

# TARA J. TROY

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## EDUCATION

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<b>Princeton University</b>		
Ph.D.	Civil and Environmental Engineering	2010
<b>Lehigh University</b>		
B.A.	History	2002
B.S.	Civil and Environmental Engineering	2001

## EMPLOYMENT HISTORY

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<b>Assistant Professor</b>		
Lehigh University, Civil and Environmental Engineering		2013-present
<b>Associate Research Scientist</b>		
Columbia University, Columbia Water Center		2012-2013
<b>Earth Institute Postdoctoral Fellow</b>		
Columbia University, Earth Institute		2010-2012
<b>Research Assistant</b>		
Princeton University, Civil and Environmental Engineering		2004-2010
<b>Assistant Instructor</b>		
Princeton University, Civil and Environmental Engineering		Fall 2006 & 2007
<b>Civil Engineer</b>		
Tristate Planning & Engineering, Old Westbury, NY		2002-2004

## TEACHING EXPERIENCE

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<b>Instructor</b>			
CEE 12	Civil Engineering Statistics	Lehigh University	Fall 2016
CEE 320/428	Engineering Hydrology	Lehigh University	Fall 2016
CEE 222	Water Resources Engineering	Lehigh University	Spring 2016
CEE 12	Civil Engineering Statistics	Lehigh University	Fall 2015
CEE 320/428	Engineering Hydrology	Lehigh University	Fall 2015
CEE 398/498	Physical Hydrology	Lehigh University	Spring 2015
CEE 12	Civil Engineering Statistics	Lehigh University	Fall 2014
CEE 398/498	Physical Hydrology	Lehigh University	Spring 2014
<b>Assistant Instructor</b>			
SDev U6240	Environmental Science for Sustainable Development, Hydrology module	Columbia University	Fall 2011 & 2012
CEE 263	Rivers in a Regional Environment	Princeton University	Fall 2006 & 2007

## FELLOWSHIPS, HONORS AND AWARDS

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Excellence in Refereeing	AGU <i>Water Resources Research</i>	2014
ASCE ExCEED Teaching Fellow	American Society of Civil Engineering	2014
DISCCRS VI Symposium Scholar		2011
Earth Institute Postdoctoral Fellowship	The Earth Institute at Columbia University	2010
Nominated for APGA Teaching Award	Princeton University	2008
Gordon Wu Fellow	Princeton University	2004
Honorable Mention	NSF Graduate Research Fellowship	2004
John B. Carson Prize	Lehigh University	2001
Phi Beta Kappa	Lehigh University	2001
Chi Epsilon	Lehigh University	2001
Tau Beta Pi	Lehigh University	1999

## COMPETITIVELY AWARDED RESEARCH FUNDING

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National Science Foundation	2014-2017
“Mesoscale Data Fusion to Map and Model the U.S. Food, Energy, and Water System,” Institutional Lead (Senior Personnel), \$90,060 to Lehigh. PI: B. Ruddell	
National Science Foundation	2014-2017
“WSC-Category 3 Collaborative: America's Water - The Changing Landscape of Risk, Competing Demands and Climate,” Institutional Lead (Senior Personnel), \$79,559 to Lehigh. PI: U. Lall.	
NSF National Socio-Environmental Synthesis Center	2013-2015
“Towards socio-hydrologic synthesis: Modeling the co-evolutionary dynamics of coupled human, water, and ecological systems,” \$90,000. PIs: T.J. Troy, M. Sivapalan, and M. Konar	
The Earth Institute at Columbia University	2011-2012
“Impact of climate variability and urbanization on water storage practices and vector-borne disease incidence: Developing an understanding for risk prediction and response using Delhi, India as context,” \$30,000 PI: S. Perveen, Co-PIs T.J. Troy and I.Pal	

## NON-COMPETITIVE RESEARCH FUNDING

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American International Group (AIG) , then Chartis	2012-2013
“Climate informed global flood risk assessment and updates,” \$300,000. PI: U. Lall, Co-PI: T.J. Troy and N. Devineni	

## INSTITUTIONAL FUNDING

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Undergraduate Laboratory Enhancement Program at Lehigh	2014
“Undergraduate Laboratory Enhancement for Hydraulic Engineering in Civil and Environmental Engineering,” PI, \$89,500. PI: T.J. Troy, Co-PI: M. Suleiman and P. Diplas	

