



Nick Martin, P.G., P.H., C.F.M. Senior Hydrogeologist

Education

M.S. Hydrogeology, Stanford University, Palo Alto, CA, 2004
M.A. International Relations, Johns Hopkins School of Advanced International Studies (SAIS), Washington, DC, 1993

B.S. Geophysics, Virginia Tech, Blacksburg, VA, 1999

B.S. International Studies, Johns Hopkins University, Baltimore, MD, 1992

Certifications

Registered Professional Geologist (PG):

- *California #GEO 9126*
- *Texas #15579*

Professional Hydrologist (PH), Surface Water:

- *American Institute of Hydrology (AIH) #13-H-5016*

Certified Floodplain Manager (CFM):

- *Association of State Floodplain Managers (ASFPM) #US-23-12983*

Microsoft Certified Solutions Expert (MCSE):

- *Cloud Platform and Infrastructure, 2017 - 2018*

Professional Service

City of Fort Collins, CO

- *Water Commissioner, 2024-present*

Colorado Groundwater Association

- *Legislative Committee Chair, 2024-present*

ASFPM International Committee

- *Member since 2023*

National Groundwater Association
American Water Resources Association
American Institute of Hydrology
Association of State Floodplain Managers

Nick Martin is a surface water and groundwater hydrologist and software developer with more than 20 years of experience. He focuses on risk assessment, risk mitigation, reliability, resiliency, and sustainability analyses related to climate change and legacy infrastructure on natural and engineered systems. Nick specializes in probabilistic analysis and modeling to quantify uncertainty and define environmental and economic risk. His technical interests include uncertainty analysis for decision support and data assimilation as part of water movement and transport modeling and machine learning and deep learning studies. He has designed and implemented numerical methods, extension modules, and standalone computer programs.

Areas of Expertise

- Hydrogeology
- Hydrology
- Hydrometeorology
- Risk Assessment, Risk Mitigation, and Reliability Analysis
- Climate Change Resiliency and Sustainability
- Decision Support Systems (DSS), Data Assimilation (DA), and Uncertainty Analysis Incorporating Artificial Intelligence (AI)
- Numerical Flow and Transport Modeling (groundwater, rivers and streams, reservoirs and lakes, estuaries and bays, and non-Newtonian flows)
- Monte Carlo Simulation and Uncertainty Quantification
- Systems Dynamics Modeling, i.e., GoldSim modeling

Principal Investigator (PI)

- "Integration of Process-Driven and Data-Driven Hydrologic Models in an Environment of Process Uncertainty", 2021 to 2023
 - Goal: Integrate Entity Aware Long Short-Term Memory Network (EALSTM), deep learning models with process-based water budget models
- "Local Two-Way Coupling between Watershed and Karst Aquifer Models", 2020
 - Goal: Loose, dynamic coupling between HSPF and MODFLOW 6 for karst environments with rapid stream-aquifer interactions
- "Stochastic Simulation of Recharge Trends Resulting from Global Climate Change", 2019 to 2020
 - Goal: Develop probabilistic risk assessment (PRA) framework for water resources impacts analysis from climate change

EMPLOYMENT HISTORY

BAS Groundwater Consulting – Fort Collins, CO

Senior Hydrogeologist (2025 to present)

Mr. Martin is a Senior Hydrogeologist assisting with data analysis and ongoing hydrogeology studies.

Vodanube, LLC – Fort Collins, CO

Principal Scientist and Founding Member (2024 to present)

Mr. Martin is Principal Scientist focusing on acquiring and implementing applied research grants on the topic of future risk to water resources.

RESPEC – Fort Collins, CO

Resident Consultant, Part time (6/2024 through 6/2025)

Business Development Director (12/2023 through 5/2024)

Mr. Martin's duties included leading market analysis to assess growth potential, prioritize investments, and create an aligned growth strategy, and he focused on developing, building, and managing relationships with strategic partners and customers, both public and private, to build a pipeline of projects.

