

Aaron I. Packman

Contact Information:

Department of Civil and Environmental Engineering
Northwestern University
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Education:

Ph.D. Environmental Engineering and Science, with Minor in Geology California Institute of Technology, Pasadena, California	May, 1997
M.S. Environmental Engineering and Science California Institute of Technology, Pasadena, California	June, 1992
B.S. Mechanical Engineering, with Minor in History, <i>cum laude</i> Washington University, St. Louis, Missouri	June, 1991

Post-Graduate Training:

Microbial Pathogenesis, Northwestern Feinberg School of Medicine	Mar.– Oct., 2007
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Experience:

Northwestern University, Dept. of Civil and Environmental Engineering	
Professor	Sept. 2010 – present
Associate Professor	Sept. 2004 – Aug. 2010
Assistant Professor	Sept. 2000 – Aug. 2004
Drexel University, Dept. of Civil and Architectural Engineering	
Assistant Professor	Nov. 1997 – Aug. 2000
California Institute of Technology, Dept. of Environmental Engineering and Science	
Graduate Research and Teaching Assistant	Sept. 1994 – Sept. 1997
Office of Naval Research Fellow (DOD-NDSEG)	Sept. 1991 – Aug. 1994
McDonnell Douglas Corporation	
Engineering Co-op (alternating terms)	1987 – 1991

Visiting and Affiliate Appointments:

Fulbright Distinguished Chair, Politecnico di Torino, Italy	Jan. – June 2013
Visiting Professor, Pontificia Universidad Católica de Chile	Feb. – Apr., 2008
Visiting Scientist, NIWA Christchurch, New Zealand	Jan. – Mar. 2007
Visiting Professor, Swedish University for Agricultural Sciences (SLU)	Aug. – Sept., 2002 –
2003	
Visiting Professor, Uppsala University, Sweden	Aug. – Sept., 2001
Research Associate, Philadelphia Academy of Natural Sciences	1999 – 2000

Honors and Awards:

Fulbright Distinguished Chair Award	2013
Cole-Higgins Award for Excellence in Advising, Northwestern University	2012
Huber Research Prize, American Society of Civil Engineers	2008
Career Award, National Institutes of Health (NIAID K25)	2006
McCormick Faculty Excellence Award, Northwestern University	2006
Searle Junior Teaching Fellow, Northwestern University	2001-2002
Career Award, National Science Foundation	1999
Department of Defense Graduate Fellowship	1991-1994
Myers Fellowship (full scholarship), Washington University	1987-1991

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Major Professional Service

Editorships

Limnology and Oceanography – Fluids and Environments, Associate Editor (2010 – 2014)

Water Resources Research, Associate Editor (1999 – 2009)

International Journal of Sediment Research, Editorial Board (2003 – present)

Society Leadership:

Consortium of Universities for the Advancement of Hydrologic Science, Board of Directors (2009 – 2012)

International Assoc. for Sediment Water Science, Board of Directors (2005–2014), Vice President (2011–2014)

Organization of Technical Conferences and Workshops:

Northwestern Climate Symposium, The Water-Energy-Climate Nexus, October 2016

NSF Critical Zone Observatory program: Microbial ecology intercomparison with cyberinfrastructure-enabled data synthesis, November 2015

NAISE Water-Energy Workshop, February 2015

12th International Symposium on Interactions between Sediment and Water, Scientific Committee, Dartington, UK, June 2011

NSF Hydrologic Synthesis Summer Institute, Director, Vancouver, June-August, 2010

NSF Hydrologic Synthesis Meeting, Water Cycle Dynamics in a Changing Environment, Evanston, Feb., 2008

AGU Spring Meeting / NABS Joint Assembly, Organizing Committee, New Orleans, May 2005

Journal Special Issues Organized and Edited:

JGR Biogeosciences and *JGR Earth Surface*: Joint special issue “Linking physical, chemical, and biological processes in watersheds from the cellular and grain scales to the landscape scale,” 2012-2013.

Freshwater Sciences: Special issue “Groundwater and Surface-Groundwater Interactions,” 2013-2014.

Participation in Technical Committees:

University of California, Irvine/NSF, PIRE: Low Energy Options for Making Water from Wastewater, advisory board (2016 – present)

University of Pennsylvania/NIEHS, Penn Superfund Research and Training Program Center, advisory board (2015 – present)

IAHS Working Group on Aquatic Biogeochemistry over Catchment, Regional and Global scales under Natural and Human-induced Changes (2014 – present)

NSF, Sediment Experimentalist Research Coordination Network, advisory committee (2013 – present)

NSF Earthcube, BiG CZ software system for integration and analysis of bio- and geo-science data in the critical zone, advisory committee (2013 – present)

CUAHSI, Northwestern Representative (2002 – present)

ASCE, Task Committee on Pathogens in Wet Weather Flows (2008 – 2014)

ASCE, Task Committee on Contaminated Sediments, Chair (2002 – 2005)

ASCE, Environmental Hydraulics Committee (2001 – 2008)

ASCE, Sedimentation Committee (2000 – 2008)

AGU, Water Quality Committee (1999 – 2010)

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Research

Research Interests:

My research focuses on water, sediments, and microbiota, with particular emphasis on the basic processes that control interfacial dynamics in aquatic systems and the coupling of physical transport processes with biological and biogeochemical processes. I seek to define critical structure-transport-transformation relationships in dynamic environments such as rivers and surface-attached microbial communities (biofilms). My work is highly collaborative and encompasses fluid mechanics, particle transport and morphodynamics, aquatic chemistry, and microbiology. Important applications include benthic microbial ecology, nutrient and carbon cycling, contaminant transport and water quality, ecosystem degradation and restoration, waterborne disease transmission, and control of biofilms in human infection and engineered water systems.

Research Funding:

Current Research Projects:

NSF:

INSPIRE Track 1: Earthcasting fluvial systems: Physical, ecological, and biogeochemical dynamics, A.I. Packman, EAR-1344280, \$1,000,000, 2013 – 2017.

Role of interfacial turbulence in hyporheic exchange and fine particle dynamics, A.I. Packman (collaborative research with J. Best, M. Garcia, and K. Christensen at UIUC), EAR-1215898, \$511,223 total project budget. \$263,759 at NU, 2012 – 2016.

EarthCube IA: Advancing biogeoscience community standards and cyberinfrastructure via Critical Zone domain engagement in synthesis science, A.I. Packman (collaborative research with Emma Aronson at Univ. California Riverside, and Emilio Mayorga at Univ. Washington), ICER-1540938, \$792,831 total project budget. \$99,836 at NU, 2015 – 2017.

EAGER: FEW: Life cycle comparison of water, energy, nutrient, and carbon requirements of urban and conventional food production strategies, A.I. Packman and E. Masanet, \$260,000, EAR-1541891, 2015 – 2017.