## REFEREED JOURNAL PUBLICATIONS

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24. C.H.R. Lima, U. Lall, **T. Troy**, N. Devineni, 2016: “A hierarchical Bayesian GEV model for improving local and regional flood quantile estimates,” *Journal of Hydrology*, doi 10.1016/j.jhydrol.2016.07.042.
23. M. Konar, T.P. Evans, M. Levy, C.A. Scott, **T.J. Troy**, C.J. Vörösmarty, and M. Sivapalan, 2016: “Water resources sustainability in a globalizing world: who uses the water?” *Hydrological Processes Today*, doi: 10.1002/hyp.10843.
22. Zhang, J., B.S. Felzer, **T.J. Troy**, 2016: “Extreme precipitation drives groundwater recharge: the Northern High Plains Aquifer, central United States, 1950–2010,” *Hydrological Processes*, doi: 10.1002/hyp.10809.
21. Kocaman, A.S., C. Abad, **T.J. Troy**, W.T. Huh, V. Modi, 2016: “A stochastic model for a macroscale hybrid renewable energy system,” *Renewable and Sustainable Energy Reviews*, 54, 688-703.
20. **T.J. Troy**, M. Konar, V. Srinivasan, and S. Thompson, 2015: “Moving sociohydrology forward: A synthesis across studies,” *Hydrology and Earth System Sciences*, 19, 3667-3679.
19. **T.J. Troy**, T.P. Evans, and M. Pavao-Zuckerman, 2015: “Debates-Perspectives on Socio-hydrology: Socio-hydrologic modeling: Tradeoffs, hypothesis testing, and validation,” *Water Resources Research*, 51, doi:10.1002/ 2015WR017046. **Invited**.
18. **T.J. Troy**, C. Kipgen\*, and I. Pal, 2015: “The impact of climate extremes and irrigation on US crop yields,” *Environmental Research Letters*, 10(5), 054013..
17. L. Marston, M. Konar, X. Cai, and **T.J. Troy**, 2015: “Virtual groundwater transfers from overexploited aquifers in the United States,” *Proceedings of the National Academy of Sciences*, 112(28), 8561-8566.
16. Lima, C.H.R., U. Lall, **T.J. Troy**, and N. Devineni, 2015: “A climate informed model for nonstationary flood risk prediction: Application to Negro River at Manaus, Amazonia,” *Journal of Hydrology*, 522, 594-602.
15. Zebiak, S.E., B. Orlove, A.G. Muñoz, C. Vaughan, J. Hansen, **T. Troy**, M.C. Thompson, A. Lustig, S. Garvin, 2015: “Investigating ENSO and Society Relationships,” *WIREs Climate Change*, 6(1), 17-34.
14. Gentine P., **T.J. Troy**, B.R. Lintner, K.L. Findell, 2012: “Scaling in surface hydrology: progress and challenges,” *Journal of Contemporary Water Research & Education*, 147(1), 28-40.
13. M. Pan, A.K. Sahoo, **T.J. Troy**, R.K. Vinukollu, J. Sheffield, and E.F. Wood, 2012: “Multi-source estimation of long-term terrestrial water budgets for major global river basins,” *Journal of Climate*, 25(9), 3191–3206.
12. **Troy, T.J.**, J. Sheffield, and E.F. Wood, 2012: “The role of winter precipitation and temperature on northern Eurasian streamflow trends,” *Journal of Geophysical Research – Atmospheres*, 117(D5), D05131.
11. **Troy, T.J.**, J. Sheffield, and E.F. Wood, 2011: “Estimation of the terrestrial water budget over northern Eurasia through the use of multiple data sources,” *Journal of Climate*, 24(13), 3272–3293.
10. Wood, E.F., J.K. Roundy, **T.J. Troy**, et al., 2011: “Hyper-Resolution Global Land Surface Modeling: Meeting a Grand Challenge for Monitoring Earth's Terrestrial Water,” *Water Resources Research*, 47, W05301.

