CURRICULUM VITAE

A. PERSONAL

Hyoun-Tae Hwang ***Citizenship***: Canada

- **Director of HydroGeoSphere & Senior Hydrogeologist**, Aquanty Inc., 600 Weber Street North, Unit B, Waterloo, ON, Canada N2V 1K4
- **Adjunct Professor & Sessional Lecturer**, Department of Earth & Environmental Sciences, University of Waterloo, 100 University Ave., Waterloo, ON, Canada
- **Professional Geoscientist (P.Geo.) in Ontario** (The Association of Professional Geoscientists of Ontario (APGO) Membership #: 3252)

Scholarly Personal Websites: Google Scholar ResearchGate

Email: hthwang@aquanty.com; hthwang@uwaterloo.ca

Education:

Degree	Institution	Date
Ph.D.	University of Waterloo	Jun, 2012
M.Sc.	Seoul National University	Aug, 2004
B.Sc.	Pukyong National University	Feb, 2002

Employment History:

Dates	Position	Employer
2012 ~ present	Director of HydroGeoSphere Senior Hydrogeologist	Aquanty Inc.
2013 ~ present	Adjunct Professor	University of Waterloo
2025	Sessional Lecturer	University of Waterloo
2012 ~ 2013	Post-Doctoral Fellow	University of Waterloo

Scholarships Received:

Dates	Details
2008 ~ 2011	University of Waterloo Graduate Scholarship
2002 ~ 2004	Brain Korea 21 Research Fellowships, Ministry of Education in Republic of Korea
2003	Academic Excellence Scholarship, Seoul National University
1994 ~ 2001	Academic Excellence Scholarships, Pukyong National University

Honors and Awards Received:

- Peter Huyakorn Award, HydroGeoLogic, Inc., USA, 2009 ($15,000)
- Science Graduate Experience Award, University of Waterloo, 2008 ($4,800)
- The Canadian Chamber of Commerce in Korea and Atomic Energy Canada Limited (AECL) Award, Korea, 2006 ($5,000)
- Best Poster Award, Korean Society of Soil and Groundwater Environment, Korea, 2003
- Dean's Award for Excellent Graduation (*Summa Cum Laude*), Pukyong National University, Korea, 2002

Teaching Activities (regular and short courses):

Dates	Details
July 2026	**Principal lecturer:** HydroGeoSphere Short Course and Workshop hosted by GeoGreen21 Co. Ltd., Seoul, Korea (4-day, 32 hour course)
January 2026	**Principal lecturer:** Winter Intensive Course on Model Development based on Control Volume Finite Difference Method, Jeonbuk National University, South Korea (5-day, 40 hour course)
July 2025	**Principal lecturer:** Summer Intensive Course on Control Volume Finite Difference Methods for Groundwater Flow and Solute Transport, Pukyong National University, South Korea (5-day, 40-hour course)
January 2025	**Sessional lecturer:** Numerical Methods in Hydrogeology (EARTH456/656 Winter 2025 term), University of Waterloo (Course Evaluation Results)
August 2024	**Principal lecturer:** HydroGeoSphere Short Course and Workshop hosted by International Geological Congress 2024, Busan, Korea (2-day course)

October 2023	**Lead lecturer:** HydroGeoSphere Training Course hosted by Aquanty Inc. (3-day course)
June 2022	**Principal lecturer:** HydroGeoSphere Short Course and Advanced Modelling Course hosted by Korea Institute of Geoscience and Mineral Resources, South Korea (7-day course)
September 2020	**Guest Lecturer:** Advanced Hydrogeology (Graduate course in English) in Seoul National University
November 2019	**Principal lecturer:** HydroGeoSphere Short Course and Advanced Modelling Course hosted by Korea Institute of Geoscience and Mineral Resources, South Korea (5-day course)
September 2018	**Principal lecturer:** HydroGeoSphere Short Course hosted by International Association of Hydrogeologists (IAH) (English lectures for 2 days in 45th IAH conference)
August 2017	**Principal lecturer:** HydroGeoSphere Short Course hosted by Korean Society of Soil and Groundwater Environment (Korean lectures for 3 days in Seoul National University)
2007 ~2011	**Teaching assistant and guest lecturer:** Physical Hydrology (graduate/4th year undergraduate level), Department of Earth and Environmental Sciences, University of Waterloo

Supervision and Mentorship of Highly-Qualified Personnel (HQP):

