 (1), 15–23. doi:10.1016/j.ejor.2011.02.026.
- Cho, H., Olivera, F., 2009. Effect of the Spatial Variability of Land Use, Soil Type, and Precipitation on Streamflows in Small Watersheds. Journal of the American Water Resources Association 45 (3), 673–686. doi:10.1111/j.1752-1688.2009.00315.x.
- Cho, H., Olivera, F., Guikema, S. D., 2008. A Derivation of the Number of Minima of the Griewank Function. Applied Mathematics and Computation 204 (2), 694–701. doi:10.1016/j.amc.2008.07.009.
- Olivera, F., Valenzuela, M., Srinivasan, R., Choi, J., Cho, H., Koka, S., Agrawal, A., 2006. ArcGIS-SWAT: A Geodata Model and GIS Interface for SWAT. Journal of the American Water Resources Association 42 (2), 295–309. doi:10.1111/j.1752-1688.2006.tb03839.x.

Journal Editorials

- Cho, H., Liuzzo, L., 2021. Editorial for Special Issue: "Multi-Source Data Assimilation for the Improvement of Hydrological Modeling Predictions." Hydrology 9 (1), 4. doi:10.3390/hydrology9010004.

Conference Presentations

- Cho, H., December 12, 2023. Leveraging Single-Node Multi-Threaded Computing Power for Rapid Flow Accumulation for Cloud-Based Hydrologic Modeling. American Geophysical Union (AGU) An-

nual Meeting 2023. San Francisco, CA.

- Cho, H., December 1, 2023. State of GRASS GIS: 40 Years Strong and Counting. Free and Open Source Software for Geospatial (FOSS4G) Asia 2023 Conference. The Open Source Geospatial Foundation (OSGeo) Korean Chapter. Seoul Hall of Urbanism & Architecture. Seoul, South Korea.
- Cho, H., November 30, 2023. Memory-Efficient Flow Accumulation Using OpenMP Parallelization. Free and Open Source Software for Geospatial (FOSS4G) Asia 2023 Conference. The Open Source Geospatial Foundation (OSGeo) Korean Chapter. Seoul Hall of Urbanism & Architecture. Seoul, South Korea.
- Cho, H., Makhdoom, N., November 8, 2023. Development of a New Mexico Statewide Land Surface Model for Water Availability Analysis. The 68th Annual New Mexico Water Conference. Albuquerque, NM.
- Arshad, E., Maxwell, C. M., Neupane, K., Prandoni, N., Cho, H., Fernald, A. G., November 8, 2023. Estimating the Effects of Watershed Restoration Practices on Flood Flow Runoff. The 68th Annual New Mexico Water Conference. Albuquerque, NM.
- Cho, H., 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).
- Cho, H., December 15–18, 2021. Data-Driven Streamflow Forecasting Using Machine Learning. The US-KOREA Conference on Science, Technology, and Entrepreneurship (UKC) 2021—Pursuing Global Health and Sustainability. Korean-American Scientists and Engineers Association (KSEA). Los Angeles, CA.
- Smith, O., Cho, H., 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). Buenos Aires, Argentina (online).
- Petras, V., Andreo, V., Landa, M., Petrasova, A., Riembauer, G., Nartišs, M., Lennert, M., Metz, M., Blumentrath, S., Cho, H., Neteler, M. September 29, 2021. State of GRASS GIS: The Dawn of a New Eara. Free and Open Source Software for Geospatial (FOSS4G) 2021 Conference. The Open Source Geospatial Foundation (OSGeo). Buenos Aires, Argentina (online).
- Andreo, V., Petras, V., Landa, M., Petrasova, A., Riembauer, G., Nartišs, M., Lennert, M., Metz, M., Blumentrath, S., Cho, H., Neteler, M. September 8, 2021. GRASS GIS 8: From Desktop to Big Data Cubes. Open Data Science Europe Workshop 2021. The OpenGeoHub Foundation. Wageningen, The Netherlands.
- Cho, H., Fathabadi, A., Seyedian, S. M., Choubin, B., March 22, 2021. Uncertainty Estimation in Hydrologic Modeling Using Bayesian Model Averaging Within the GLUE Framework. 2021 Georgia Water Resources Conference (GWRC). Tate Student Center, Athens, GA (online).