9. Sahoo, A., M. Pan, **T.J. Troy**, R.K. Vinukollu, J. Sheffield, and E.F. Wood, 2011: Reconciling the global terrestrial water budget using satellite remote sensing," *Remote Sensing of the Environment*, 115(8), 1850–1865.
8. Rawlins, M.A. et al., 2010: "Analysis of the Arctic System for Freshwater Cycle Intensification: Observations and Expectations," *Journal of Climate*, 23(21), 5715–5737.
7. Rennermalm, A., E.F. Wood, and **T.J. Troy**, 2010: "Observed changes in pan-arctic cold-season river discharge," *Climate Dynamics*, 35(6), 923-939.
6. **Troy, T.J.** and E.F. Wood, 2009: "Comparison and evaluation of gridded radiation products across northern Eurasia," *Environmental Research Letters*, 4(4), 045008.
5. Sheffield, J., C.R. Ferguson, **T.J. Troy**, M.F. McCabe, and E.F. Wood, 2009: "Closing the Terrestrial Water Budget from Satellite Remote Sensing," *Geophysical Research Letters*, 36.
4. **Troy, T.J.**, J. Sheffield, and E.F. Wood, 2008: "Effects of temporal and spatial resolution on hydrological model calibration," *Water Resources Research*, 44, W09411.
3. Feng, X., A. Sahoo, K. Arsenault, P. Houser, Y. Luo, and **T.J. Troy**, 2008: "The impact of snow model complexity at three CLPX sites," *Journal of Hydrometeorology*, 9(6), 1464-1481.
2. Wojcik, R., K. Andreadis, M. Tedesco, E. Wood, **T. Troy**, and D. Lettenmaier, 2008: "Multi-model estimation of snow microwave emission during CLPX'03 using operational parameterization of micro-physical snow characteristics," *Journal of Hydrometeorology*, 9(6), 1491-1505.
1. Hayhoe, K., C.P. Wake, T.G. Huntington, L. Luo, M.D. Schwartz, J. Sheffield, E. Wood, B. Anderson, J. Bradbury, A. DeGaetano, **T.J. Troy**, and D. Wolfe, 2007: "Past and future changes in climate and hydrological indicators in the US Northeast," *Climate Dynamics*, 28(4), 381-407.

#### PUBLICATIONS IN REVIEW OR PREPARATION

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\* indicates student supervised

6. X. Li\* and **T.J. Troy**, "The typology of flooding across the continental US," to be submitted to *Water Resources Research* Feb 2017.
5. X. Zhu\* and **T.J. Troy**, "The climatology of climate extremes and their trends in the world's major agricultural regions," to be submitted to *Environmental Research Letters* Jan 2017.
4. **T.J. Troy**, N. Devineni, C.H.R. Lima, and U. Lall, "Flood modeling and issues of scale with the VIC hydrologic model," to be submitted to *Water Resources Research* Jan 2017.
3. X. Li\* and **T.J. Troy**, "The role of climate in determining crop yield gains due to irrigation," to be submitted to *Agricultural and Forest Meteorology* Dec 2016.
2. X. Shi, **T. Troy**, D. Lettenmaier, "Effects of pan-Arctic snow cover and air temperature changes on soil heat content," *The Cryosphere*, in review.
1. C. Samela\*, **T.J. Troy**, S. Manfreda, "Flood Hazard Mapping over Large Regions using Geomorphic Approaches," *Advances in Water Resources*, in review.

#### OTHER PUBLICATIONS

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**T.J. Troy**, 2013: "Wetting the Arctic," *Nature Climate Change*, 3(17), 17-18. Invited.

## INVITED SEMINARS AND PRESENTATIONS

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- Seminar      Forthcoming, Department of Civil and Environmental Engineering, University of Illinois Urbana-Champaign, March 2017.
- Talk & Panel    Thinking about the water-food-climate nexus across the United States, AGU Hydrology Student Workshop, AGU Fall Meeting, San Francisco, CA, December 2016.
- Seminar      Improving knowledge of flood mechanisms and flood risk estimation,” Department of Earth and Environmental Sciences, Lehigh University, October 2016.
- Seminar      Is every flood unique? A typology of flood-generating processes across different river basin sizes, Department of Geology, University of North Carolina, Chapel Hill, March 2016.
- Talk          Characterizing tradeoffs between water and food under different climate regimes across the United States, AGU Fall Meeting, San Francisco, CA, December 2015.
- Seminar      The impact of climate and irrigation on crop yields, School of Natural Resources, University of Nebraska, November 2015.
- Talk          Sociohydrology: The co-evolutionary dynamics of coupled human, water, and ecological systems, Tufts-MIT Water Workshop: Reframing Complex Water Challenges, Cambridge, MA, May 2015.
- Talk          Flooding: The role of drainage area, heavy precipitation, and model resolution, CUAHSI Biennial colloquium, Shepherdstown, WV, July 2014.
- Seminar      Water for Food: Understanding the linkages between climate, water resources, and agriculture, Sigma Xi Lecture, Lehigh University, March 2014.
- Talk          Understanding Scale in Flooding: The role of drainage area, heavy precipitation, and model resolution, AGU Fall Meeting, San Francisco, CA, December 2013.
- Talk          Balancing food and water security in northwest India, Advancing Socio-hydrology, a New Science of People and Water Workshop, University of Illinois, August 2013.
- Talk & Panel    Water in India, League of Women Voters, Connecticut, May 2013.
- Seminar      Climate, land surface hydrology, and human water demands: Examples over northern Eurasia and India,” Department of Environmental Sciences, Rutgers University, April 2012.
- Seminar      Climate, land surface hydrology, and human water demands,” Water sourcing and delivery in an era of climate change speaker series, New York University Wagener School, February 2012.