Southwest Research Institute (SwRI) – San Antonio, TX

Principal Scientist (2018 to 2023)

Mr. Martin led technical and analysis teams for surface water and groundwater interaction, water resources climate risk assessments, and permitting risk management assessment. He was Principal investigator (PI) on three, multi-year research grants.

DHI Water & Environment – Lakewood, CO

Project Manager/Lead {Software} Engineer (2017 to 2018)

Executed and managed hydrology and hydrogeological studies and associated software development. Extended software tools and methodologies related to mining, water resources, and data analysis.

Goldsim Technology Group – Issaquah, WA

Senior Simulation Engineer (2014 to 2017)

Provided software user training, technical support, solution development, technical consulting, and project management, marketing, and sales expertise. Developed and proto-typed cloud offerings and business solutions.

Ausenco – Denver, CO

Senior Hydrogeologist (2010 to 2012)

Supervised and trained two colleagues. Provided technical management including scope generation, budget creation and oversight, and technical review for multi-discipline projects. Implemented mining hydrology studies including groundwater, surface water, and water balance modeling.

Denver Water – Denver, CO

Applications Developer (2010 to 2012)

Provided technical expertise and programming for the Platte and Colorado River Simulation Model (PACSM) integrated system of water rights and water supply computer programs and associated relational database management systems (RDMS). Designed and implemented distributed Source Code Management (SCM) system.

Bechtel Corporation – San Francisco, CA and Frederick, MD
Senior Hydrologist (2008 to 2010)

Prepared and reviewed hydrologic and hydrogeologic data, studies, models, and calculations. Technical work was primarily in support of permit acquisition for proposed nuclear reactors.

Clearwater Hydrology – Berkeley, CA
Senior Hydrologist (2006 to 2008)

Designed, assisted in permit acquisition, managed, and supervised construction of five stream and wetland restoration projects.

Flow Science Incorporated – Harrisonburg, VA
Associate Scientist (2004 to 2006)

Conducted coastal, estuarine, and reservoir hydrodynamics, transport, and mixing modeling studies.

INSTRUCTOR FOR TRAINING COURSES, WORKSHOPS, AND WEBINARS

- Workshop - “Produced Water Disposal Risk Assessment for Southern Texas: the 5 Biggest Risks and Mitigation Strategies,” International Petroleum Environment Conference (IPEC) Connect Subject Matter #2 Session, April 2021
- Workshop - “Rural Water Resources Management: Cultivation, Innovation, Collaboration – Innovation,” 10th Annual Texas Rural Challenge, June 2019
- Training Course - FEFLOW 3-Day Introductory Training Course, Lakewood, CO, June 2018
- Training Course - GoldSim 3-Day Training Course, Vancouver, BC, April 2017
- Training Course - GoldSim 3-Day Training Course, Columbus, OH, August 2016
- Webinar - “Monte Carlo Simulation: Uncertainty and Probability,” GoldSim Monthly Webinar, October 2015
- Workshop - “Monte Carlo Simulation Techniques,” GoldSim User Conference, September 2015
- Workshop - “Event-based Modeling and Discrete Events,” GoldSim User Conference, September 2015
- Webinar - “Time Series Analysis with GoldSim,” GoldSim Monthly Webinar, May 2015
- Webinar - “Modeling Unsaturated Flow Using Material Delays,” GoldSim Monthly Webinar, February 2015

FIRST AUTHOR, PEER-REVIEWED PUBLICATIONS

Martin, N., White, J., and Southard, P. (2025). A Null Space Sensitivity Analysis for Hydrological Data Assimilation with Ensemble Methods. *Hydrology*, 12(5), 106.
<https://doi.org/10.3390/hydrology12050106>.

Martin, N., Peña, F., and Powers, D. (2025). Probabilistic Risk Assessment (PRA) for Sustainable Water Resource Management: A Future Flood Inundation Example. *Water*, 17(6), 816.
<https://doi.org/10.3390/w17060816>.

