

Ruo-Qian (Roger) Wang

RWH 328E, Department of Civil and Environmental Engineering, Rutgers University, 500 Bartholomew Road,
Piscataway, NJ 08854

☎ +1(848)445-4288 | ✉ rq.wang@rutgers.edu | 🏠 www.whirl-lab.com

Education

Massachusetts Institute of Technology (MIT)

PH.D. IN CIVIL AND ENVIRONMENTAL ENGINEERING

Thesis Committee: Eric Adams (Advisor), Heidi Nepf (Chair), Ole Madsen, Roman Stocker, Adrian Law

Cambridge, MA

Sep. 2009 - Jun. 2014

Nanyang Technological University / Stanford University

M.S. IN ENVIRONMENTAL ENGINEERING

Advisors: Adrian Law and Oliver Fringer

Singapore / Stanford, CA

Jun. 2007 - Jul. 2008

Beijing University of Aeronautics and Astronautics

B.S. IN AEROSPACE ENGINEERING

Beijing, China

Sep. 2003 - Jun. 2007

Experience

Rutgers, The State University of New Jersey

ASSISTANT PROFESSOR

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

Piscataway, NJ

Jan. 2019 - Present

University of Dundee

LECTURER IN ENVIRONMENTAL FLUID MECHANICS

SCHOOL OF SCIENCE AND ENGINEERING

Dundee, UK

Aug. 2017 - Dec. 2018

University of California, Berkeley

POSTDOCTORAL SCHOLAR

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

Advisor: Mark Stacey

Berkeley, CA

Feb. 2016 - Jul. 2017

Massachusetts Institute of Technology (MIT)

POSTDOCTORAL ASSOCIATE

DEPARTMENT OF MECHANICAL ENGINEERING

Advisor: Amos Winter

Cambridge, MA

Aug. 2014 - Jan. 2016

Singapore-MIT Alliance for Research and Technology Center (SMART)

RESEARCH ENGINEER

Singapore

Jun. 2008 - Aug. 2009

Publications

PUBLISHED:

- Jia, G., Wang, R. Q., Stacey, M. T., (2019), Investigation of Impact of Shoreline Alteration on Coastal Hydrodynamics using Dimension Reduced Surrogate based Sensitivity Analysis, **Advances in Water Resources**, accepted.
- Wang, R. Q., Mao, H., Wang, Y., Rae, C., Shaw, W., (2018), Hyper-resolution monitoring of urban flooding with social media and crowd-sourcing data, **Computers and Geosciences**, 111(2), 139 - 147.
- Wang, R. Q. , Stacey, M. T., Herdman, L., Hummel, M., Erikson, L., & Barnard, P., (2018), Interdependence of Coastal Protection Infrastructure Projects and the Effects of Sea Level Rise, **Earth's Future**, 6, 677-688.
- Ariza, C., Casado, C., Wang, R. Q., Adams, E. E., Marugán, J. (2018), Comparative evaluation of OpenFOAM and ANSYS Fluent for the modeling of hydrodynamics and mass transport in tubular and annular reactors., **Chem Eng & Technol**, 41, No. 7, 1473-1483.
- Wang, R. Q. , Stacey, M. T., Herdman, L., Hummel, M., Erikson, L., & Barnard, P. (2017), Interactions of Estuarine Shoreline Infrastructure With Multiscale Sea Level Variability, **Journal of Geophysical Research: Oceans**, 122, 9962 - 9979.
- Yin, H. L., Zhao, Z. C., Wang, R. Q., Xu, Z. X., & Li, H. Z.(2017), Determination of urban runoff coefficient using time series inverse modeling, **Journal of Hydrodynamics, Ser. B**, 29(5), 898-901.
- Shamshery, P., Wang, R. Q. , Tran, D. V., & Winter, A. G. (2017), Modeling the future of irrigation: A parametric description of pressure compensating drip irrigation emitter performance, **PloS ONE** 12(4): e0175241.
- Wang, R. Q. , Lin, T., Shamshery, P., & Winter, A. G. (2017), Control of Flow Limitation in Flexible Tubes, **Journal of Mechanical Design**, 139(1), 013401.
- Lai, A. C., Wang, R. Q., Law, A. W. K., & Adams, E. E. (2016). Modeling and experiments of polydisperse particle clouds. **Environmental Fluid Mechanics**, 16, 875-898.
- Yin, H., Xu, Z., Wang, R. Q. , Li, H., & Schwegler, B. R. (2016). Modeling of pollutant removal by powdered activated carbon in a raw water aqueduct. **Journal of Hydro-environment Research**, 11, 16-28.
- Wang, R. Q. , Adams, E. E., Law, A. W. K., & Lai, A. C. (2015). Scaling particle cloud dynamics: from lab to field. **Journal of Hydraulic Engineering**, 141(7), 06015006.
- Wang, R. Q. , Law, A. W. K., & Adams, E. E. (2014). Large-Eddy Simulation (LES) of settling particle cloud dynamics. **International Journal of Multiphase Flow**, 67, 65-75.
- Sappok, A., Wang, Y., Wang, R. Q. , Kamp, C. & Wang, V. (2014). Theoretical and Experimental Analysis of Ash Accumulation and Mobility in Ceramic Exhaust Particulate Filters and Potential for Improved Ash Management. **SAE Int. Journal of Fuels and Lubrication**, 7(2), 511-524.
- Wang, R. Q. , Law, A. W. K., Adams, E. E., & Fringer, O. B. (2011). Large-eddy simulation of starting buoyant jets. **Environmental Fluid Mechanics**, 11(6), 591-609.
- Wang, R. Q. , Law, A. W. K., & Adams, E. E. (2011). Pinch-off and formation number of negatively buoyant jets. **Physics of Fluids**, 23(5), 052101.

Wang, R. Q., Law, A. W. K., Adams, E. E., & Fringer, O. B. (2009). Buoyant formation number of a starting buoyant jet. *Physics of Fluids*, 21(12), 125104.

NON-PEERREVIEWED:

Wang, R. Q., (2018), AI could help us manage natural disasters – but only to an extent, *The Conversation*, <https://theconversation.com/ai-could-help-us-manage-natural-disasters-but-only-to-an-extent-90777>.

Wang, R. Q., (2018), Book Chapter 6: Preprocessing and Chapter 8: Postprocessing in *Computational Fluid Dynamics Applications in Water, Wastewater and Stormwater Treatment*, Editors: Liu, X. and Zhang, J., American Society of Civil Engineering (ASCE).

Wang, R. Q., Lenhart, J., (2017), How EWRI Urban Water Resources Research Council Renewed the Field. *EWRI Currents*, ASCE, Spring, 2017.

Wang, R. Q., (2016), An axisymmetric steady state vortex ring model. *arXiv Fluid Dynamics* arXiv:1601.06414 .

Patent

Wang, R. Q., Winter, A. G., and Joshi, A. (2017), Low-Pressure and Low-Energy Self-Regulating Valve, U.S. Patent No.: WO2017087638 A1, May 26, 2017

Grants

Co-PI. Synthesizing bathymetric and topographic data in the Raritan River basin towards development of hydrodynamic model, The Rutgers Raritan River Consortium Mini-grant, 5/2019, \$8k.

PI. Discovering urban floods using crowdsourcing visual data, Rutgers Research Council, 5/2019, \$3k.

PI. Multi-scale Interaction between Wind Turbines and Coastal Processes: coupling OpenFAST with a regional coupled air-sea modeling system, Rutgers Energy Institute, 4/2019, \$10k.

PI. UK-China International Exchange Research for Numerical Simulation of the Wake of Fish Cages, The Royal Society / Newton Fund, 3/2018, £12k.