Position of HQP	Research Topic	Institution	Role	Period
Postdoctoral Fellow	Machine Learning–based Integrated Groundwater–Surface Water Modelling	Aquanty Inc. / University of Waterloo	Supervisor	2025–Present
Ph.D. Student	Three-Dimensional Geostatistical Inverse Analyses	University of Waterloo	Committee Member	2024–Present
M.Sc. Student	Development of Physics-Informed Neural Networks for Integrated Groundwater–Surface Water Modelling	University of Waterloo	Committee Member	2025–Present

M.Sc. Student	Uncertainty Analysis of a Decommissioned Nuclear Power Plant	Jeonbuk National University	Committee Member	2024–Present
Ph.D. Student	Development of a Model for Back Diffusion and Aquifer Heterogeneity Using HGS Modelling	Pukyong National University	Mentor	2024–Present
Undergraduate Student	Research project in groundwater Modelling	University of Waterloo	Mentor	2025–Present
M.Sc. Student	Hydraulic Tomography Survey	University of Waterloo	Committee Member	2022–2024
M.Sc. Student	Assessment of Hydraulic and Thermal Properties of the Antarctic Active Layer	Jeonbuk National University	Mentor	2022–2024

B. RESEARCH

Areas of Interest:

- **Mathematical Modelling**: atmosphere-surface water-groundwater flow and contaminant and energy transport in hydrologic/hydrogeologic systems by numerical and analytical methods
- **Surface Water/Groundwater Contamination and Remediation**: stochastic analysis of flow and mass transport in surface water (e.g., rivers and lakes) and heterogeneous porous and fractured geologic media.
- **Artificial Intelligence for Water Resources Systems:** development of physics-guided artificial intelligence, graph neural networks, surrogate models, and generative AI integrated with hydrological and hydrogeological models for real-time prediction, inverse modeling, uncertainty quantification, digital twins, and intelligent decision support for complex water resources systems.

Refereed Journal Articles:

In Preparation, Review, and Revision:

- C. Wang, Z. Dou, Z. Ning, **H.-T. Hwang**, W. A. Illman, Z. Wang, C. Wang, Predicting Complex Transport Behavior via a Hydrofacies-Constrained Simulation Framework, ***Journal of Hydrology*** (in review)
- H. Jeong, S. Berg, G. Stonebridge, K.-K. Lee, K.-H. Cho, **H.-T. Hwang (Corresponding Author)** Hydrodynamic-guided graph learning bridges data-driven and physics-informed artificial intelligence, ***Nature Communications*** (in submission)
- **H.-T. Hwang**, A. R Erler, O. Khader, S. J. Berg, E. A. Sudicky, J. P. Jones, Climate-Driven Enhancement of Groundwater–Surface Water Interactions in the Athabasca River Basin, ***Water Resources Research*** (in submission)
- **H.-T. Hwang**, Y. Heo, H. Do, S.-W. Jeen, S. J. Berg, Modelling of Radionuclide Transport from Decommissioned Nuclear Power Plants with Consideration of Uncertainty (in preparation, 80% completed)
- H. Lee, E. Lee, D. Park, **H.-T. Hwang**, Analysis of the impact of weir operation on the river and groundwater environment of the Nakdonggang River Basin with an integrated hydrologic model. (in preparation, 80% completed)
- **H.-T. Hwang**, D. Park, H. Lee, S. J. Berg, E. A. Sudicky, Integrated Surface Water–Groundwater Modelling for Regional-Scale Nitrate Contamination (in preparation, 70% completed)
- **H.-T. Hwang**, Y. Heo, H. Do, S. J. Berg, X. Xu, E. Kessel, S.-W. Jeen, Korean Peninsula–Scale Groundwater–Surface Water Modelling for Underground Radioactive Waste Repository Site Selection, (in preparation, 60% completed)
- G. Stonebridge, S. K. Frey, **H.-T. Hwang**, Integrated Groundwater - Surface Water Quality Modelling – South Nation Hindcast Simulation and Water Quality(in preparation, 50% completed)

Publication:

2026

46) J. H. Davison, **H.-T. Hwang**, E. A. Sudicky, D.V. Mallia, J. C. Lin, Hydrological Analysis of the California Basin Model, ***PLOS Water***, 5 (6), e0000535