## CONFERENCE AND WORKSHOP PRESENTATIONS SINCE JOINING LEHIGH

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*\* Refers to a student under my direct supervision. The presenter is the first author unless otherwise noted.*

- T.J. Troy**, A. Ritter\* and E. Williamson\*, Quantifying the impact of human activities on hydrologic signatures, AGU Fall Meeting, San Francisco, CA, December 2016.
- B. Michaelis\* and **T.J. Troy**, Analyzing the Propagation of Human Impacts Through Fluvial Systems Using Computational Model Experimentation, AGU Fall Meeting, San Francisco, CA, December 2016.
- X. Xhu\*, **T.J. Troy**, and N. Devineni, Evaluation of Historical and Projected Agricultural Climate Risk Over the Continental US, AGU Fall Meeting, San Francisco, CA, December 2016.

- X. Li\* and **T.J. Troy**, Assessing the Influence of Climate Variables on the Past Floods in Continental USA, AGU Fall Meeting, San Francisco, CA, December 2016.
- M. Alattar\* and **T.J. Troy**, MODFLOW-OWHM for Simulation and Analysis of the Water Cycle across the United States, AGU Fall Meeting, San Francisco, CA, December 2016.
- U. Lall et al., A Road Map for America's Water for the Next 20 Years, AGU Fall Meeting, San Francisco, CA, December 2016. Invited.
- L. Josset, J.A. Rising, T.A. Russo, **T.J. Troy**, U. Lall, and M. Allaire, How Conjunctive Use of Surface and Ground Water Could Increase Resiliency in US? AGU Fall Meeting, San Francisco, CA, December 2016.
- J.A. Rising, **T.J. Troy**, and U. Lall, A National Water Network for Future Impacts Analysis, AGU Fall Meeting, San Francisco, CA, December 2015.
- N. Devineni and **T.J. Troy**, An integrated statistical-physical modeling approach for multivariate flood risk assessment, AGU Fall Meeting, San Francisco, CA, December 2015.
- X. Zhu\* and **T.J. Troy** (presenter), The climatology of climate extremes in the world's major growing regions, AGU Fall Meeting, San Francisco, CA, December 2015.
- L. Marston, M. Konar, X. Cai, and **T.J. Troy**, Virtual groundwater transfers from overexploited aquifers in the United States, AGU Fall Meeting, San Francisco, CA, December 2015.
- C. Samela\*, **T.J. Troy**, S. Manfreda, A new classifier for flood hazard mapping over large regions, AGU Fall Meeting, San Francisco, CA, December 2015.
- X. Li\* and **T.J. Troy**, The characteristic precipitation and land surface conditions that lead to flooding over different basin sizes, AGU Fall Meeting, San Francisco, CA, December 2015.
- T.J. Troy**, U. Lall, and N. Devineni, Modeling floods in large river basins: Model resolution and storm patterns, AGU Fall Meeting, San Francisco, CA, December 2014.
- X.Li\* and **T.J. Troy**, The impact of climate and its variability on crop yield and irrigation, AGU Fall Meeting San Francisco, CA, December 2014.
- T.J. Troy**, N. Devineni, and U. Lall, Understanding Scale in Flooding: The role of drainage area, heavy precipitation, and model resolution, Amtrak Club Meeting, Lehigh University, Bethlehem, PA, May 2014.
- T.J. Troy**, C. Kipgen, and I. Pal, The impact of climate extremes on US agricultural production and the buffering impacts of irrigation, EGU General Assembly, Vienna, Austria, April 2014.
- Kuil, L., M. Levy, M. Pavao-Zuckerman, G. Penny, C. Scott, V. Srinivasan, S. Thompson, and **T. Troy** (presenter), Syndromes of the global water crisis: Exploring the emergent dynamics through socio-hydrological modeling, EGU General Assembly, Vienna, Austria, April 2014.
- T.J. Troy**, N. Devineni, C. Lima, and U. Lall, Climate-informed flood risk estimation, AGU Fall Meeting, San Francisco, CA, December 2013.