NIH:

Metabolic heterogeneity and antibiotic susceptibility in biofilms, A.I. Packman, D. Chopp, and M. Parsek, \$1,870,420, NIH/NIAID R01AI081983, R56AI081983, 2010 – 2016.

DOD:

Physically-based tempered fractional-order operators for efficient multiscale simulations, ARO W911NF-15-1-0569, A.I. Packman, \$481,684, 2015 – 2019.

Publications

Cover Articles, Publication Highlights and Awards

Editor's Highlight, *Applied and Environmental Microbiology*, "Biomining and particle deposition distinctively mediate biofilm susceptibility to chlorine," Vol. 82, No. 10, 2016.

Editor's Highlight, *Applied and Environmental Microbiology*, "Spatial patterns of carbonate biomining in biofilms," Vol. 81, No. 21, 2015.

Editor's Highlight, *Water Resources Research*, "Agricultural chemical export dynamics in a watershed," Vol. 47, art. no. W00J02, 2011.

Editor's Highlight, *Geophysical Research Letters*, "Particle deposition and clogging: Microstudies of colloids moving through pore spaces," Vol. 34, No. 18, 2007.

Cover Image, *Geophysical Research Letters*, "Tomographic images of colloidal zirconia deposits within a porous medium composed of glass beads," Vol. 34, No. 18, 2007.

Editor's Highlight, *Geophysical Research Letters*, "Particle deposition and clogging: Microstudies of colloids moving through pore spaces," Vol. 34, No. 18, 2007.

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Editor's Highlight, *Geophysical Research Letters*, "Fractal topography and groundwater flow," Vol. 34, No. 7, 2007.

Cover Image, *Applied and Environmental Microbiology*, "Retention of *Cryptosporidium parvum* oocysts in a *Pseudomonas aeruginosa* biofilm resolved by confocal microscopy," Vol. 72, No. 9, 2006.

Editor's Highlight, *Geophysical Research Letters*, "Using surface topography to predict groundwater flow patterns," Vol. 33, No. 7, 2006.

Work Featured in Popular Press and Congressional Briefs

<p style="padding-left:22px; text-indent:-22px">Engineering News, "Symposium Looks to Israel as a Role Model for Water Sustainability," Amanda Morris, May 19, 2016, www.mccormick.northwestern.edu/news/articles/2016/05/symposium-looks-to-israel-as-role-model-for-water-sustainability.html </p>

<p style="padding-left:22px; text-indent:-22px">Northwestern University News, "Water Sustainability Symposium to Examine Solutions for Middle East," Fritz T. Burgher, May 16, 2016, www.northwestern.edu/newscenter/stories/2016/05/water-sustainability-symposium.html </p>

<p style="padding-left:22px; text-indent:-22px">North by Northwestern, "New research center aims to alleviate global water crisis," Isabella Jiao, April 4, 2016, www.northbynorthwestern.com/story/new-research-center-aims-to-alleviate-global-water </p>

<p style="padding-left:22px; text-indent:-22px">The Daily Northwestern, "New center to facilitate collaborations for research on water," Peter Kotecki, March 31, 2016, dailynorthwestern.com/2016/03/31/campus/new-center-to-facilitate-collaborations-for-research-on-water </p>

<p style="padding-left:22px; text-indent:-22px">Water & Wastes Digest Magazine, "Launch of Chicago's "Current" partnership will drive innovation," March 30, 2016, www.wwdmag.com/launch-chicagos-current-partnership-will-drive-innovation </p>

<p style="padding-left:22px; text-indent:-22px">Chicago Tribune, "New group wants to open flow of water research in Chicago," Ally Marotti, March 28, 2016, www.chicagotribune.com/bluesky/originals/ct-world-business-chicago-launches-current-bsi-20160328-story.html </p>

<p style="padding-left:22px; text-indent:-22px">World Business Chicago, "Mayor Emanuel and regional partners launch joint effort to address international water challenges," March 28, 2016, www.worldbusinesschicago.com/current-initiative-to-address-water-challenges </p>

<p style="padding-left:22px; text-indent:-22px">Northwestern University News, "Water sustainability is focus of new research center: Researchers will develop innovative global solutions to regional water problems," Megan Fellman, March 28, 2016, www.northwestern.edu/newscenter/stories/2016/03/water-sustainability-research-center.html </p>

<p style="padding-left:22px; text-indent:-22px">Co.exist, "The White House doesn't want audacious water goals, it wants hundreds of water projects," Charles Fishman, March 25, 2016, www.fastcoexist.com/3058288/the-white-house-doesnt-want-audacious-water-goals-it-wants-hundreds-of-water-projects </p>

<p style="padding-left:22px; text-indent:-22px">The White House, Office of the Press Secretary, "Fact sheet: Working Together to Build a Sustainable Water Future," March 22, 2016, www.whitehouse.gov/the-press-office/2016/03/22/fact-sheet-working-together-build-sustainable-water-future </p>

<p style="padding-left:22px; text-indent:-22px">The Nature Conservancy, "Technology revolutionizes storm water study at Indian Boundary Prairies," March 9, 2016, www.nature.org/ourinitiatives/regions/northamerica/unitedstates/illinois/explore/storm-water-study-at-indian-boundary-prairies.xml </p>

<p style="padding-left:22px; text-indent:-22px">Chicago Council on Science and Technology, Public presentation and panel discussion, "Water: Chicago in the 21st Century and Beyond," Feb. 12, 2015. www.c2st.org/event/2015/02/water-chicago-21st-century-and-beyond, Viewable at www.youtube.com/watch?v=n6t7JCUsvk </p>

<p style="padding-left:22px; text-indent:-22px">WTTW Chicago Tonight (live television), "Water: Chicago in the 21st Century and Beyond," Feb. 11, 2015. Viewable at chicagotonight.wttw.com/2015/02/11/water-chicago-21st-century-and-beyond </p>

<p style="padding-left:22px; text-indent:-22px">Chicago Tribune, "Will County failed to follow through on dumpsite complaints," Geoff Ziezulewicz, Jan. 11, 2015. </p>