45) C. Wang, Z. Ning, N. Luo, Z. Zhao, S. Berg, **H.-T. Hwang**, W. Illman, Three-Dimensional Analysis of Heat Tracer Transport with Hydraulic Conductivity Distributions from Various Approaches in a Complex Aquifer System, ***Water Resources Research***, 62 (6), e2025WR042412

44) Y.-J. Park, **H.-T. Hwang (Corresponding Author)**, T. Tanaka, Y. Morita, W. Illman, Improving Seepage Face Boundary Conditions for Dynamic Groundwater System, ***Water Resources Research***, 62 (2), e2025WR041547

43) Z. Ning, T. Nakashima, K. Inaba, T. Shimizu, **H.-T. Hwang**, W. Illman, Three-Dimensional Geostatistical Inverse Analyses of Transient Head and Temperature Data From a Long-Term Heat Tracer Test, ***Water Resources Research***, 62 (2), e2025WR041599

2025

42) Mahmoodi N., **Hwang, H.-T.**, Struck, U., Schneider M., Merz C., Reinforce lake water balance components estimations by integrating water isotope compositions with a hydrological model, ***Hydrology and Earth System Sciences,*** 29(16): 3993-4014. DOI:10.5194/hess-29-3993-2025

41) S. Kim, Baek S.-S., **Hwang, H.-T. (Corresponding Author)**, Kim, J. H., Cho, K. H., Unstructured mesh-based graph neural networks for estimating the spatiotemporal distribution of a human-induced chemical in freshwater, ***Water Research X***, 28, 100367, DOI:https://doi.org/10.1016/j.wroa.2025.100367

40) Ko, H.-N., Oh, S., Hyun, Y., **Hwang, H.-T.**, Lee, K.-K., Jeen, S.-W., 2025. Evaluation of measurement methods for assessing vertical velocity in groundwater systems: a case study from Osongji (Osong Pond), Jeonju-si, South Korea. ***Environmental Earth Sciences***, 84(8): 199. DOI:10.1007/s12665-025-12206-3

39) **Hwang, H.-T.**, Park, Y.-J., Berg, S.J., Jones, J.P., Miller, K.L., Sudicky, E.A., 2025. A dynamic meshing scheme for integrated hydrologic Modelling to represent evolving landscapes. ***Science of The Total Environment***, 976: 179129. DOI:https://doi.org/10.1016/j.scitotenv.2025.179129

2024

38) Callaghan, M.V., Frey, S.K., Miller, K., **Hwang, H.-T.**, Zolfaghari, R., Hammel, K., Berg, S.J., Sudicky, E.A., 2024. Development of a fully integrated hydrological fate and transport model for plant protection products: incorporating groundwater, tile drainage, and runoff. ***Frontiers in Environmental Science***, 12. DOI:10.3389/fenvs.2024.1505480

37) Chen, X., Yu, Z., Yi, P., Chen, P., **Hwang, H.-T.**, Sudicky, E.A., Simonovic, S.P., 2024. Water sources and threshold behaviors of streamflow generation in a mountain headwater catchment. ***Journal of Hydrology***, 644: 132117. DOI:https://doi.org/10.1016/j.jhydrol.2024.132117

36) **H.-T. Hwang**, S.-W. Jeen, S.-S. Lee, S.-W. Ha, S. J. Berg, S. K. Frey, E. A. Sudicky, K.-K. Lee, Enhancing Reliability in CO2 Leakage Monitoring Networks through K-COSEM Hydrogeological Modeling, ***Science of The Total Environment***, 175256; https://doi.org/10.1016/j.scitotenv.2024.175256

35) J. Kim, **H.-T. Hwang**, J. Lee, W. A. Illman, S.-W. Jeen, Assessment of hydraulic and thermal properties of the Antarctic active layer: Insights from laboratory column experiments and inverse modeling, ***Science of The Total Environment***, 173474; https://doi.org/10.1016/j.scitotenv.2024.173474

34) S. Kim, E. Lee, **H.-T. Hwang**, J. Pyo, D. Yun, S.-S. Baek, and K. H. Cho, A spatiotemporal assessment of groundwater and surface water conditions using deep learning and a physics-based model, ***Water Research X;*** https://doi.org/10.1016/j.wroa.2024.100228

33) X Chen, Z Yu, P Yi, **H.-T. Hwang**, EA Sudicky, T Tang, A Aldahan, Effects of soil heterogeneity and preferential flow on the water flow and isotope transport in an experimental hillslope. ***Science of The Total Environment***, 170548; https://doi.org/10.1016/j.scitotenv.2024.170548