- Cho, H., 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. Brussels, Belgium (online).
- Smith, O., Cho, H., McCollum, J., July 13–16, 2020. Tree Canopy Dataset Creation for the State of Georgia with NAIP Imagery and Python. 2020 Esri User Conference. San Diego, CA (online).
- Smith, O., Cho, H., March 13, 2020. A Reproducible Supervised Classification System for Tree Canopy and Deforestation Detection Within an Open Source Python Framework Utilizing NAIP Imagery. University of North Georgia 25th Annual Research Conference (ARC). Gainesville, GA (online).
- McCollum, J., Cho, H., March 13, 2020. Georgia Statewide Tree Canopy Analysis. University of North Georgia 25th Annual Research Conference (ARC). Gainesville, GA (online).
- Henderson, T., Cho, H., March 13, 2020. Expansion of Topographic Wetness Index to Include Remotely Sensed Soil Data. University of North Georgia 25th Annual Research Conference (ARC). Gainesville, GA (online).
- Cho, H., Kim, D., Onof, C., Choi, M., October 2, 2018. Let-It-Rain: A Web-Based Stochastic Rainfall Generator. 2018 Georgia Geospatial Conference. Georgia Urban and Regional Information Systems Association. Classic Center, Athens, GA.
- Flores, M., Cho, H., May 2, 2018. Bridging the Gap between Esri and CRM. 2018 Esri Southeast User Conference. Esri. Charlotte Convention Center, Charlotte, NC.
- Lee, J., Cho, H., Kim, D., April 24, 2017. Assessment of the Applicability of the Satellite-In-Situ Composite Soil Moisture Data Assimilation using Ensemble Kalman Filter. European Geosciences Union General Assembly 2017. Vienna, Austria.
- Cho, H., April 20, 2017. Web-Based Hydrologic Modeling System for Texas. 2017 Georgia Water Resources Conference (GWRC). University of Georgia, Athens, GA.
- Yee, T. M., Cho, H., April 20, 2017. Floodway Optimization Algorithm for Streams in Georgia. 2017 Georgia Water Resources Conference (GWRC). University of Georgia, Athens, GA.
- Lee, J., Cho, H., Kim, D., August 22, 2016. Applicability of AMSR2 Soil Moisture Data in a Real-Time Land Surface Model. HIC 2016, The 12th International Conference on Hydroinformatics—Smart Water for the Future. Society of Smart Water Grid. Songdo ConvensiA, Incheon, South Korea.
- Kim, D., Cho, H., Han, J., May 15, 2014. Development and Validation of a Web-Based Poisson Cluster Synthetic Rainfall Generator. Korea Water Resources Association Conference 2014. Korea Water Resources Association. Busan, South Korea.
- Cho, H., Kim, D., March 8, 2014. Spatiotemporal Storm Tracking for Hydrologic Modeling Using Particle Swarm Optimization. Southeastern Regional Conference 2014—Future Preparedness: Smart Technologies and Science. Korean-American Scientists and Engineers Association. Atlanta, GA.
- Cho, H., Choi, J., Demby, J., Crampton, S., Selvanathan, S., March 4, 2013. Development of FEMA's GeoDam-BREACH Toolset for Simplified Dam Break Analysis. Virginia Water Conference 2013.

Virginia Lakes and Watersheds Association. Richmond, VA.