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- <p style="padding-left:22px; text-indent:-22px">Water Environment Federation Stormwater Report, "EWRI releases report on pathogens in urban stormwater systems," Oct. 28, 2014, stormwater.wef.org/2014/10/ewri-releases-report-pathogens-urban-stormwater-systems/ </p>
- <p style="padding-left:22px; text-indent:-22px">Voice of America, "Study: Mississippi River overwhelmed by agricultural chemicals," G. Flakus, May 22, 2014 </p>
- <p style="padding-left:22px; text-indent:-22px">NSF News from the Field, "Predicting changing river landscapes," April 30, 2014, nsf.gov/news/news_summ.jsp?cntn_id=131297 </p>
- <p style="padding-left:22px; text-indent:-22px">Reno News and Review, "Real scientists on climate change," D. Myers, June 14, 2012. </p>
- <p style="padding-left:22px; text-indent:-22px">McCormick News, "Engineers for a Sustainable World students conduct water research in Chile," Sep. 19, 2011, www.mccormick.northwestern.edu/news/articles/article_967.html. </p>
- <p style="padding-left:22px; text-indent:-22px">McCormick News, "Engineers for a Sustainable World builds ram pumps in Philippines," Dec. 6, 2010, www.mccormick.northwestern.edu/news/articles/article_799.html. </p>
- <p style="padding-left:22px; text-indent:-22px">El Mercurio (Santiago, Chile), "El arsénico y el boro no dejan florecer al Valle de Lluta," (Arsenic and boron prevent the Lluta River valley from blooming), July 21, 2009. </p>
- <p style="padding-left:22px; text-indent:-22px">McCormick Magazine, "To Chile's deserts, mountains, and snow to see how arsenic flows," E. Ashford, Spring 2009. </p>
- <p style="padding-left:22px; text-indent:-22px">American Geophysical Union, Image of the week, "Micro-scale imaging of particle deposits helps to predict the evolution of sedimentary systems," April, 2008. </p>
- <p style="padding-left:22px; text-indent:-22px">The Journal of Young Investigators, "Carbon cycle in the rivers; a drop from the ocean," M. Ziadh, Vol. 3, No. 18, March, 2008. </p>
- <p style="padding-left:22px; text-indent:-22px">The New Nation, "Studying rivers for clues to global carbon cycle," T. Munna, February 25, 2008. </p>
- <p style="padding-left:22px; text-indent:-22px">AboutMyPlanet.com, "Rivers – The missing pieces of global carbon cycle," P. Sequeira, February 23, 2008. </p>
- <p style="padding-left:22px; text-indent:-22px">New Energy and Fuel, "A look at another carbon cycle sink," February 13, 2008 </p>
- <p style="padding-left:22px; text-indent:-22px">Science Daily, "Rivers form larger component of global carbon cycling than previously thought", February 12, 2008. </p>
- <p style="padding-left:22px; text-indent:-22px">The Assam Chronicle, "Rivers contribute much more to global carbon cycling than previously believed," February 11, 2008. </p>
- <p style="padding-left:22px; text-indent:-22px">Terra Daily, "Studying rivers for clues to global carbon cycle," February 11, 2008. </p>
- <p style="padding-left:22px; text-indent:-22px">Asia News International (ANI news service), "Carbon processing in rivers is a bigger component of global carbon cycling than previously believed" February 10, 2008. </p>
- <p style="padding-left:22px; text-indent:-22px">SooToday.com, "What rivers can teach us about climate change," R. McGee, February 9, 2008 </p>
- <p style="padding-left:22px; text-indent:-22px">Digital Journal, "Rivers studied for clues to global carbon cycle," B. Ewing, February 8, 2008. </p>
- <p style="padding-left:22px; text-indent:-22px">Bio-Medicine, "Studying rivers for clues to global carbon cycle," February 8, 2008. </p>
- <p style="padding-left:22px; text-indent:-22px">Chicago Tribune, "Great Lakes key front in water wars," T. Jones, October 28, 2007 (Front page). </p>
- <p style="padding-left:22px; text-indent:-22px">Northwestern Centerpiece, "Imaging of colloidal deposits in granular porous media by x-ray difference micro-tomography." Vol. 7, No. 1, Fall 2007. </p>

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<p style="padding-left:22px; text-indent:-22px">Congressional Brief, "Migration of zoonotic pathogens in aquatic systems," USDA, March, 2007. </p>

<p style="padding-left:22px; text-indent:-22px">McCormick by Design, "Legionnaire's Disease: McCormick, Feinberg join the fight," Fall 2006. </p>

Publication summary and citation information:

Peer-reviewed publications: 90 (including book chapters). Total publications: 102.

Citation statistics (January 2016):

H-index: 34, i10-index: 63 (based on Google Scholar),

Total citations: ~3,700. Average citations per peer reviewed publication: ~43.

Invited Commentaries and Articles in Popular Press:

1. Packman, A.I., 2013, Building bacterial bridges, *Nature Geoscience*, 6, 682-683, DOI:10.1038/ngeo1938.
2. Wuebbles, D., and Packman, A., June 6 2012, Extraordinary extremes: Climate scientists explain our crazy weather, *Chicago Tribune*.

Book chapters:

1. Medina, M.A., Doneker, R.L., Grosso, N., Johns, D.M., Lung, W., Mohsen, M.F.N., Packman, A.I., and Roberts, P.J. 2004, Surface water-ground water interactions and modeling applications. In *Contaminated Ground Water and Sediment: Modeling for Management and Remediation*, C.C. Chien, M.A. Medina, Jr., G.F.Pinder, D.D. Reible, B.E. Sleep; and C. Zheng (eds.), CRC Press, 1-62.
2. Packman, A.I., and Bencala, K.E. 2000, Modeling methods in the study of surface-subsurface hydrologic interactions, in *Streams and Ground Waters*, J.B. Jones and P.J. Mulholland (eds.), Academic Press, 45-80.

Forthcoming papers:

1. Xie, M., Gaillard, J.F., Packman, A.I., Hydrodynamic forcing mobilizes Cu in low-permeability estuarine sediments, *Environmental Science and Technology*, in press.
2. Roche, K.R., Aubeneau, A., Xie, M., Aquino, T., Bolster, D., Packman, A.I., Bioturbation causes anomalous mixing in freshwater sediments, *Environmental Science and Technology*, in review.
3. Roche, K.R., Drummond, J.D., Boano, F., Packman, A.I., Battin, T.J., Hunter, W.R., Benthic biofilm controls on fine particle dynamics in streams, *Water Resources Research*, Special Issue: Emergent aquatic carbon-nutrient dynamics as products of hydrological, biogeochemical, and ecological interactions, in review.
4. Drummond, J.D., Harvey, J.W., Larsen, L.G., González-Pinzón, R., Packman, A.I., Fine particle retention within stream storage areas at baseflow and in response to a storm event, *Water Resources Research*, in review.
5. Biomineralization regulates the formation of *Proteus mirabilis* and *Pseudomonas aeruginosa* dual-species biofilms, by Li, X. Lu, N., Brady, H., Packman, A.I., *FEMS Microbiology Ecology*, in review.