2023

32) E. Lee, H. Lee, D. Park, **H.-T. Hwang (Corresponding Author)**, C. Park, Application of Different Weighting Schemes and Stochastic Simulations to Parameterization Processes Considering Observation Error: Implications for Climate Change Impact Analysis of Integrated Watershed Models. ***Water***, 15(10), 1880; https://doi.org/10.3390/w15101880

31) X. Chen, Z. Yu, P. Yi, A. Aldahan, **H.-T. Hwang**, E. Sudicky, Disentangling runoff generation mechanisms: combining isotope tracing with integrated surface/subsurface simulation. ***Journal of Hydrology***, 129149. doi: https://doi.org/10.1016/j.jhydrol.2023.129149

30) Y.-J. Park, **H.-T. Hwang (Corresponding Author)**, T. Hasegawa, S. Okamoto, T. Ozutsumi, T. Tanaka, Y. Morita, W. Illman, Steady-State Density-Driven Flow and Transport: Pseudo-Transient Parameter Continuation. ***Advances in Water Resources***, 104380. https://doi.org/10.1016/j.advwatres.2023.104380

29) **H.-T. Hwang**, A. R Erler, O. Khader, S. J. Berg, E. A. Sudicky, J. P. Jones, Dynamic Interactions between Surface Water and Groundwater Systems in the Athabasca River Basin, Alberta, Canada. ***Journal of Hydrology-Regional Studies***, 101301. doi:https://doi.org/10.1016/j.ejrh.2022.101301

2022

28) **Hwang, H.-T.**, K.-K. Lee, Evaluation of push–pull tracer tests for estimating groundwater velocity in a fractured-rock aquifer . ***Hydrogeology Journal***, 30, 2171–2182. https://doi.org/10.1007/s10040-022-02546-w

27) **Hwang, H.-T.**, Neupauer, R. M., Jeen, S.-W., Steinmoeller, D. T., Sudicky, E. A., Lee, S.-S., & Lee, K.-K. (2022). Evaluating backward probability model under various hydrogeologic and hydrologic conditions. ***Journal of Contaminant Hydrology***, 103909. doi:https://doi.org/10.1016/j.jconhyd.2021.103909

2021

26) **Hwang, H.-T.**, Jeen, S.-W., Lee, S.-S., Ha, S.-W., Berg, S. J., Miller, K. L., Lee, K.-K. (2021). An adaptive zone-based refinement method for characterizing a highly complex aquifer system model. ***Journal of Hydrology***, 603, 126961. doi:https://doi.org/10.1016/j.jhydrol.2021.126961

25) Frey, S. K., Miller, K., Khader, O., Taylor, A., Morrison, D., Xu, X.,SJ Berg, **H-T Hwang**, EA Sudicky, Lapen, D. R. (2021). Evaluating landscape influences on hydrologic behavior with a fully-integrated groundwater – surface water model. ***Journal of Hydrology***, 602, 126758. doi:https://doi.org/10.1016/j.jhydrol.2021.126758

24) **Hwang, H.-T.**, Lee, E., Berg, S. J., Sudicky, E. A., Kim, Y., Park, D., Park, C. (2021). Estimating anthropogenic effects on a highly-controlled basin with an integrated surface-subsurface model. ***Journal of Hydrology***, 603, 126963. doi:https://doi.org/10.1016/j.jhydrol.2021.126963

23) Xu, S., Frey, S. K., Erler, A. R., Khader, O., Berg, S. J., **Hwang, H.-T.**, . .,Sudicky, E. A. (2021). Investigating groundwater-lake interactions in the Laurentian Great Lakes with a fully-integrated surface water-groundwater model. ***Journal of Hydrology***, 594, 125911. doi:https://doi.org/10.1016/j.jhydrol.2020.125911

2020

22) Y.-J. Park, **H.-T. Hwang**, S. Suzuki, H. Saegusa, K. Nojiri, T. Tanaka, P. Bruines, K. Abumi, Y. Morita, W.A. Illman (2020) Improving precision in regional scale numerical simulations of groundwater flow into underground openings, ***Engineering Geology***, Volume 274, 2020, 105727, ISSN 0013-7952, https://doi.org/10.1016/j.enggeo.2020.105727