- Sharma, D., Choi, J., Sadhu, J., Selvanathan, S., Cho, H., Logsdon, K., Jr., October 21, 2010. Improved Visualization of Contours/Bands as Symbology Using ESRI Terrain for Flood Mapping and Engineering Analysis. The 6th Annual MAFSM Conference—New Maps, New Regs—Reducing Flood and Stormwater Impacts in Maryland. Maryland Association of Floodplain and Stormwater Managers. Linthicum, MD.
- Sadhu, J., Choi, J., Sharma, D., Selvanathan, S., Cho, H., Logsdon, K., Jr., October 21, 2010. Overcoming Depth Grid Creation Challenges through the Use of Depth TIN/Terrain. The 6th Annual MAFSM Conference—New Maps, New Regs- Reducing Flood and Stormwater Impacts in Maryland. Maryland Association of Floodplain and Stormwater Managers. Linthicum, MD.
- Choi, J., Selvanathan, S., Sadhu, J., Sharma, D., Cho, H., October 14, 2010. Automated Peakflow Computations Using NSS and ArcGIS. The 6th NJAFM Annual Conference—Proactive Floodplain Management: Reducing Vulnerability and Leveraging Resources. New Jersey Association for Floodplain Management. Somerset, NJ.
- Katherine, H., Logsdon, K., Jr., Cho, H., May 18, 2010. Digital Flood Insurance Rate Map Panel Management Module. ASFPM 34th Annual National Conference—Building Blocks of Floodplain Management. Association of State Floodplain Managers. Oklahoma City, OK.
- Logsdon, K., Jr., Choi, J., Cho, H., May 18, 2010. Layered Flood Theme and an Integrated QC Module. ASFPM 34th Annual National Conference—Building Blocks of Floodplain Management. Association of State Floodplain Managers. Oklahoma City, OK.
- Cho, H., Bedane, T., Sreetharan, M., Huang, J., October 15, 2009. Floodplain Development for Flood Insurance Studies Using GeoTerrain. The 5th NJAFM Annual Conference: Effective Floodplain Management—Solutions Using Limited Resources. New Jersey Association for Floodplain Management. Somerset, NJ.
- Olivera, F., Cho, H., July 4, 2007. Importance of Spatial Distribution in Small Watersheds. The 4th International Soil and Water Assessment Tool (SWAT) Conference. UNESCO-IHE. Delft, The Netherlands.
- Olivera, F., Cho, H., July 14, 2005. Two-Step Calibration Method for SWAT. The 3rd International Soil and Water Assessment Tool (SWAT) Conference. Swiss Federal Institute for Environmental Science and Technology (Eidgenössische Anstalt für Wasserversorgung. Abwasserreinigung und Gewässerschutz–EAWAG). Zürich, Switzerland.
- Olivera, F., Cho, H., April 2005. The Two-Step Calibration Method of Distributed Models. VII IAHS Scientific Assembly. International Association of Hydrologic Sciences (IAHS). Foz do Iguaçu, Brazil.

Conference Papers

- Cho, H., December 2021. Data-Driven Streamflow Forecasting Using Machine Learning. The US-KOREA Conference on Science, Technology, and Entrepreneurship (UKC) 2021 Proceedings. Korean-

American Scientists and Engineers Association (KSEA). Los Angeles, CA.

- Smith, O., Cho, H., 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.
- Cho, H., April 16, 2019. Revisiting the Longest Flow Path Algorithm. Proceedings of the 2019 Georgia Water Resources Conference (GWRC). University of Georgia, Athens, GA.
- Park, J., Cho, H., Kim, D., May 24, 2017. Efficient Uncertainty Estimation of TOPMODEL Using Particle Swarm Optimization: Case Studies for Texas Watersheds. Proceedings of the 2017 Korea Water Resources Association Conference, 161.
- Yee, T. M., Cho, H., May 22, 2017. Towards an Automated Floodway Optimizer for HEC-RAS. 2017 EWRI World Environmental & Water Resources Congress. Sacramento, CA.
- Kim, J., Han, K., Cho, H., Choi, H., November 2001. GIS-Based Hydrological Modeling by Using GRASS. Proceedings of the 2001 Korean Society of Civil Engineers Conference, 1–4.

Conference Workshops

- Cho, H., September 28, 2021. Physically-Based Hydrologic Modeling Using GRASS GIS r.topmodel. Free and Open Source Software for Geospatial (FOSS4G) 2021 Conference. Buenos Aires, Argentina (online).
- Han, K., Kim, S., Son, I., Baek, C., Choi, K., Cho, H., February 1999. Riverine & Lacustrine Water Quality Prediction Models (QUAL2E, WASP, etc.). 7th Water Resources Engineering Workshop Manual. Korea Water Resources Association.

Book Reviews

- Cho, H., January 2019. Review of "GIS for Surface Water: Using the National Hydrography Dataset" by Jeff Simley. Photogrammetric Engineering & Remote Sensing 85 (1), 11–12. doi:10.14358/PERS.85.1.11.

Scientific Reports

- Cho, H., Smith, O., June 15, 2021. Georgia Statewide Assessment of Canopy Change Between 2009 and 2019. Submitted to the Georgia Forestry Commission as Partial Fulfillment of Georgia Statewide Canopy Assessment Phase 2: Canopy Change Analysis 2009–2019.
- Cho, H., Smith, O., January 29, 2021. Georgia Statewide Assessment of 2019 Canopy. Submitted to the Georgia Forestry Commission as Partial Fulfillment of Georgia Statewide Canopy Assessment Phase 1.5: Canopy Analysis 2019.
- Smith, O, Cho, H., January 29, 2021. Training New Automated Feature Extraction Models for Canopy Classification Using the 2019 60cm NAIP Imagery. Submitted to the Georgia Forestry Commission as Partial Fulfillment of Georgia Statewide Canopy Assessment Phase 1.5: Canopy Analysis 2019.