Papers published in peer-reviewed journals:

1. <p style="padding-left:22px; text-indent:-22px">Li, X. Chopp, D.L., Russin, W.A., Brannon, P.T., Parsek, M.R., and Packman, A.I., 2016, *In situ* biomineralization and particle deposition distinctively mediate biofilm susceptibility to chlorine, *Applied and Environmental Microbiology*, 82(10), DOI:10.1128/AEM.03954-15. [Editor's highlighted article]</p>
2. <p style="padding-left:22px; text-indent:-22px">Battin, T.J., Besemer, K., Bengtsson, M., Romani, A., Packman, A.I., 2016, The ecology and biogeochemistry of stream biofilms, *Nature Reviews Microbiology*, 14(4), 251-263, DOI:10.1038/nrmicro.2016.15</p>

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3. <p style="padding-left:22px; text-indent:-22px">Li, X., Lu, N., Brady, H.R., and Packman, A.I., 2016, Ureolytic biomineralization reduces *Proteus mirabilis* biofilm susceptibility to ciprofloxacin, *Antimicrobial Agents and Chemotherapy*, DOI:10.1128/AAC.00203-16.</p>
4. <p style="padding-left:22px; text-indent:-22px">Aubeneau, A.F., Martin R.L., Jerolmack D.J., and Packman, A.I., 2015, Fractal patterns in riverbed morphology produce fractal scaling of water storage times, *Geophysical Research Letters*, 42(13), 5309–5315, DOI:10.1002/2015GL064155</p>
5. <p style="padding-left:22px; text-indent:-22px">Culotti, A., and Packman, A.I., 2015, *Pseudomonas aeruginosa* facilitates *Campylobacter jejuni* growth in biofilms under oxic flow conditions, *FEMS Microbiology Ecology*, 91(12), DOI:10.1093/femsec/fiv136</p>
6. <p style="padding-left:22px; text-indent:-22px">Stonedahl, S.H., Roche, K.R., Stonedahl, F., and Packman, A.I., 2015, Visualizing hyporheic flow through bedforms using dye experiments and simulation, *Journal of Visualized Experiments*, 105, e53285, DOI:10.3791/53285</p>
7. <p style="padding-left:22px; text-indent:-22px">Li, X. Chopp, D.L., Russin, W.A., Brannon, P.T., Parsek, M.R., Packman, A.I., 2015, Spatial patterns of carbonate biomineralization in biofilms, *Applied and Environmental Microbiology*, 81, 7403–7410, DOI:10.1128/AEM.01585-15. [Editor’s highlighted article]</p>
8. <p style="padding-left:22px; text-indent:-22px">Drummond, J.D., Davies-Colley, R.J.; Stott, R., Sukias, J.P., Nagels, J.W., Sharp, A., and Packman, A.I., 2015, Microbial transport, retention, and inactivation in streams – a combined experimental and stochastic modeling approach, *Environmental Science and Technology*, 49(13), 7825–7833, DOI:10.1021/acs.est.5b01414</p>
9. <p style="padding-left:22px; text-indent:-22px">Xie, M., Jarrett, B.A., Cadoux, C., Fetters, K.J., Burton Jr., G.A., Gaillard, J-F, Packman, A.I., 2015, Coupled effects of hydrodynamics and biogeochemistry on the mobility and bioavailability of Zn in highly contaminated sediments, *Environmental Science and Technology*, 49(9), 5346–5353, DOI:10.1021/acs.est.5b00416</p>
10. <p style="padding-left:22px; text-indent:-22px">Li, X., Song, J.L., Culotti A., Zhang, W., Chopp, D.L. Packman, A.I., 2015, Methods for characterizing the co-development of biofilm and habitat heterogeneity, *Journal of Visualized Experiments*, (97), e52602, DOI:10.3791/52602</p>
11. <p style="padding-left:22px; text-indent:-22px">Aubeneau, A.F., Drummond, J.D., Schumer, R., Bolster, D., Tank, J.L., Packman, A.I., 2015, Effects of benthic and hyporheic reactive transport on breakthrough curves, *Freshwater Science*, 34(1), 301-315, DOI:10.1086/680037</p>
12. <p style="padding-left:22px; text-indent:-22px">Larned, S.T., Gooseff, M.N, Packman, A.I., Rugel, K., and Wondzell, S.M., 2015, Surface water-groundwater interactions: Current research directions, *Freshwater Science*, 34(1), 92-98, DOI:10.1086/679491</p>
13. <p style="padding-left:22px; text-indent:-22px">Fan, Y., Richard, S., Bristol, S., Peters, S., Ingebritsen, S., Moosdorf, N., Packman, A., Gleeson, T., Zaslavsky, I., Peckham, S., Murdoch, L. Fienen, M., Cardiff, M., Tarboton, D., Jones, N., Hooper, R., Arrigo, J., Gochis, D., Olson, J., Wolock, D., 2015, DigitalCrust: A 4D data system of material properties for transforming research on crustal fluid flow, *Geofluids*, 15(1-2), 372-379, DOI:10.1111/gfl.12114</p>
14. <p style="padding-left:22px; text-indent:-22px">Drummond, J. D., Davies-Colley, R. J., Stott, R., Sukias, J. P., Nagels, J. W., Sharp, A., Packman, A.I., 2014, Retention and remobilization dynamics of fine particles and microorganisms in pastoral streams, *Water Research*, 66, 459-472, DOI:10.1016/j.watres.2014.08.025</p>
15. <p style="padding-left:22px; text-indent:-22px">Culotti, A.C., Packman, A.I., 2014, *Pseudomonas aeruginosa* promotes *Escherichia coli* biofilm formation in nutrient-limited medium, *PLOS One*, 9(9):e107186. DOI:10.1371/journal.pone.0107186</p>
16. <p style="padding-left:22px; text-indent:-22px">Boano, F., Harvey, J.W., Marion, A., Packman, A.I., Revelli, R., Ridolfi, L., and Wörman, A, 2014, Hyporheic flow and transport processes: Mechanisms, models, and biogeochemical implications, *Reviews of Geophysics*, 52, DOI:10.1002/2012RG000417</p>

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17. <p style="padding-left:22px; text-indent:-22px">Drummond, J.D., Aubeneau, A.F., Packman, A.I., 2014, Stochastic modeling of fine particle dynamics in rivers, *Water Resources Research*, 50(5), 4341–4356, DOI:10.1002/2013WR014665</p>
18. <p style="padding-left:22px; text-indent:-22px">Kelly, J.J., Minalt, N., Culotti, A., Pryor, M. and Packman, A., 2014, Temporal variations in the abundance and composition of biofilm communities colonizing drinking water distribution pipes, *PLoS One*, 9(5): e98542. DOI:10.1371/journal.pone.0098542</p>
19. <p style="padding-left:22px; text-indent:-22px">Song, J.L., Au, K.H., Huynh, K.T., Zhang, W., Packman, A.I., 2013, Biofilm responses to smooth flow fields and chemical gradients in novel microfluidic flow cells, *Biotechnology and Bioengineering*, 111(3), 597-607. </p>
20. <p style="padding-left:22px; text-indent:-22px">Stonedahl, S.H., Harvey, J.W., and Packman, A.I., 2013, Interactions between hyporheic flow produced by stream meanders, bars, and dunes, *Water Resources Research*, 9, 5450–5461, DOI:10.1002/wrcr.20400</p>
21. <p style="padding-left:22px; text-indent:-22px">Shogan, B., Smith, D., Packman, A., Kelley, S., Landon, E., Bhangar, S., Vora, G., Jones, R., Keegan, K., Stephens, B., Ramos, T., Kirkup, B., Levin, H., Rosenthal, M., Foxman, B., Chang, E., Siegel, J., Cobey, S., An, G., Alverdy, J., Olsiewski, P., Martin, M., Marrs, R., Hernandez, M., Christley, S., Morowitz, M., Weber, S. The Hospital Microbiome Project: Meeting Report for the 2nd Hospital Microbiome Project, Chicago, USA, January 15th, 2013. Standards in Genomic Sciences, North America, 8, Jul. 2013. Available at: <http://www.standardsingenomics.org/index.php/sigen/article/view/sigs.4187859/946></p>
22. <p style="padding-left:22px; text-indent:-22px">Tseng, B.S., Zhang, W., Quach, T.P., Harrison, J.J., Song, J.L., Chopp, D.L., Packman, A.I., Parsek, M.R., 2013, The extracellular matrix protects *Pseudomonas aeruginosa* biofilms by limiting the penetration of tobramycin, *Environmental Microbiology*, 15(10), 2865-2878, DOI:10.1111/1462-2920.12155</p>
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Patents