- Science Communication – “Probabilistic risk assessment (PRA) for sustainable water resources”, January 2026. <https://doi.org/10.56367/oag-049-12434>
- Science Communication – “The Future of Floods: Smarter Risk Tools for Sustainable Water Management in a Changing Climate”, October 9, 2025. <https://doi.org/10.33548/SCIENTIA1329>

- Martin, N., and White, J. (2024). "Water Resources' AI-ML Data Uncertainty Risk and Mitigation Using Data Assimilation" *Water* v. 16, n. 19: 2758. <https://doi.org/10.3390/w16192758>.
- Science Communication – "Data Assimilation: Overcoming AI's Data Uncertainty Limitations for Water Resources", November 19, 2025. <https://doi.org/10.33548/SCIENTIA1346>
- Martin, N. (2023). "Incorporating Weather Attribution to Future Water Budget Projections" *Hydrology* v. 10, 12: 219. <https://doi.org/10.3390/hydrology10120219>.
- Science Communication – "Climate Change and Water Budgets: Accounting for Increased Drought Risk based on Recent Observations", August 21, 2024. <https://sciencefeatured.com/2024/08/21/climate-change-and-water-budgets-accounting-for-increased-drought-risk-based-on-recent-observations/>
- Martin, N. and Yang, C. (2023). "Statistical learning of water budget outcomes accounting for target and feature uncertainty" *Journal of Hydrology*, 624 129946, <https://doi.org/10.1016/j.jhydrol.2023.129946>.
- Martin, N. (2023). "Dynamic Assimilation of Deep Learning Predictions to a Process-Based Water Budget" *Hydrology* v. 10, no. 6: 129. <https://doi.org/10.3390/hydrology10060129>.
- Martin, N., and White, J. (2023). "Flow Regime-Dependent, Discharge Uncertainty Envelope for Uncertainty Analysis with Ensemble Methods" *Water* v. 15, n. 6: 1133. <https://doi.org/10.3390/w15061133>.
- Martin, N., Nicholaides, K., and Southard, P. (2022). "Enhanced Water Resources Risk from Collocation of Disposal Wells and Legacy Oil and Gas Exploration and Production Regions in Texas." *JAWRA - Journal of the American Water Resources Association*, v. 58, n. 6. <https://doi.org/10.1111/1752-1688.13048>.
- Martin, N. (2021b). "Risk Assessment of Future Climate and Land Use/Land Cover Change Impacts on Water Resources." *Hydrology*, v. 8, n. 38. <https://doi.org/10.3390/hydrology8010038>.
- Martin, N. (2021a). "Watershed-Scale, Probabilistic Risk Assessment of Water Resources Impacts from Climate Change." *Water*, v. 13, n. 40. <https://doi.org/10.3390/w13010040>.
- Martin, N., and others. (2019). "Blanco River Aquifer Assessment Tool – A Tool to Assess How the Blanco River Interacts with Its Aquifers: Creating the Conceptual Model." Technical Report. San Marcos, TX: Meadows Center for Water and the Environment, Texas State University. <https://gatodocs.its.txstate.edu/jcr:3a5f9f4d-454d-4cf4-9d12-6cc643a64368>.
- Martin, N. and Gabora, M. (2018). "Modeling Complex Mine Water Closure Challenges using a Coupled FEFLOW-GoldSim Model." *Mine Water – Risk to Opportunity (Vol I) – Wolkersdorfer, Sartz, Weber, Burgess, & Tremblay (eds), Tshwane University of Technology, Pretoria, South Africa* p. 41–47. https://www.imwa.info/docs/imwa_2018/IMWA2018_Martin_41.pdf.
- Martin, N. and Gorelick, S.M. (2005). "MOD_FreeSurf2D: A MATLAB surface fluid flow model for rivers and streams", *Computers & Geosciences*, v. 31, p. 929-946. [Awarded International Association for Mathematical Geology Best Paper of 2005] <https://doi.org/10.1016/j.cageo.2005.03.004>.
- Martin, N. and Gorelick, S.M. (2005). "Semi-analytical method for departure point determination." *International Journal for Numerical Methods in Fluids*, v. 47, p. 121-137. <https://doi.org/10.1002/flid.799>.