- Cho, H., Smith, O., McCollum, J., May 27, 2020. Georgia Statewide Assessment of 2009 Canopy. Submitted to the Georgia Forestry Commission as Partial Fulfillment of Georgia Statewide Canopy Assessment Phase 1: Canopy Analysis 2009.
- Cho, H., McCullum, J., Smith, O., December 19, 2019. Reproducibility of the 2015 Results and a Proposed Method for Future Canopy Analyses. Submitted to the Georgia Forestry Commission as Partial Fulfillment of Georgia Statewide Canopy Assessment Phase 1: Canopy Analysis 2009.
- Cho, H., December 31, 2019. Application of GIS Database Models to Hydrologic Modeling and Flood Management. Submitted to the Korean Institute of Civil Engineering and Building Technology, Goyang, South Korea, as a Non-Resident Senior Fellow.
- Cho, H., August 25, 2019. A Method for Improving the Predictive Uncertainty of Models Using Bayesian Probability Theory. Submitted to Dong-A University, Busan, South Korea.
- Cho, H., July 12, 2019. A Heuristic Approach for Optimizing the Floodway Using the HEC-RAS API. Submitted to Kyungpook National University, Daegu, South Korea.
- Cho, H., March 14, 2019. Current Trends of the Development of River Information Management Systems in the United States. Submitted to the Korean Institute of Civil Engineering and Building Technology, Goyang, South Korea, as a Non-Resident Senior Fellow.

VIII Invited Talks

- Computation of Hydrologic Parameters for Continental-Scale Modeling. The U.S. Department of the Interior (DOI) Open-Source Geospatial Software Group. October 19, 2023. Online.
- Memory-Efficient Flow Accumulation Using OpenMP. The U.S. Department of Agriculture (USDA) Lunch & Learn Series. August 23, 2023. Online.
- Supervised Classification of Tree Canopy Using Remote Sensing Data and Machine Learning. Brain Korea 21 FOUR Seminar. November 19, 2021. Dong-A University, Busan, South Korea.
- Application of Hack's Law to the Discovery of the Longest Flow Path. November 9, 2020. Kennesaw State University, Marietta, GA.
- Revisiting the Longest Flow Path Algorithm. May 25, 2019. Kyungpook National University, Daegu, South Korea.
- Revisiting the Longest Flow Path Algorithm. May 22, 2019. Sangji University, Wonju, South Korea.
- Recent Trends in GIS Applications. May 22, 2019. Sangji University, Wonju, South Korea.
- Working in the United States and Recent Trends in Civil Engineering. May 21, 2019. Semyung University, Jecheon, South Korea.
- Web-based Hydrologic Modeling System for Texas. May 20, 2019. Dong-A University, Busan, South Korea.
- Bridging the Gap Between GIS and CRM. May 20, 2019. Kyungpook National University, Daegu, South Korea.

- Revisiting the Longest Flow Path Algorithm. May 17, 2019. Hongik University, Seoul, South Korea.
- Bridging the Gap Between GIS and CRM. May 17, 2019. Hongik University, Seoul, South Korea.
- Recent Trends in GIS Applications. May 14, 2019. Jungwon University, Goesan, South Korea.
- Revisiting the Longest Flow Path Algorithm. May 13, 2019. Korea Institute of Civil Engineering and Building Technology, Goyang, South Korea.
- Hydrologic Modeling Using Open Source GIS. November 13, 2018. GIS Day, Geospatial Alliance Club, University of North Georgia, Oakwood, GA.
- Web-based Hydrologic Modeling System for Texas. November 24, 2017. Hongik University, Seoul, South Korea.
- Flood Insurance Study. November 24, 2017. Hongik University, Seoul, South Korea.
- Development of an Automated Toolset for Simplified Dam Break Analysis. November 24, 2017. Hongik University, Seoul, South Korea.
- Floodway Optimization Algorithm for Streams in Georgia. November 23, 2017. Kyungpook National University, Daegu, South Korea.
- Automation of Floodway Models for HEC-RAS. Co-presentation with Yee, T. M., November 11, 2016. PDH Day, Georgia Society of Professional Engineers. Georgia Tech Student Center, Atlanta, GA.
- Let-It-Rain: A Web-based Stochastic Rainfall Generator. April 20, 2016. Dewberry, Atlanta, GA.
- Effect of Spatial Variability on a Distributed Hydrologic Model. May 6, 2015. Kyungpook National University, Daegu, South Korea.
- Impacts of Climate Change and Land-Cover Changes on Water Resources—Methodology Review. May 6, 2015. Korea Institute of Civil Engineering and Building Technology, Goyang, South Korea.
- Improved Search for Local Optima in Particle Swarm Optimization. May 6, 2015. Hongik University, Seoul, South Korea.
- Hydrologic Modeling Using Open Source Software. April 30, 2015. Korea Water Resources Corporation, Daejeon, South Korea.