## RESEARCH ADVISING

<u>Student Name</u>	<u>Level</u>	<u>Dates</u>	<u>Placement</u>
Xiuyuan Li	Ph.D. student	7/2015-present	In progress
	Masters student	3/2014-5/2015	
Xiao Zhu	Ph.D. student	9/2014-present	In progress
Mustafa Al-Attar	Ph.D. student	12/2015-present	In progress
Jiaorui Zhang	Masters student	8/2016-present	In progress
Caterina Samela	Visiting Ph.D. student	8/2014-1/2015	Postdoc, U. of Basilicata

Brenden Michaelis	Undergraduate	4/2015-present	In progress
Amber Schrum	Undergraduate	8/2015-present	M.S. program, U. Colorado at Boulder
Amanda Ritter	Undergraduate	2/2016-present	In progress
Casey Urban	Undergraduate	5/2016-present	In progress
Malcolm Scobell	Undergraduate	5/2016-present	In progress
Emma Williamson	Undergraduate	8/2016-present	In progress

## EDITORSHIP

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Guest Editor: Special Issue in *Hydrology and Earth Systems Science/Earth System Dynamics*: “Predictions Under Change: Water, Earth, and Biota in the Anthropocene.” 46 papers. 2013-2015.

## UNIVERSITY SERVICE

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Class of 2017 Environmental Engineering Advising	Spring 2014-present
CEE Search Committee	Fall 2016-present
CEE Undergraduate Curriculum Committee	Fall 2016-present
EES Search Committee	Fall 2015-Spring 2016
CEE Website Committee	Fall 2014-present
Global Citizenship Faculty Advisory Board	Fall 2015-Spring 2016
Data X Innovation Grant Committee (Co-chair)	Fall 2015-Spring 2016
Lehigh’s High School Senior Open House	Fall 2013, 2014, 2015
Engineering 5 Presentation	Fall 2014, 2016
GEWR seminar series organizer	Spring 2014-Spring 2016
CHOICES panel	Spring 2014; Summer 2014, 2015

## PROFESSIONAL SERVICE

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Session Convener:	<i>Socio-Hydrology: The Dynamic Interplay between Water and Human Systems</i> IUGG General Assembly	2015
	<i>Global Floods: Forecasting, Monitoring, Risk Assessment and Socioeconomic Response</i> AGU Fall Meeting	2014
	<i>Sociohydrology: Modeling Feedbacks in Complex Coupled Natural Human Water Systems</i> AGU Fall Meeting	2014
	<i>Global Floods: Satellite Observation, Modeling and Socioeconomic Response</i> AGU Fall Meeting	2013
Committees:	Outstanding Student Paper Award, Hydrology Section	2013-2015
	IAHS Panta Rhei: Socio-hydrologic modeling and synthesis	2015-
	IAHS Panta Rhei: Changes in flood risk	2015-
Membership:	American Geophysical Union	
	American Society of Civil Engineers	
	American Meteorological Society	

Proposal Reviewer:	NSF Graduate Research Fellowship	2015
	NSF Hydrologic Sciences Ad Hoc	2015
	NASA SWOT Panel Reviewer	2015
	NASA Earth Science Fellowships	2014
	Earth Institute Fellows Selection Committee, Columbia University	2013
	DISCCRS Review Panel	2013
Peer Reviewer:	<i>Advances in Water Resources</i>	
	<i>Agricultural and Forest Meteorology</i>	
	<i>Climate Dynamics</i>	
	<i>Climate Research</i>	
	<i>Environmental Research Letters</i>	
	<i>Geophysical Research Letters</i>	
	<i>Hydrology and Earth System Sciences</i>	
	<i>Journal of Geophysical Research – Atmospheres</i>	
	<i>Journal of Hydrology</i>	
	<i>Journal of Hydrometeorology</i>	
	<i>Nature Climate Change</i>	
	<i>Water Resources Research</i>	
	32 Articles in Total	