

David J. Yu

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RESEARCH AREA

I research coupled systems (*engineered-social*, *socio-hydrological*, or *social-ecological*) in which some natural or human-made resources are shared by many and governed through collective choice. I investigate the resilience of these systems in the face of novel change and uncertainty associated with globalization and climate change. I examine how configurations of biophysical and institutional factors shape individual and system-level responses in these systems. I use systems modeling, case study analysis, and behavioral experiments to conduct the research.

PROFESSIONAL EXPERIENCE

Assistant Professor – Tenure-Track (08/2015 ~ Present)

Joint Appointments with the Lyles School of Civil Engineering & Department of Political Science, Purdue University, W. Lafayette, IN

Faculty Associate & Graduate Research Associate (08/2010 ~ 05/2015)

School of Sustainability, Arizona State University, Tempe, AZ

Visiting Research Associate (05/2011 ~ 08/2011)

Ecology Lab, Graduate School of Environmental Studies, Seoul National University, Korea

Advisory Consultant, Samsung SDS, Korea (07/2004 ~ 07/2008)

Co-founder, Entrepreneur, Genops Bioinformatics, Inc., Burnaby, BC, Canada (03/2000 ~ 09/2002)

EDUCATION

Ph.D. in Sustainability Science (2015)

School of Sustainability, Arizona State University, Tempe, AZ

Committee: John M. Anderies (Chair), Marco A. Janssen, Rachata Muneeppeerakul

Master in Public Policy (2010)

Lee Kuan Yew School of Public Policy, National University of Singapore, Singapore

Advisor: Eduardo Araral

Bachelor of Applied Science (2004)

School of Engineering Science, Simon Fraser University, Burnaby, BC, Canada

Exchange student, (KAIST) Korea Advanced Institute of Science & Technology (1998)

PEER-REVIEWED JOURNAL ARTICLES

-----Published or forthcoming-----

Giuliano Di Baldassarre, Murugesu Sivapalan, Maria Rusca, Christophe Cudennec, Margaret Garcia, Heidi Kreibich, Megan Konar, Elena Mondino, Johanna Mård, Saket Pande, Matt Sanderson, Fuqiang Tian, Alberto Viglione, Jing Wei, Yongping Wei, **David J. Yu**, Veena Srinivasan, & Günter Blöschl. Socio-hydrology: Scientific Challenges in Addressing a Societal Grand Challenge. *Water Resources Research* 55.

Feng M, Liu P, Guo S, **Yu DJ**, Cheng L, Yang G, Xie A. 2019. Adapting reservoir operations to the nexus across water supply, power generation, and environment systems: An explanatory tool for policy makers. *Journal of Hydrology*, 574:257–275.