PI. The Scottish Alliance for Geoscience, Environment & Society (SAGES) Small Grants Scheme, The SAGES Research & Innovation Committee, 3/2018, £500 (\$700).

PI. The role of morphological uncertainty in predicting the impact of sea-level rise on tidal energy and coastal flooding, Postgraduate and Early Career Researcher Exchanges, Scottish Research Partnership in Engineering (SRPe), 2/2018, £4.7k (\$6.7k).

PI. Sensitivity study of the tidal circulation pattern around Orkney Islands - is there a threshold of chaos?, Short Research Visit, UK Fluids Network, 2/2018, £1k (\$1.4k).

Honors & Awards

2018	Teaching Innovation Award Nomination , School of Science and Engineering, University of Dundee	<i>Dundee, Scotland</i>
2018	Early Career Researcher Bursary , EIMR 2018 conference, The MASTS Marine Renewable Energy Forum	<i>Orkney, Scotland</i>
2018	Roland Schlich Early Career Scientist's Travel Award , European Geosciences Union General Assembly 2018	<i>Vienna, Austria</i>
2018	Travel Award , Cascading hazards workshop: Developing a coastal megacity catchment observatory, Newton Fund Researcher Links programme, British Geological Survey	<i>Hanoi, Vietnam</i>
2016	Travel Award , The 69th Annual Meeting of the American Physical Society - Division of Fluid Dynamics	<i>Portland, OR</i>
2015	Third Place , Postdoc Sharing Their Science (Poster Presentation Competition)	<i>Cambridge, MA</i>
2014	Semi-finalist , \$100K Entrepreneurship Competition	<i>Cambridge, MA</i>
2012	Global Fellow , MIT-Imperial College Global Fellow Program	<i>London, UK</i>
2009	Schoettler Graduate Fellowship , Massachusetts Institute of Technology	<i>Cambridge, MA</i>
2007	SSP Scholarship , Singapore Stanford Partnership	<i>Singapore / Stanford, CA</i>

Media Coverage

*"Twitter + Citizen Science + AI = improved flood data collection", **The Sunday Times, Wall Street Journal, Phys.org, Times of India, Digital Trends, Yahoo News, Communications of Association for Computing Machinery (ACM), University of Dundee News, TreeHugger, etc.** Dec 20, 2017.*

*"Watering the world: new design cuts costs, energy needs for drip irrigation, bringing the systems within reach for more farmers", **Phys.org, MIT News.** Apr 20, 2017.*

*"Re-engineering the sprinkler", **MIT News, Engineering.com, TechXplore.com, Guokr.com, Sohu.com.** Nov 9, 2016.*

Conferences

INVITED KEYNOTE SPEECHES:

Wang, R. Q., *The Imperative for Multi-Level Cooperation in Adapting to Sea-Level Rise: A case study in San Francisco Bay*, **Invited Seminar**, Jan 24, 2019, Multi-stakeholder dialogue and capacity-building partnership event, United Nations Headquarters, New York.

Wang, R. Q., *Optimisation, Sensitivity Analysis and Bio-inspired Design to Hack Energy-food-water Nexus in Developing Countries*, **Invited Seminar**, Dec 20, 2018, University of Glasgow, Glasgow, UK.

Wang, R. Q., *Harnessing the data revolution to boost the model-based decision-making in coastal engineering*, **Invited Seminar**, Nov 15, 2018, Loughborough University, Liverpool, UK.

Wang, R. Q., *Harnessing the data revolution to boost the model-based decision-making in coastal engineering*, **Invited Seminar**, Oct 3, 2018, National Oceanography Centre, Liverpool, UK.

Wang, R. Q., *Big data + Artificial Intelligence + Social Media = Solution to Urban Floods*, **Invited Seminar**, Aug 11, 2018, China Science and Technology Museum, Beijing, China.