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Presentations

Presentation Awards

The Peter Gilbert Award for Excellence in Innovation and Biofilm Control, A.I. Packman, W. Zhang, T. Sileika, Y. Liu, and C. Chen, Interplay between environmental gradients and biofilm growth, 5th ASM Conference on Biofilms, 2009.

Keynote and Plenary Presentations:

Summer Institute on Sustainability and Energy, Chicago, August, 2016.

ISSM Ninth International Symposium on Subsurface Microbiology, Pacific Grove, California, October, 2014.

XXVII Nordic Hydrological Conference - Nordic Water 2012, Oulu, Finland, August, 2012.

Sixth International Symposium on Ecohydraulics, Christchurch, New Zealand, February, 2007.

Second Iowa Workshop on Large Rivers, Contaminated Sediments: Fate and Transport, Lucille A. Carver Mississippi Riverside Environmental Research Station, Fairport, Iowa, October 2004.

Kerner von Marilaun Workshop: Long Term Development in Fluvial Ecology, Nov. 2003.

Gordon Conference on Permeable Sediments, Bates College, Lewiston, Maine, June 2003.

Savannah River Site Workshop, Department of Energy, Office of Science, March 2003.

AWRA Specialty Conference, Water Quality Monitoring and Modeling, San Antonio, April 2001.

Invited Presentations:

The Nature Conservancy, Urban Conservation Retreat, Chicago, May 2016

International Conference on Hydro-Biogeochemical Processes, Coupling, and Impact, Wuhan, October 2015.

Tsinghua University, Department of Hydraulic Engineering, October 2015.

Helmholtz Center for Environmental Research – UFZ, Leipzig, June 2015.

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HypoTrain Marie Curie ITN, Leibniz Institute of Freshwater Ecology and Inland Fisheries – IGB, Berlin, June 2015.

Society for Freshwater Sciences Annual Meeting, Milwaukee, May 2015.

University of California, Davis, March 2015.

Argonne National Laboratory, February 2015.

University of Pennsylvania, January 2015.

M. Gordon Wolman Seminar, Johns Hopkins University, January 2015.

Royal Institute of Technology (KTH), Sweden, September 2014.

Virginia Tech, September 2014.

Joint Aquatic Sciences Meeting, Portland, May 2014.

AGU Fall Meeting, San Francisco, December 2013.

CIESS Distinguished Speaker, University of Texas, October 2013.

International Workshop on Observation and Modeling of Ecohydrological Processes in Inland River Basins, Beijing, July, 2013.

Digital Crust: A Joint NSF EarthCube and USGS Powell Synthesis Center Workshop, Jan. 2013.

AGU Fall Meeting, San Francisco, December 2012.

University of Notre Dame, Department of Civil & Environmental Engineering & Earth Sciences, October 2012.

University of Illinois, Department of Civil and Environmental Engineering, August 2012.

Ecotoxicity Technical Advisory Panel, July 2012.

Workshop on the Physics of Bacterial Communities, Nieuwland Lectureship Series, University of Notre Dame and Argonne National Laboratory, June 2012.

University of Illinois-Chicago, Urban Water Infrastructure, Policy, and Infectious Diseases Seminar Series, March 2012.

3rd Workshop on stochastic transport and emergent scaling in earth-surface processes, Lake Tahoe, Oct. 2011.

EGU General Assembly, Vienna, April 2011.

AGU Fall Meeting, San Francisco, December 2010.

Illinois Science and Technology Leadership Seminar Series (presentation to Illinois congressional delegation and science committee staff), Washington, D.C., October, 2010.

ASLO/NABS Joint Meeting, Santa Fe, June 2010.

AGU Fall Meeting, San Francisco, December 2009.

AGU-CGU Joint Assembly, Toronto, May 2009.

Washington University, Department of Energy, Environmental and Chemical Engineering, February 2009.

University of Washington, Department of Microbiology, August, 2008.

Technical Meeting on Sediment Conclusion Testing, EU REACH program, Copenhagen, Denmark, June, 2008.

Universidad Tarapacá de Arica, Faculty of Sciences, Arica, Chile, April, 2008.

Pontificia Universidad Católica de Chile, Department of Hydraulic and Environmental Engineering, Santiago, Chile, March, 2008.

University of Nevada-Reno, Hydrologic Sciences Program, February, 2008.

Workshop on Stochastic Transport and Emergent Scaling in Earth-surface Processes, Lake Tahoe, Nov. 2007.

Universidad de Chile, Department of Hydraulic and Environmental Engineering, Santiago, Chile, June 2007.

Stanford University, Department of Civil and Environmental Engineering, March 2007.

New Zealand National Institute of Water and Atmospheric Research (NIWA), National Centre for Water Resources, Christchurch, New Zealand, January 2007.

Geological Society of America, Annual Meeting, Philadelphia, Pennsylvania, October 2006.

University of Illinois, Department of Civil and Environmental Engineering, October 2006.

University of California, Davis, Department of Land, Air, and Water Resources, May 2006.

Massachusetts Institute of Technology, Department of Civil and Environmental Engineering, April 2006.

Tsinghua University, Department of Hydraulic Engineering, Beijing, China, March 2006.

Southwest Jiaotong University, School of Civil Engineering and School of Environmental Science and Engineering, Chengdu, China, March 2006.

University of Notre Dame, Department of Civil Engineering and Geological Sciences, March 2006.

Pontificia Universidad Católica de Chile, Department of Hydraulic and Environmental Engineering, Santiago, Chile, October 2005.

Geological Society of America, Annual Meeting, Salt Lake City, October 2005.