- Konar M, Garcia M, Sanderson MR, **Yu D.J.**, Sivapalan M. 2019. Expanding the Scope and Foundation of Sociohydrology as the Science of Coupled Human-Water Systems. *Water Resources Research* 55(2):874–887.
- ^{*G}Choi J, Naderpajouh N, **Yu DJ**, Hastak M. 2019. Capacity Building for an Infrastructure System in Case of Disaster Using the System's Associated Social and Technical Components. *Journal of Management in Engineering* 35(4):04019013.
- Naderpajouh, N., **D. J. Yu**, D. P. Aldrich, I. Linkov, and J. Matinheikki. 2018. Engineering meets institutions: an interdisciplinary approach to the management of resilience. *Environment Systems and Decisions* 38(3):306–317.
- ^{*G}Chacon-Hurtado, D., K. Gkritza, J. D. Fricker, and **D. J. Yu**. 2018. Exploring the role of worker income and workplace characteristics on the journey to work. *International Journal of Sustainable Transportation* 0(0):1–13.
- ^{*G}Sung, K., H. Jeong, ^GN. Sangwan, and [†]**D. J. Yu**. 2018. Effects of Flood Control Strategies on Flood Resilience Under Sociohydrological Disturbances. *Water Resources Research*, 54(4), 2661–2680, doi:10.1002/2017WR021440.
- ^{*}Ishtiaque, A., ^GN. Sangwan, and [†]**D. J. Yu**. 2017. Robust-yet-fragile nature of partly engineered social-ecological systems : a case study of coastal Bangladesh. *Ecology and Society* 22(3):5. <https://doi.org/10.5751/ES-09186-220305>
- ^{**†}**Yu, D. J.**, ^GN. Sangwan, ^GK. Sung, X. Chen, and V. Merwade. 2017. Incorporating institutions and collective action into a sociohydrological model of flood resilience. *Water Resources Research*, 53, doi:10.1002/2016WR019746.
- ^{**†}**Yu, D. J.**, H. C. Shin, I. Pérez, J. M. Anderies, and M. A. Janssen. 2016. Learning for resilience-based management: Generating hypotheses from a behavioral study. *Global Environmental Change* 37:69–78. doi:10.1016/j.gloenvcha.2016.01.009
- ^{**†}Barnett, A. J., J. A. Baggio, H. C. Shin, **D. J. Yu**, I. Perez-Ibarra, C. Rubiños, U. Brady, E. Ratajczyk, N. Rollins, R. Aggarwal, J. M. Anderies, and M. A. Janssen. 2016. An iterative approach to case study analysis: insights from qualitative analysis of quantitative inconsistencies. *International Journal of the Commons* 10(2):467. doi:10.18352/ijc.632
- ^{**†}Ratajczyk, E., U. Brady, J. A. Baggio, A. J. Barnett, I. Perez-Ibarra, N. Rollins, C. Rubiños, H. C. Shin, **D. J. Yu**, R. Aggarwal, J. M. Anderies, and M. A. Janssen. 2016. Challenges and opportunities in coding the commons: Problems, procedures, and potential solutions in large-N comparative case studies. *International Journal of the Commons* 10(2):440–466. doi:10.18352/ijc.652
- ^{**†}Baggio, J. A., A. J. Barnett, I. Perez-Ibarra, U. Brady, E. Ratajczyk, N. Rollins, C. Rubiños, H. C. Shin, **D. J. Yu**, R. Aggarwal, J. M. Anderies, and M. A. Janssen. 2016. Explaining success and failure in the commons: the configurational nature of Ostrom's institutional design principles. *International Journal of the Commons* 10(2):417. doi:10.18352/ijc.634
- ^{**†}**Yu, D. J.**, M. R. Qubbaj, R. Muneeppeerakul, J. M. Anderies, and R. M. Aggarwal. 2015. Effect of infrastructure design on commons dilemmas in social-ecological system dynamics. *Proceedings of the National Academy of Sciences* 112(43):13207–13212. doi:10.1073/pnas.1410688112
- ^{**†}Perez, I., **D. J. Yu**, M. A. Janssen, and J. M. Anderies. 2015. Social roles and performance of social-ecological systems: evidence from behavioral lab experiments. *Ecology and Society* 20(3):art23. doi:10.5751/ES-07493-200323
- ^{**†}Janssen, M. A., J. M. Anderies, I. Pérez, and **D. J. Yu**. 2015. The effect of information in a behavioral irrigation experiment. *Water Resources and Economics* 12:14–26. doi:10.1016/j.wre.2015.09.001
- ^{**†}**Yu, D. J.**, J. M. Anderies, D. Lee, and I. Perez. 2014. Transformation of resource management institutions under globalization: the case of songgye community forests in South Korea. *Ecology and Society* 19(2):art2. <http://dx.doi.org/10.5751/ES-06135-190202>

^{*†}Araral, E., and **D. J. Yu**. 2013. Comparative water law, policies, and administration in Asia: Evidence from 17 countries. *Water Resources Research* 49(9):5307–5316. doi:10.1002/wrcr.20414

^{*†}Ching, L., and **D. J. Yu**. 2010. Turning the tide: informal institutional change in water reuse. *Water Policy* 12(S1):121. doi:10.2166/wp.2010.117

----- *Under review, revision, or submitted* -----

^{*†}**David J. Yu**, Michael Schoon, ^GJason K. Hawes, Seungyoon Lee, Jeryang Park, P. Suresh C. Rao, Laura Siebeneck, Satish Ukkusuri, Toward general principles for resilience engineering (*under revision for Risk Analysis*).

Hoon C. Shin, **David J. Yu**, ^GSamuel Park, John Anderies, Joshua Abbott, Marco Janssen, T.K. Ahn. How do resource mobility and group size affect institutional arrangements for rule enforcement? Empirical hypotheses about institutional fit (*under review by Ecological Economics*).

Proctor, Caitlin; Lee, Juneseok; **Yu, David J.**; Shah, Amisha; Whelton, Andrew. Scientific and Policy Needs to Address Wildfire Caused Wide-spread Drinking Water Distribution Network Contamination (*under review by Environmental Science & Technology*).

^{*†}**David J. Yu**, Heejun Chang, Taylor Davis, Vicken Hillis, Landon Marston, Woisok Oh, Murugesu Sivapalan, Timothy Waring. From Place-Based Modeling Toward General Theories of Sociohydrology: Lessons from Social-ecological Systems (*under revision for Water Resources Research*).

^{*}Jeong, H., Bhattarai, R., Adamowski, J., Sivapalan, M, **Yu, D.J.** Insights from socio-hydrological modeling to design sustainable wastewater reuse strategies for agriculture at the watershed scale (*under review by Agricultural Water Management*).

Jeong HY, **David J. Yu**, Byung-Cheol Min, and Seokcheon Lee. The Humanitarian Flying Warehouse (*under revision and re-review by Transportation Research Part E: Logistics and Transportation Review*).