Wang, R. Q., *Big Data of Urban Flooding: Dance with Social Media, Citizen Science, and Artificial Intelligence*, **Physical Geography Round Table**, Nov 1, 2017, University of Dundee, Dundee, UK.

Wang, R. Q., *Re-engineering the Dripper and Sprinkler*, **Keynote Speech in Singapore International Energy Week**, Oct 27, 2017. Singapore.

Wang, R. Q., *Data-driven Analysis for Future Water Infrastructure*, **USGS PCMSC seminar**, Spring 2017, Santa Cruz, CA.

SELECTED REFEREED PROCEEDINGS AND PRESENTATIONS:

Wang, R. Q., *Real-time urban flood detection with TensorFlow*, **2019 International Research Committee on Disasters Researchers Meeting**, July 17-18, 2019, Broomfield, CO.

Wang, R. Q., *Social Media Diffusion Pattern Recognition for Flood Hazards using Dimensionality Reduction*, **American Association of Geography Annual Meeting 2019**, April 3-7, 2019, Washington D.C., US.

Wang, R. Q., **Ciantia, M. O.**, and **Zhang, F.**, *GPU based CFD-DEM Simulation of Internal Erosion of Soil under Triaxial Stress Conditions*, **ECCM-ECFD 2018**, June 11-15, 2018, Glasgow, UK.

Wang, R. Q., *Feel the beat of beach: Data-driven analysis of beach stability using Dynamic Mode Decomposition*, **the 8th International Symposium on Environmental Hydraulics**, June 4-7, 2018, Notre Dame, IN, USA.

Wang, R. Q., **Stacey, M. T.**, and **Mitchell, C. P.**, *The impact of sea-level rise and coastal protection construction on the tidal energy of San Francisco Bay*, **Environmental Interactions of Marine Renewable Energy Technologies (EIMR)**, April 24-27, 2018, Kirkwall, Orkney.

Wang, R. Q., **Zhao, Z.**, and **Yin, H.**, *Delineation of Urban Subcatchment by Inverse Modeling*, **World Environmental and Water Resources Congress (EWRI) 2017**, May 21-25, 2017, Sacramento, CA.

Wang, R. Q., **Shamshery, P.** and **Winter, A. G.**, *A Novel Bio-Inspired Pressure Compensating Emitter for Low-Cost Drip Irrigation Systems*, **World Environmental and Water Resources Congress (EWRI) 2016**, pp. 30-36, May 22-26, 2016, West Palm Beach, FL.

Wang, R. Q., **Shamshery, P.**, **Taylor, K.**, and **Winter, A. G.**, *A Novel Bio-inspired Pressure Compensating Emitter for Low-Cost Drip Irrigation Systems*, **26th ICID Euro-Mediterranean Regional Conference and the 66th ICID International Executive Council**, Oct 11-16, 2015, Montpellier, France.

Wang, R. Q., **Law, A. W. K.**, and **Adams, E. E.**, *A Method to Capture Vortex Rings in Starting Particle-Laden Jets*, **7th International Symposium on Environmental Hydraulics**, Jan 7-9, 2014, Singapore.

Wang, R. Q., *Large-Eddy Simulation Study of the Settling Behavior of Sediment Clouds*, **35th International Assoc. of Hydraulic Eng. & Research (IAHR) Biennial Congress**, Sept 8-13, 2013, Chengdu, China.

Wang, R. Q., **Law, A. W. K.**, and **Adams, E. E.**, *Large Eddy Simulation of Starting and Developed Particle-Laden Jets*, **International Conference on Multiphase Flow 2013**, May 26-31, 2013, Jeju, Korea.

Wang, R. Q., Law, A. W. K., Adams, E. E., Zhao, B., Huang, Z., Lai, A. C. H., Experimental and numerical Study of Settling Particle Clouds, Dredging 2012, October 22-25, 2012, San Diego, CA.