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UNESCO Workshop on Groundwater-Surface Water Interactions and Nutrient Behavior in River Corridors, University of Oxford, UK, September 2005.
AGU-NABS Joint Assembly, New Orleans, May 2005.
University of Arizona, Department of Hydrology and Water Resources, February 2005
Oregon State University, University Hydrology Seminar Series, April 2003.
5th International Conference on Hydrosience and Engineering, Warsaw, Poland, September 2002.
Swedish University for Agricultural Sciences (SLU), Dept. of Biometry and Informatics, September 2002.
U.S.-Chinese Joint Workshop on Sediment Transport and Environmental Studies, Milwaukee, July 2002.
AGU Spring Meeting, Washington, D.C., May 2002.
University of Wisconsin, Environmental Chemistry and Technology Program, February 2002.
Uppsala University, Sweden, Department of Earth Sciences, September 2001.
EPA National Exposure Research Lab, Athens, Georgia, June 2001.
Georgia Institute of Technology, School of Civil and Environmental Engineering, October 2000.
DuPont Workshop on Modeling and Management of Emerging Environmental Issues, July 2000.
University of Arizona, Department of Hydrology and Water Resources, March 2000.
Purdue University, School of Civil Engineering, March 2000.
Northwestern University, Department of Civil and Environmental Engineering, February 2000.
University of Texas, Department of Civil Engineering, February 2000.
Temple University, Department of Geology, February 2000.
DuPont Corporate Remediation Group, Wilmington, November 1999.
University of Delaware, Department of Geology, October 1999.
University of Colorado, Dept. of Civil, Environmental, and Architectural Engineering, April 1999
U.S. Geological Survey, Trenton District Office, September 1997.

Conference Presentations (last two years):

Effects of in-stream mixing on carbon photo-mineralization of dissolved organic carbon in arctic rivers, A. Li, A. Aubeneau, T. King, R. Cory, B. Neilson, G. Kling, D. Bolster, A. Packman, CSDMS - SEN Annual Meeting: Capturing Climate Change, Boulder, May, 2016.
Coupled effects of hyporheic flow structure and metabolic pattern on reach-scale nutrient uptake, A. Li, A. Aubeneau, D. Bolster, J. Tank, A. Packman, AGU Fall meeting, San Francisco, December, 2015.
Fractal patterns in riverbed morphology produce fractal scaling of water storage times, A. Aubeneau, R. Martin, D. Bolster, R. Schumer, D. Jerolmack, A. Packman, AGU Fall meeting, San Francisco, December, 2015.
Benthic biofilm structure controls the deposition-resuspension dynamics of fine clay particles, W. Hunter, K. Roche, J. Drummond, F. Boano, A. Packman, T. Battin, AGU Fall meeting, San Francisco, December, 2015.
Barriers and potential solutions for Critical Zone data integration between environmental genomics and the geosciences, E. Aronson, F. Meyer, A. Packman, E. Mayorga, AGU Fall meeting, San Francisco, December, 2015.
Turbulent hyporheic exchange in permeable sediments, K. Roche, A. Aubeneau, A. Li, and A. Packman, AGU Fall meeting, San Francisco, December, 2015.
Microbial indicators, pathogens, and antibiotic resistance in groundwater impacted by animal farming: Field scale to basin scale, T. Harter, X. Li, E.R. Atwill, A. Packman, AGU Fall meeting, San Francisco, December, 2015.
Influence of depth on enhancing biofilm extraction from aquifers through in-situ sonication, K. Huynh, A. Inglis, J. Webber, L. Weaver, P. Abraham, A. Packman, M. Close, AGU Fall meeting, San Francisco, December, 2015.
Turbulent hyporheic exchange in permeable sediments, K. Roche and A. Packman, SFS Annual Meeting, Milwaukee, May 2015.
Stochastic modeling of carbon photo-mineralization along arctic rivers, A. Li, A. Aubeneau, T. King, R. Cory, B. Neilson, G. Kling, D. Bolster, A. Packman, SFS Annual Meeting, Milwaukee, May 2015.
Quantification of the bioturbation activity of *Lumbriculus variegatus* worms in freshwater contaminated sediments, L. Hernandez, K. Roche, M. Xie, A. Packman, SFS Annual Meeting, Milwaukee, May 2015.
Combined effects of hyporheic metabolism & porewater flow on reach-scale nutrient uptake: Do conservative tracers capture distributions of hyporheic metabolism? A. Packman, A. Li, A. Aubeneau, SFS Annual Meeting, Milwaukee, May 2015.