21) Jeong, J.; Jeen, S.-W.; **Hwang, H.-T.**; Lee, K.-K. (2020) Changes in Geochemical Composition of Groundwater Due to CO2 Leakage in Various Geological Media, ***Water*** 2020, 12, 2597

20) Jong Heon Ha, Sung-Wook Jeen, **Hyoun-Tae Hwang**, Kang-Kun Lee (2020) Changes in geochemical and carbon isotopic compositions during reactions of CO2-saturated groundwater with aquifer materials, ***International Journal of Greenhouse Gas Control***, Volume 95, 2020, 102961, ISSN 1750-5836, https://doi.org/10.1016/j.ijggc.2020.102961

19) Boko, B.A.; Konaté, M.; Yalo, N.; Berg, S.J.; Erler, A.R.; Bazié, P.; **Hwang, H.-T.**; Seidou, O.; Niandou, A.S.; Schimmel, K.; Sudicky, E.A. (2020) High-Resolution, Integrated Hydrological Modeling of Climate Change Impacts on a Semi-Arid Urban Watershed in Niamey, Niger, ***Water*** 2020, 12, 364

18) Abdou Boko Boubacar, Konaté Moussa, Nicaise Yalo, Steven J. Berg, Andre R. Erler, **Hyoun-Tae Hwang**, Omar Khader, Edward A. Sudicky (2020) Characterization of groundwater – surface water interactions using high resolution integrated 3D hydrological model in semiarid urban watershed of Niamey, Niger, ***Journal of African Earth Sciences***, Volume 162, 2020, 103739, ISSN 1464-343X, https://doi.org/10.1016/j.jafrearsci.2019.103739

17) **Hwang, H.-T.**, Jeen, S.-W., Kaown, D., Lee, S.-S., Sudicky, E. A., Steinmoeller, D., & Lee, K.-K. (2020) Backward Probability Model for Identifying Multiple Contaminant Source Zones Under Transient Variably-Saturated Flow Conditions, ***Water Resources Research***, 55. https://doi.org/10.1029/2019WR025400

2019

16) Chen, J., E. A. Sudicky, J. H. Davison, S. K. Frey, Y. J. Park, **H. T. Hwang**, A. R. Erler, et al. (2019) Towards a Climate-Driven Simulation of Coupled Surface-Subsurface Hydrology at the Continental Scale: A Canadian Example, ***Canadian Water Resources Journal***: 1-17

15) Erler, A. R., S. K. Frey, O. Khader, M. d'Orgeville, Y.-J. Park, **H.-T. Hwang**, D. R. Lapen, W. R. Peltier, and E. A. Sudicky (2019) Evaluating Climate Change Impacts on Soil Moisture and Groundwater Resources Within a Lake-Affected Region, ***Water Resources Research***, 0(0), doi: 10.1029/2018wr023822

14) **Hwang, H.-T.**, Y.-J. Park, S. K. Frey, M. V. Callaghan, S. J. Berg, D. R. Lapen, and E. A. Sudicky (2019) Efficient numerical incorporation of water management operations in integrated hydrosystem models: Application to tile drainage and reservoir operating systems, ***Journal of Hydrology***, 575, 1253-1266, doi: https://doi.org/10.1016/j.jhydrol.2019.03.098

13) **Hwang, H.-T.**, S. K. Frey, Y.-J. Park, K. D. M. Pintar, D. R. Lapen, J. L. Thomas, J. Spoelstra, S. L. Schiff, S. J. Brown, and E. A. Sudicky (2019) Estimating cumulative wastewater treatment plant discharge influences on acesulfame and Escherichia coli in a highly impacted watershed with a fully-integrated modelling approach, ***Water Research***, 157, 647-662, doi: https://doi.org/10.1016/j.watres.2019.03.041

12) Erler, A. R., Frey, S. K., Khader, O., d'Orgeville, M., Park, Y.-J., **Hwang, H.-T.,** et al. (2019) Simulating climate change impacts on surface water resources within a lake-affected region using regional climate projections, ***Water Resources Research***, 55, 130– 155. https://doi.org/10.1029/2018WR024381

11) Berg, S. J., N. R. Grosso, M. P. Sherrier, K. Mudrick, M. Ohr, **H.-T. Hwang**, Y.-J. Park, M. V. Callaghan, S. K. Frey, and E. A. Sudicky (2019) Natural Stimuli Calibration with Fining Direction Regularization in an Integrated Hydrologic Model, ***Groundwater***, 57(1), 21-35, doi: 10.1111/gwat.12842