Wang, R. Q., Law, A. W. K., Adams, E. E., and Fringer, O. B., The Determination of Formation Number for Starting Buoyant Jets, AIP Conference Proceedings, ISCM II & EPMESC XII, Volume 1233, Issue 1, November 29 - December 3, 2009, Hong Kong.

Wang, R. Q., Law, A. W. K., Adams, E. E., and Fringer, O. B., Large Eddy Simulation of the Starting Buoyant Jets, 33rd International Association of Hydraulic Engineering & Research (IAHR) Biennial Congress, August 9-14, 2009, Vancouver, Canada.

Teaching

Environmental Engineering Analysis Tools & Civil and Environmental Data Analysis

Piscataway, NJ

LECTURER

Spring 2019

Designed and delivered lectures to **13 undergrad students**.

MSc Programme of Marine Hydrodynamics and Ocean Engineering

Dundee, UK

MODULE LEADER

Fall 2018 - Spring 2019

Co-developed the MSc programme and led the module of Numerical Analysis and CFD.

CE31003 Fluid Mechanics

Dundee, UK

MODULE LEADER

Falls 2017, 2018

Designed and delivered lectures on Fluid Mechanics along with Lab sessions to **33 undergrad students**.

A Three-day Short Course for OpenFOAM, Dalian University of Technology

Dalian, China

LECTURER

Oct. 2014

Designed and delivered a three-day workshop on OpenFOAM to **30 graduate students**.

OpenFOAM Style - A Three-day Short Course for OpenFOAM

Singapore

LECTURER

Jan. 2013

Designed and delivered a three-day workshop on OpenFOAM to **40 graduate students and professionals**. Graded homework, led in-class discussion, and organized class practice.

Mentoring:

Master and Undergraduate Theses, University of Dundee

Dundee, UK

SUPERVISOR

2017-present

Supervised three master students and two undergraduate students for theses.

Research Program at Civil and Environmental Eng., UC Berkeley

Berkeley, CA

SUPERVISOR

2016-2017

Supervised two undergraduate and one master students on the project of Chasing Flooding: A Big Data Challenge in Urban Flooding.

Senior Thesis at Mechanical Engineering, MIT

Cambridge, MA

SUPERVISOR

Spring 2015

Supervised a senior student in experiments, data analysis, prototype design, and manufacturing. Published a 118-page thesis.

Academic Services

COMMITTEES:

Program Organizer, *GeoAI and Deep Learning Symposium: Geo-Text Data Analytics, AAG Annual Meeting, Washington DC, 2019.*

Expert, *Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects, United Nations, 2018-present.*

Program Committee, *The First Workshop on GeoAI: AI and Deep Learning for Geographic Knowledge Discovery, 25th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems, 2017.*

Council Member, *EWRI Urban Water Resources Research Council, 2017-present.*

Member, *EWRI Computational Fluid Dynamics Task Committee, 2015-present.*

Secretary and Newsletter Editor, *Chinese American Water Resources Association, 2016-present.*

SESSION CHAIRS:

68th Annual Meeting of the APS Division of Fluid Dynamics, Boston, MA, 11/2015.

The 8th International Conference on Multiphase Flow, Jeju, Korea, 05/2013.

REVIEWERS:

MASTS Small Grants Travel Scheme

Water Resources Research, Computers & Geosciences, Journal of Fluid Mechanics, Physics of Fluids, Journal of Hydro-environment Research, Journal of Hydraulic Engineering, Engineering Applications of Computational Fluid Mechanics, Ocean Engineering, International Journal of Disaster Risk Reduction, Geophysical Journal International, Acta Oceanologica Sinica, Powder Technology, Conference on Ocean Offshore & Arctic Engineering

Memberships

Edinburgh Mathematical Society

Scottish Alliance for Geoscience, Environment & Society (SAGES)

Marine Alliance for Science and Technology for Scotland (MASTS)

European Geosciences Union (EGU)

American Society of Civil Engineers (ASCE)

American Geophysical Union (AGU)

American Association of Geographers (AAG)