Laura Zanotti, L., Ma, Z., Johnson, J., Johnson, D., **Yu, D.J.**, Burnham, M., Carothers, C. Sustainability, Resilience, Adaptation, and Transformation: Synergies and Tensions. Ecology and Society (*under review by Ecology & Society*).

^GChacon-Hurtado, D., L. Losada-Rojas, K. Gkritza, J. Fricker, **D.J. Yu**. Proposed Framework for the Incorporation of Economic Resilience into Transportation Decision Making," has been received by the Journal of Management in Engineering (*under review by Journal of Management in Engineering*).

----- *In progress* -----

^GSamuel Park, **David J. Yu**. et al. Effects of Social Media on Community Disaster Resilience.

^GHawes, J., **D.J. Yu**, Z. Ma. Agent Based Modeling for Exploratory Predictive Analysis of Adaptation Decision Making.

^GPeyman Yousefi, Hanseok Jeong, Rabin Bhattarai, **David J. Yu**, Pranay Ranjan. Human-Drainage Interaction in Agricultural Systems: Effects of Governance and Infrastructure Characteristics.

Heejun Chang, Chang-yu Hong, Samuel Markolf, **David J. Yu**. Extreme flood events and resilience of city infrastructure.

Woisok Oh, Rachata Muneeppeerakul, David J. Yu, et al., Urban flood evacuation in multiple dimensions: integration of structural and nonstructural features and policy dilemma between efficiency and fairness

*: 1st author, †: Corresponding author, ^G: Graduate student

BOOKCHAPTERS & PROFESSIONAL REPORTS

- *Johnson, J., L. Zanotti, D.R., Johnson, Z., Ma, D.J. Yu, A., Kirkham, C., Carothers. 2017. Chapter 1-Interplays of Sustainability, Resilience, Adaptation and Transformation. In book: *Handbook of Sustainability and Social Science Research*, pp.3-25. Springer. DOI10.1007/978-3-319-67122-2_1
- *Yu, D. J, P. S. C. Rao, C.J. Klinkhamer, ^GE. H. Krueger, ^GN. Sangwan, and ^GK. Sung. 2016. Aligning Different Schools of Thought on Resilience of Complex Systems and Networks. IRGC Resource Guide on Resilience. Published by International Risk Governance Council Resource Guide on Resilience.
- *Park, J. and D. J. Yu. 2016. Chapter 5-Modeling Resilience in Ecological Systems. In *Ecological Engineering: Theory and Application*. Seoul, Korea. (In Korean)

PROFESSIONAL ACTIVITIES

Guest co-editor, *Water Resources Research* Special Section - Socio-hydrology: Spatial and Temporal Dynamics of Coupled Human-Water Systems. 2017 (in collaboration with Murugesu Sivapalan, University of Illinois; Megan Konar, University of Illinois; Taikan Oki, University of Tokyo; and Christopher Scott, University of Arizona).

Guest co-editor, *Hydrological Sciences Journal* Special Issue - Advancing socio-hydrology: a synthesis of coupled human–water systems across disciplines. 2018.

Guest co-editor, *ASCE Journal of Management in Engineering* Special Issue - Management of Resilience in Civil Infrastructure Systems: An Interdisciplinary Approach. 2018.

CONFERENCE AND WORKSHOP PRESENTATIONS

- *Yu, D. J., M. R. Qubbaj, R. Muneeppeerakul, J. M. Anderies, and R. M. Aggarwal. 2014. The effect of infrastructure on social-ecological system dynamics: Provision thresholds and asymmetric access. Presented at Workshop on the Ostrom Workshop (Bloomington, IN, June 2014).
- *Yu, D. J., J. M. Anderies, D. Lee, and I. Perez. 2014. Transformation of resource management institutions under globalization: the case of songgye community forests in South Korea. Presented at Workshop on the Ostrom /Workshop (Bloomington, IN, June 2014).
- *Yu, D. J., H. C. Shin, I. Pérez, J. M. Anderies, and M. A. Janssen. 2015. Adaptive management of social-ecological system under uncertainty: Evidence from a behavioral experiment. Presented at 15th Biennial Global Conference International Association for the Study of the Commons (Edmonton, Alberta, May 2015).
- *Yu, D. J., ^GN. Sangwan, ^GK. Sung, X. Chen, and V. Merwade. 2016. Modeling human-flood interactions: Collective action and community resilience. Presented at 2016 AGU Fall Meeting (San Francisco, CA, Dec. 2016).
- ^GSangwan, N., J. Eisma, ^GK. Sung, and D. J. Yu. 2016. A Socio-Hydrological Model of the Voluntary Urban Water Conservation Behavior during Droughts. Presented at 2016 AGU Fall Meeting (San Francisco, CA, Dec. 2016).
- ^GSung, K., D. J. Yu, ^GW. Oh, and ^GN. Sangwan. 2016. Poster: Land Sea Level Difference Impacts on Socio-Hydrological System. Presented at 2016 AGU Fall Meeting (San Francisco, CA, Dec. 2016).