2018

10) **Hwang, H-T**, Park Y-J, Sudicky EA, Berg SJ, McLaughlin R, Jones JP. (2018) Understanding the water balance paradox in the Athabasca River Basin, Canada, ***Hydrological Processes***. 32:729–746

9) Davison, J. H., **Hwang, H.-T.**, Sudicky, E. A., Mallia, D. V., & Lin, J. C. (2018) Full coupling between the atmosphere, surface, and subsurface for integrated hydrologic simulation, ***Journal of Advances in Modeling Earth Systems***, 10, 43–53

2017

8) **Hwang, H.-T.**, Jeen, S.-W., Suleiman, A.A., Lee, K.-K. (2017) Comparison of Saturated Hydraulic Conductivity Estimated by Three Different Methods, ***Water*** 9, 942

2016 or before

7) Frey, S. K., **H.-T. Hwang**, Y.-J. Park, S. I. Hussain, N. Gottschall, M. Edwards, D. R. Lapen (2016) Dual permeability modeling of tile drain management influences on hydrologic and nutrient transport characteristics in macroporous soil, ***Journal of Hydrology***, 535, 392-406

6) **Hwang, H.-T.**, Y.-J. Park, S. K. Frey, S. J. Berg, E.A. Sudicky (2016) A simple iterative method

for estimating evapotranspiration with integrated surface/subsurface flow models, ***Journal of Hydrology***, 531, Part 3, 949-959

5) Jason H. Davison, **Hyoun-Tae Hwang**, Edward A. Sudicky, John C. Lin (2015) Coupled atmospheric, land surface, and subsurface modeling: Exploring water and energy feedbacks in three-dimensions, ***Advances in Water Resources***, 86, Part A, 73-85

4) **Hwang, Hyoun-Tae**, Sung-Wook Jeen, Edward A. Sudicky, Walter A. Illman (2015) Determination of rate constants and branching ratios for TCE degradation by zero-valent iron using a chain decay multispecies model, ***Journal of Contaminant Hydrology***, 177-178, 43-53

3) **Hwang, Hyoun-Tae**, Young-Jin Park, Edward A. Sudicky, Peter A. Forsyth (2014) A Parallel Computational Framework to Solve Flow and Transport in Integrated Surface-Subsurface Hydrologic Systems, ***Environmental Modelling & Software***, 61 (0), 39-58

2) **Hwang, Hyoun-Tae**, Young-Jin Park, Edward A. Sudicky, Andre J. Unger, Walter A. Illman, Shaun K. Frape, Orfan Shouakar-Stash (2013) A multiphase flow and multispecies reactive transport model for DNAPL-involved Compound Specific Isotope Analysis, ***Advances in Water Resources***, 59, 111-122

1) Edward A. Sudicky, **Hyoun-Tae Hwang**, Walter A. Illman, Yu-Shu Wu, Jan B. Kool, Peter Huyakorn (2013) A Semi-Analytical Solution for Simulating Contaminant Transport Subject to Chain-Decay Reactions, ***Journal of Contaminant Hydrology***, 144(1), 20-45

Patent:

- **Hyoun-Tae Hwang**, Young-Jin Park, Steven J. Berg, Edward A. Sudicky (2018) Method and System for Dynamic Mesh Evolution, ***Patent NO. 62/727728***, USA. US20210333434A1: https://patents.google.com/patent/US20210333434A1/en

Invited Manuscripts Reviews:

Advances in Water Resources, Environmental Earth Sciences, Environmental Modelling & Software, Geosciences Journal, Groundwater, Hydrological Processes, Hydrology and Earth System Sciences, Journal of Contaminant Hydrology, Journal of Hydrology, Water, Water Resources Research

Online Lecture & Public webinar:

Integrated Modelling Lecture (Seoul National University)

- Integrated Surface Water and Groundwater Modelling-Session 01-Introduction (2020) ***Guest Lecture at Seoul National University***
- Integrated Surface Water and Groundwater Modelling-Session 02-HydroGeoSphere-The Basics (2020) ***Guest Lecture at Seoul National University***
- Integrated Surface Water and Groundwater Modelling-Session 03-Module 01 SatFlow&Trans (2020) ***Guest Lecture at Seoul National University***
- Integrated Surface Water and Groundwater Modelling-Session 04-Module 02