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- Transport dynamics of dissolved and particulate nutrients in response to wood additions within an agriculturally impacted stream, J. Drummond, A. Wright-Stow, P. Franklin, J. Quinn, A. Packman, SFS Annual Meeting, Milwaukee, May 2015.
- Biofilm complexity controls fine particle dynamics in streams, K. Roche, W. Hunter, J. Drummond, T. Battin, F. Boano, A. Packman, AGU Fall Meeting, San Francisco, Dec. 2014.
- Stochastic modeling of carbon photo-mineralization along arctic rivers, A. Li, A. Aubeneau, T. King, R. Cory, B. Neilson, G. Kling, D. Bolster, A. Packman, AGU Fall Meeting, San Francisco, Dec. 2014.
- Hot “spoments” in river networks (Invited), A. Aubeneau, T. Aquino, D. Bolster, J. Tank, A. Packman, AGU Fall Meeting, San Francisco, Dec. 2014.
- Impacts of wood additions on dissolved and particulate nutrient retention in an agriculturally impacted stream: A multi-tracer injection study at Whatawhata, New Zealand, J. Drummond, A. Wright-Stow, J. Nagels, J. Quinn, P. Franklin, A. Packman, AGU Fall Meeting, San Francisco, Dec. 2014.
- DigitalCrust – A 4D framework to organize our knowledge of crustal properties (Invited), Y. Fan, S. Richard, S. Bristol, S. Peters, I. Zaslavsky, N. Moosdorf, S. Ingebritsen, A. Packman, T. Gleeson, R. Hooper, AGU Fall Meeting, San Francisco, Dec. 2014.
- Measuring spatial and temporal heterogeneity of dissolved oxygen in streambed sediments using pressure sensitive paint (PSP), K. Huynh, A. Salus, M. Xie, K. Roche, A. Packman, AGU Fall Meeting, San Francisco, Dec. 2014.
- Quantification of the bioturbation activity of *Lumbriculus variegatus* worms using fluorescent particulate tracers, L. Hernandez-Gonzalez, K. Roche, M. Xie, A. Packman, AGU Fall Meeting, San Francisco, Dec. 2014.
- Hyporheic flow in coarse gravel beds: A laboratory investigation, H. Wu, C. Zuniga Zamalloa, G. Blois, J. Best, K. Christensen, M. Garcia, A. Packman, AGU Fall Meeting, San Francisco, Dec. 2014.
- The community-driven BiG CZ software system for integration and analysis of bio- and geoscience data in the critical zone, A. Aufdenkampe, E. Mayorga, J. Horsburgh, K. Lehnert, I. Zaslavsky, D. Valentine, S. Richard, R. Cheetham, F. Meyer, C. Henry, G. Berg-Cross, A. Packman, E. Aronson, AGU Fall Meeting, San Francisco, Dec. 2014.
- Ecological connectivity between surface and groundwater systems (Invited), A.I. Packman, J.D. Drummond, A.F. Aubeneau, R. Davies-Colley, Ninth International Symposium on Subsurface Microbiology, Pacific Grove, October 2014.
- Effects of resuspension on speciation and mobilization of zinc in sediments, M. Xie, B.A. Jarrett, C. Cadoux, J.-F. Gaillard, A.I. Packman, Synchrotron Environmental Science-VI, Argonne, Aug. 2014.
- Upscaling of carbon and nutrient dynamics in rivers (Invited), A.I. Packman, J.D. Drummond, A.F. Aubeneau, Joint Aquatic Sciences Meeting, Portland, May 2014.
- Microbial transport dynamics in streams: Accumulation and transmission (Invited), J.D. Drummond, A.I. Packman, A.F. Aubeneau, R. Davies-Colley, R. Stott, Joint Aquatic Sciences Meeting, Portland, May 2014.
- Retention, survival and growth of *E. coli* and *C. jejuni* in dual-species biofilms with *P. aeruginosa* under nutrient-limited conditions, A. Culotti, A.I. Packman, Biofilms 6, Vienna, May 2014.
- Spatial patterns of carbonate biomineralization in biofilms, X. Li, D.L. Chopp, W.A. Russin, P.T. Brannon, A.I. Packman, Biofilms 6, Vienna, May 2014.
- Microbial and organic fine particle transport dynamics in streams – a combined experimental and stochastic modeling approach, J.D. Drummond, A. I. Packman, A.F. Aubeneau, R. Davies-Colley, R. Stott, J. Sukias, J. Nagels, A. Sharp, EGU General Assembly, Vienna, Apr. 2014.
- Retention, survival and growth of *E. coli* and *C. jejuni* in dual-species biofilms with *P. aeruginosa* under nutrient-limited conditions, A. Culotti, A.I. Packman, Watercon 2014, Illinois Section AWWA and Illinois Water Environment Association, Springfield, Mar. 2014.
- Visualizing groundwater flow with pressure sensitive paints, K. Huynh and A.I. Packman, Watercon 2014, Illinois Section AWWA and Illinois Water Environment Association, Springfield, Mar. 2014.

Teaching and Mentoring

Courses Taught at Northwestern University:

GEN ENG 205-2 Engineering Analysis II (Freshman Level)

CIV ENV 260 Fundamentals of Environmental Engineering (Sophomore Level)

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CIV ENV 261 Environmental Engineering Analysis (Junior Level)
CIV ENV 395 Water in Israel and the Middle East (Undergraduate/Graduate)
CIV ENV 440 Environmental Transport Processes (Graduate)
CIV ENV 448 Biophysicochemical Processes in Environmental Systems (Graduate)
CIV ENV 516 Seminar in Environmental Engineering (Graduate)

Courses Taught at Drexel University:

tDEC 100 Freshman Seminar
CIVE 340 Municipal Water Facilities (Junior Level)
CIVE 360 Water Quality (Junior Level)
CIVE 430 Introduction to Hydrology (Junior/Senior Level)
CIVE 767 Surface Water Mixing Processes (Graduate)
CIVE 768 Sediment and Contaminant Transport (Graduate)

Short Courses:

Surface-groundwater Interactions, Politecnico di Torino, May 7 – 24, 2013.

Solute transport and nutrient dynamics from the cellular scale to the river network scale, NSF Hydrologic Synthesis Summer Institute, University of British Columbia, June 24 – August 10, 2010.

Harmful algal blooms in rivers: Invasion and blooming behavior of *Didymosphenia geminata*, NSF Hydrologic Synthesis Summer Institute, University of British Columbia, June 24 – August 10, 2010.

Environmental Transport Processes: Physical phenomena and biogeochemical dynamics in fluvial systems, Pontificia Universidad Católica de Chile, March 6 – 28, 2008.

Research and Thesis Supervision:

Current Graduate students (5 Ph.D., 1 M.S.):

L. Hernández-Gonzales, Ph.D. in Civil and Environmental Engineering, Nutrient, carbon, sediment, and microbial dynamics in urban agriculture and biodiversity preserves.

K. Roche, Ph.D. in Civil and Environmental Engineering, Turbulent coupling between free-surface flows and porewaters.

M. Xie, Ph.D. in Civil and Environmental Engineering, Contaminant transport processes in sediments.

X. Li, Ph.D. in Civil and Environmental Engineering, Coupling between fluid flow, solute transport, and biofilm architecture.

A. Li, Ph.D. in Civil and Environmental Engineering, Stochastic modeling of carbon dynamics in rivers.

D. Duan, M.S. in Civil and Environmental Engineering, Turbulent flow-boundary interactions with obstructions on porous beds.

Former Graduate students (12 Ph.D., 10 M.S.):

Northwestern University:

J. Drummond (Ph.D. in Chemical and Biological Engineering, 2015), Fine particle transport and retention in streams: Particulate organic carbon dynamics and pathogen transmission.

K.-F. Chen (M.S. in Biotechnology, 2015), Spatial patterns of aerobic and anaerobic metabolism in biofilms.

A. Culotti (Ph.D. in Civil and Environmental Engineering, 2014), Environmental biofilms: A reservoir for pathogens in water distribution systems.

J. Song (Ph.D. in Chemical and Biological Engineering, 2014), Spatiotemporal patterns of biofilm growth, fluid flow and particle retention in *Pseudomonas aeruginosa* biofilms.

K. Huynh, (B.S. in Environmental Engineering with honors thesis / M.S. in Mechanical Engineering, 2014), Visualizing dissolved oxygen concentrations on submerged surfaces using pressure-sensitive paint.

A. Aubeneau (Ph.D. in Civil and Environmental Engineering, 2013), Surface-groundwater mixing in rivers.

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N. Chiangwong (M.S. in Civil and Environmental Engineering, 2013, co-advised with David Chopp), Image processing and analysis of 3D biofilm data.

A. Iyer, (M.S. in Biotechnology, 2013), Microbial community metabolic efficiency under flow complexity.

A. Ambekar, (M.S. in Biotechnology, 2013), Linking biomineralization and community metabolism in *Proteus mirabilis* catheter biofilm infections.

S. Stonedahl (Ph.D. in Civil and Environmental Engineering, 2011), Investigation of the effect of multiple scales of topography on hyporheic exchange.

W. Zhang (Ph.D. in Civil and Environmental Engineering, 2011), Biofilm heterogeneity and flow-biofilm interactions investigated using a novel planar flow cell.