Invited talk & seminars:

- *Yu, D. J. et al. 2017. Updating the principles for building resilience in socio-technical systems. Invited seminar at the Purdue workshop on New Perspectives on Sustainability and Resilience (West Lafayette, IN, March 2017).

- *Yu, D. J., H. C. Shin, I. Pérez, J. M. Anderies, and M. A. Janssen. 2017. A Laboratory Behavioral Experiment for the Study of Socio-Hydrology. Invited seminar at Ven Te Chow Hydrosystems Laboratory Seminar Series at University of Illinois at Urbana-Champaign (Urbana-Champaign, IL, Apr. 2017).
- *Yu, D. J., H. C. Shin, I. Pérez, J. M. Anderies, and M. A. Janssen. 2017. A Behavioral Approach to the Study of Socio-Hydrology. Invited presentation at Japan Geophysics Union (Chiba, Japan, May 2017).
- *Yu, D. J. 2018. Part Designed & Part Self-Organized Nature of Human-Flood System. Invited presentation at the Panta Rhei Symposium on Comparative socio-hydrology of floods, droughts, and water management (Tsinghua University, Beijing, Apr. 2018).
- ^GPark, S., *D.J. Yu. 2018. Effects of Social Media on Community Disaster Resilience. Invited presentation at Asia Resilience Center (Seoul, Korea, Nov. 2018).
- *Yu, D. J., M. R. Qubbaj, R. Muneeppeerakul, J. M. Anderies, and R. M. Aggarwal. 2018. The effect of infrastructure on social-ecological system dynamics. Invited presentation at American Geophysics Union (Washington, D.C., Dec. 2018).
- *Yu, D. J. 2018. Towards a more nuanced approach to capturing the levee and adaptation effects in sociohydrology modeling of human-flood interaction. Invited presentation at American Geophysics Union (Washington, D.C., Dec. 2018).

*: Presenter, ^G: Graduate student

TEACHING EXPERIENCE

Instructor:

POL223-Introduction to Environmental Policy, Purdue University (Spring 2017)
 CE497/POL429/IE490/ME297-It's a Complex World: Addressing Global Challenges (Spring 2017)
 CE497-Community Resilience, Purdue University (Fall 2016, Spring 2018)
 CE598-Dynamics of Social, Ecological, & Technological Systems, Purdue University (Spring 2016, Fall 2018)
 AML100-Intro to Applied Math for the Life and Social Sciences, Arizona State University (Fall 2014)

Teaching Assistant:

AML100-Intro to Applied Math for the Life and Social Sciences, Arizona State University (Fall 2012, Spring 2013)

AWARDS, GRANTS & FELLOWSHIPS

Competitive Funding Acquired for Research & Development:

Funding Source	Year	Amount
Collaborative Grant (PI), National Science Foundation (NSF) CMMI-CIS	2019	\$154,523
Faculty Summer Grant (PI), Purdue Research Foundation, Purdue University	2019	\$12,000
ASPIRE travel grant, Purdue University	2018	\$1,500
Seed Grant (PI), Center for the Environment, Purdue University	2018	\$15,000
Seed Grant (Co-PI), USDA NIFA seed grant	2017	\$70,000
Seed Grant (PI), Center for the Environment, Purdue University	2017	\$20,000
Resilience Engineering Grant (Co-PI), Lloyd's Register Foundation	2017	\$28,778
Purdue Research Foundation Grant, Purdue University	2016	\$29,130
ASPIRE travel grant, Purdue University	2016	\$2,500
Seed Grant (Co-PI), Center for the Environment, Purdue University	2016	\$20,000
Seed Grant (Co-PI), Center for the Environment, Purdue University	2016	\$20,000
Dow Sustainability Post-doctoral Fellowship, Univ. of Michigan at Ann Arbor (declined)	2015	\$108,000
Neely Research Grant, Arizona State University	2014	\$400
Venture Capital Seed Funding for Bioinformatics S/W Development, A Private Investor	2000	\$800,000

Scholarships & Awards:

Source	Year
AGU WRR (Water Resources Research) Editor's Choice Award for Best Papers	2018
Wrigley Fellowship, Arizona State University	2013
Lee Kuan Yew School Scholarship, National University of Singapore (2-Year Scholarship & Stipend)	2008
Dean's Honor Roll, National University of Singapore	2009
Entrance Scholarship, Simon Fraser University	1995

PUBLIC SERVICE

Peer Reviewer: *Water Resources Research, World Development, Ecology & Society, Sustainability Science, International Journal of the Commons, Nature Human Behavior, Nature Sustainability*