VariablySatFlow (2020) ***Guest Lecture at Seoul National University***

Public Webinar

- Athabasca River Basin High-Res Modelling of the Impact of Climate Change (2021) ***Canada's Oil Sands Innovation Alliance (COSIA)***: Information: https://cosia.ca/blog/modelling-impact-climate-change
- Numerical Methods and Parallel Processing (2022) ***Aquanty Webinar***: Information: https://www.aquanty.com/events-calendar/webinar-numerical-methods-parallel-processing

Invited Talks and Conference Presentations:

Invited Talks (last five years)

- Integrated Groundwater–Surface Water Modeling for the Korean Peninsula: Applications to Radioactive Waste Repositories and Nuclear Decommissioning, (2026) Korea Institute of Geoscience and Mineral Resources, Daejeon, South Korea
- Advances in HydroGeoSphere for a Last Decade, (2026) Aquanty Inc., Ontario, Canada
- Integrated Water Resources Modelling: From Theory to Applications, (2026) Glocal Resource Circulation and Environmental Education & Research Group Mini Symposium: Perspectives on the Earth System, Jeonbuk National University, Jeonju, South Korea
- Advancing Digital Twin Modelling through HydroGeoSphere and Machine Learning Integration, (2025) Korea Institute of Geoscience and Mineral Resources, Daejeon, South Korea
- Advances in HydroGeoSphere Over the Last Decade, (2025) Aquanty, Waterloo, Canada
- Peninsula-Scale Integrated Groundwater–Surface Water Modelling for Ecosystem Assessment, (2025) Korea Institute of Geoscience and Mineral Resources, Daejeon, South Korea
- Integrated Surface–Subsurface Modelling for Estimating Contaminant Exchanges under Climate-Change–Induced Extreme Conditions, (2024) Department of Environmental Engineering, Pukyong National University, Busan, South Korea
- Estimating cumulative wastewater treatment plant discharge influences on acesulfame and Escherichia coli in a highly impacted watershed with a fully-integrated modelling approach, (2024) Korea Institute of Geoscience and Mineral Resources, Daejeon, South Korea
- HydroGeoSphere: Bridge Between Science and Engineering (2023) Aquanty, Waterloo, ON, Canada
- Development of Surface-Subsurface Integrated Model for Simulating Groundwater and Chemical Transport in Geum River Basin, Korea, (2022) Korea Institute of Geoscience and Mineral Resources, Daejeon, South Korea
- Numerical Methods and Parallel Processing (2022) Aquanty Webinar, Waterloo, ON, Canada

- Athabasca River Basin High-Res Modelling of the Impact of Climate Change (2021) Canada's Oil Sands Innovation Alliance, Alberta, Canada
- Estimating cumulative wastewater treatment plant discharge influences on acesulfame and Escherichia coli levels with a fully integrated hydrologic model (2020) Department of Environmental Engineering, Pukyong National University, Busan, South Korea

Conference Presentations (last five years)

- **Hyoun-Tae Hwang**, Park, Young-Jin, Berg, Steven, Jones, Jon, Miller, Killian, Sudicky, Edward (2026) Integrated modelling innovations for mining and underground infrastructure: dynamic mesh adaptation and tunnel boundary conditions for surface–groundwater systems, International Mine Water Association conference, Jeongseon, South Korea
- Hyeonju Lee, Eunhee Lee, Dongkyu Park, and **Hyoun-Tae Hwang** (2025) Changes in Groundwater and Surface Water Interactions due to Weir Operation in the Nakdonggang River Basin, Korea, Using an Integrated Hydrological Model, EGU, Vienna, Austria
- Sooyoung Noh, **Hyoun-Tae Hwang**, Hyunkwon Do, Sung-Wook Jeen (2025) Integrated Surface–Subsurface Modeling for Predicting Radioactive Element Transport at a Research Reactor Site, The Korean Society of Soil and Groundwater Environment, Jeju, South Korea
- **Hyoun-Tae Hwang**, Steven Berg (2024) Groundwater–Surface Water Interactions, Session Co-Convener, International Geological Congress 2024, Busan, South Korea.
- **Hyoun-Tae Hwang**, Graham Stonebridge, Killian Miller, HGS-ML Research Projects in 2025-2030, Aquanty Annual Conference, Waterloo, ON, Canada
- Soobin Kim, Eunhee Lee, **Hyoun-Tae Hwang,** Jongcheol Pyo, Daeun Yun, Sang-Soo Baek, and Kyung Hwa Cho (2023) Enhancing Spatiotemporal Simulation of Groundwater and Surface Water Conditions Using Deep Learning and Physics-based Modeling, SWAT conference, Aarhus, Denmark.
- Jeonga Kim, Sung-Wook Jeen, **Hyoun-Tae Hwang**, Jeonghoon Lee (2022) Determination of Soil Hydraulic and Thermal Properties for an Antarctic Area: Column Experiments and Inverse Modeling, AGU Fall Meeting, Chicago, Illinois, USA.
- **Hyoun-Tae Hwang,** Young-Jin Park, Steven J. Berg, Jon P. Jones, Edward A. Sudicky (2021) Dynamic Meshing for Integrated Hydrologic Modelling in Mining, ModFlow and More, Colorado, USA.