IX Patents

- Kim, D., Choi, E., Cho, H., 2018. The System for Generating Stochastic Rainfall of the Poisson Cluster Based on Optimized Parameter Maps, and the Method for the Same. Registration No. 10-1818568. Korean Intellectual Property Office.

X Academic Services

Peer Review Activities

- Journal of Water Management Modeling published by Computational Hydraulics International
- KSCE Journal of Civil Engineering published by the Korean Society of Civil Engineers

- Hydrology published by MDPI
- International Journal of Environmental Research and Public Health published by MDPI
- Journal of Flood Risk Management published by Chartered Institution of Water and Environmental Management and John Wiley & Sons Ltd.
- Sustainability published by MDPI
- Water published by MDPI
- Smart Water published by Springer
- Journal of Hydroinformatics published by International Water Association Publications
- Resources, Conservation & Recycling published by Elsevier
- Computers and Electronics in Agriculture published by Elsevier
- 2017 International Conference on Water Resource and Environment
- Journal of Hydrologic Engineering published by the American Society of Civil Engineers
- Applied Mathematics and Computation published by Elsevier
- PLOS ONE published by the Public Library of Science
- Journal of Water Resources Planning and Management published by the American Society of Civil Engineers
- Journal of the Operational Research Society published by the Operational Research Society
- European Journal of Operational Research published by Elsevier
- Journal of the American Water Resources Association published by the American Water Resources Association

Editorial Activities

- Guest Editor for the Special Issue "Advances in Hydroinformatics for Water Data Management and Analysis, Volume II" for the Water journal published by MDPI
- Guest Editor for the Special Issue "Big Data and Machine Learning in Hydrology: Recent Advances and Trends" for the Hydrology journal published by MDPI
- Guest Editor for the Special Issue "Multi-Source Data Assimilation for the Improvement of Hydrological Modeling Prediction" for the Hydrology journal published by MDPI
- Associate Editor for the Journal of Spatial Hydrology published by ScholarsArchive, Brigham Young University

Proposal Review Activities

- National Science Foundation (NSF) Hydrologic Sciences Program

Conference Organization

- Committee for the 2024 New Mexico Transportation and Construction Conference. April 17–19, 2024. Las Cruces, New Mexico.
- Committee for the 2023 New Mexico Transportation and Construction Conference. April 12–14, 2023. Las Cruces, New Mexico.
- General Track Program Committee for the Free and Open Source Software for Geospatial (FOSS4G) 2022 Conference. August 22–28, 2022. Firenze, Italy (online).
- General Track Program Committee for the Free and Open Source Software for Geospatial (FOSS4G) 2021 Conference. September 27–October 2, 2021. Buenos Aires, Argentina (online).
- Scientific Committee for the International Commission on Statistical Hydrology-Statistical Hydrology (ICSH-STAHY) Workshop 2021 (ICSH-STAHY2021). September 16–17, 2021. València, Spain (online).
- Han, K., Cho, H., Heo, J., New Technology for Mitigating Flood Disaster Under Climate Change Session in the Hydrological Sciences Section. The Asia Oceania Geosciences Society 17th Annual Meeting. June 28–July 4, 2020. Hongcheon, South Korea. Event Cancelled Because of COVID-19.

XI Professional Affiliations

- GRASS GIS Core Development Team, Project Steering Committee (PSC)
- Open Source Geospatial Foundation (OSGeo)
- Georgia Urban and Regional Information Systems Association (Georgia URISA)
- American Society of Civil Engineers (ASCE)
- American Geophysical Union (AGU)
- Association of State Floodplain Managers, Inc. (ASFPM)

XII Professional Licenses

- Professional Engineer (PE), Maryland Department of Labor, June 2013.
- Certified Floodplain Manager (CFM), New Mexico Floodplain Managers Association (NMFMA), Association of State Floodplain Managers, Inc. (ASFPM), November 2009.
- Certified Geographic Information Systems Professional (GISP), GIS Certification Institute (GISCI), April 2011.