Funded Research Projects (last five years):

Dates	Project Title/Funding Institute or Agency/Position
2025 ~ 2027	Basin-scale Algal Bloom Occurrence Modelling/Korea Institute of Geoscience and Mineral Resources (KIGAM)/ **Principal Investigator**
2025 ~ 2027	HydroGeoSphere-Machine Learning Model Development for Real-Time Water Resources Management/Industrial Research Assistance Program National Research Council/ **Principal**

	Investigator
2024 ~ 2029	Nuclear Waste Repository Risk Assessment / Korea Atomic Energy Research Institute/ **Principal Investigator**
2023 ~ 2028	Nuclear Power Plant Dismantlement and Radio Nuclide Contamination Investigation / Korea Atomic Energy Research Institute/ **Principal Investigator**
2020 ~ 2025	Safety Assessment of High-Level Nuclear Waste Repository sites in Japan / Obayashi Inc. & Nuclear/ **Principal Investigator**
2021 ~ 2022	Analysis of backward probability model for contaminant source identification problems / Seoul National University R&DB Foundation & Korea Environmental Industry and Technology Institute / **Principal Investigator**
2019 ~ 2022	Climate Change and Groundwater Sustainability - Numerical simulation of groundwater-surface water interaction and mapping of groundwater dependent ecosystem with different climate change scenarios/ Korea Institute of Geoscience and Mineral Resources (KIGAM)/ **Principal Investigator**
2020 ~ 2021	Understanding surface-subsurface flow mechanisms in the Barton Peninsular, Antarctica/ Jeonbuk National University & Korea Polar Research Institute/ **Principal Investigator**
2019 ~ 2020	Impact of Climate Change on Surface Water and Groundwater Resources in the Athabasca River Basin/ Canada's Oil Sands Innovation Alliance (COSIA)/ **Principal Investigator**
2019 ~ 2020	New HydroGeoSphere feature developments for Nuclear Waste Management and Operations/Nuclear Waste Management Organization (NWMO)/ **Principal Investigator, Developer & Reviewer**
2016 ~ 2020	Carbon Dioxide Capture and Storage/Seoul National University & Korea Environmental Industry and Technology Institute/ **Principal Investigator**
2018 ~ 2020	Development of Dynamic Meshing Scheme for Oil Sands Mining and Geotechnical Operations/Suncor Energy/ **Principal Investigator & Developer**

Software Developments:

Software	**Details**
HydroGeoSphere Utility	Pre- and post-processing datasets for integrated surface/subsurface/atmosphere simulations
Parallel computing simulator	Solving linear and nonlinear equations with parallel computation. Currently, the software is implemented into HydroGeoSphere

Artificial Neural Network for monitoring system	Computing optimized sensor locations and numbers for designing hydrologic/hydrogeologic monitoring network
3D Mesh Generator	Generating meshes using high resolution digital elevation data
3D Fracture Generator	Generating fractures based on the mathematical models
Airy function Calculator	Calculating analytical solutions for solute transport
FEMWELL	Simulating groundwater flow based on well geometry
Sequential Gaussian Simulator	Generating heterogeneous fields based on geostatistical methods
3D Saturated Groundwater Flow and Transport Simulator	Simulating groundwater flow and solute transport using a finite difference method

Technical Skills

- **Programming languages**: FORTRAN, C, C++, Python, MATLAB, R
- **Hydrologic modeling tools**: HydroGeoSphere, MODFLOW, FEFLOW, 3DFEMWATER, 3DLEWASTE, FEMFAT, GMS (RT3D), WRF (basic operations)