S. Waller (Ph.D. in Civil and Environmental Engineering, 2011, co-advised with Martina Hausner), Assessing biofilms in drinking water distribution systems.

M. Barnes (M.S. in Biotechnology, 2009, co-advised with Nicholas Cianciotto), Persistence and survival of *Legionella pneumophila* in biofilms.

C. Chen (Ph.D. in Civil and Environmental Engineering, 2008, co-advised with Jean-François Gaillard), Pore-scale investigation of colloid deposition, changing pore geometry, fluid flow, and solute transport in porous media.

R. Rajbanshi (M.S. in Civil and Environmental Engineering, 2008), Imaging fine particle interactions with bacterial biofilms in flow cells.

J. Miceli (M.S. in Civil and Environmental Engineering and Masters of Project Management, 2006), Biofilm growth in cooling towers.

L. Marx (B.S./M.S. in Civil and Environmental Engineering, 2006), Deposition, retention, and resuspension of fine particles in benthic biofilms.

K. Searcy (Ph.D. in Civil and Environmental Engineering, 2005), Transport of *Cryptosporidium parvum* in surface waters: Interactions with suspended sediments, bed sediments, and biofilms.

M. Salehin (Ph.D. in Civil and Environmental Engineering, 2004), Hydrodynamics of hyporheic exchange for complex natural streambed topography, channel geometry, and sediment structure.

J. Ren (Ph.D. in Civil and Environmental Engineering, 2003), Exchange of adsorbing contaminants between streams and streambeds in the presence of colloidal particles.

Drexel University:

R. Ryan (Ph.D. in Environmental Engineering, 2004), The impact of urbanization on the transient storage characteristics, phosphorus uptake dynamics and community metabolism of Valley Creek.

J. MacKay (B.S./M.S. in Civil Engineering, 2001). Linking stream-subsurface interactions, streambed structure, and fine particle dynamics in rivers.

Post-Doctoral Researchers (7):

J. Drummond (2015-present), Stochastic modeling of river-groundwater interactions.

N. Lv (2014-present), Biofilm formation and onset of antimicrobial susceptibility in early-stage biofilms.

W. Zhang (2011-2013), Relationships between environmental heterogeneity and biofilm heterogeneity.

S. Waller (2011), Microarray analysis of microbial communities in drinking water distribution biofilms.

Y. Liu (2007-2008), Biofilm adhesion, growth, and control on industrial and environmental surfaces.

B. Lau (2005-2007), Association of *Cryptosporidium parvum* with benthic biofilms.

S. Arnon (2004-2006), Pore water fluxes, periphyton structure, and denitrification in streams and wetlands.

Visiting Scholars (13):

M. Boehm (Bucknell University, 2015), Monitoring of water, carbon, and nutrients in urban agriculture

L. Hernández-Gonzales (University of Puerto Rico at Mayagüez, 2014), Porewater exchange of nutrients and contaminants

Y. Bai (Southwest Jiaotong University, Chengdu, China, 2012 – 2014), Coupling between pore fluid flow and carbonate precipitation/dissolution

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- C. Vidali (Politecnico di Torino, 2013), Biogeochemical dynamics and clogging in river bedforms (Laurea thesis)
- A. Vega (Loyola Marymount University, 2013), Contaminant fluxes in sediments
- Q. Le (Tokyo Institute of Technology, 2013), Nutrient interactions with suspended sediments and biofilms
- M. Xie (Southwest Jiaotong University, Chengdu, China, 2011 – 2013), Physical, chemical, and biological factors influencing contaminant fluxes and bioavailability in sediments.
- D. Peng (Southwest Jiaotong Univ., 2008 – 2010), Arsenic distributions in sediments of the rivers of northern Chile.
- F. Boano (Politecnico di Torino, 2006), A continuous-time random walk model for solute transport in rivers.
- G. Singer (Univ. Vienna, 2005), Relating morphological heterogeneity to microbial heterogeneity in streambeds.
- D. Giuliani (Univ. Padova, 2003), Solute transport in structured streambeds (Laurea thesis).
- M. Zaramella (Univ. Padova, 2001), Theoretical evaluation of the principal parameters of the transient storage model for hyporheic exchange (Laurea thesis).
- D. Jerolmack (MIT, 2001), Physicochemical processes in turbidity currents.

Undergraduate Research Supervised (36):

Northwestern University:

B. Bizrat, A. Acosta, H. Brady, C. MacArthur, T. Sevilla (2014-2015), M. Baker (2012-2015), K. Huynh (2012-2014), Z. Allen (2014), R. Scholes (2013-2014), D. Russman (2012-2014), M. Wagner (2012-2013), E. Zhuang (2012-2013), B. Gibbons (2011-2013), A. Salus (2010-2013), K. Au (2011-2013), P. House (2011-2012), K. Tsang (2011), K. Simonson (2010-2011), A. Cheema (2011), E. Herberg (2008-2011), M. El Natour (2008-2010), G. Kim (2008-2010), L. Rossi (2008-2010), J. Chhun (2008-2009), A. Rahman (2008-2009), K. Ruehlow (2008-2009), T. Sileika (2007-2009), L. MacDonald (2007-2008), M. Pakula (2007-2008), A. Jones (2007), J. Kessler (2006), L. Marx (2004-2005), K. Rehg (2002-2003), L. Pigion (2003), M. Paradis (2002).

Drexel University:

D. Jerolmack (1999-2000), J. MacKay (1999-2000).

Student Awards Supervised:

L. Hernandez Gonzalez, NSF Graduate Research Fellowship, 2016, Multifunctional green infrastructure for urban water management, biodiversity conservation, and food production.

L. Hernandez Gonzalez, The Nature Conservancy, “Meet the researcher who is leading the storm water study at Indian Boundary Prairies,” www.nature.org/ourinitiatives/regions/northamerica/unitedstates/illinois/explore/meet-researcher-liliana-m-hernandez-gonzalez.xml

K. Roche, A. Aubeneau, A. Li, and A. Packman, Outstanding Student Paper Award, AGU Fall meeting, San Francisco, December, 2015. Turbulent hyporheic exchange in permeable sediments.

J.D. Drummond, Fulbright Fellowship for research at Centre d'Estudis Avançats de Blanes, Spain, 2014.

K. Roche, CUAHSI Pathfinder Fellowship, The response of benthic (river bottom) and hyporheic biofilms to varying hydrodynamic conditions, for collaborative research at WasserCluster Lunz and the University of Vienna, Austria, 2014.

K. Huynh and A.I. Packman, Best Poster and Best Overall Presentation for Math, Computer Sciences, Engineering, and Physics. Chicago-Area Undergraduate Research Symposium, April 2014, Visualizing groundwater flow and oxygen distributions with pressure sensitive paints.

A. Culotti and A.I. Packman, Student Presentation Award: Best Student Presentation, Watercon 2014, Illinois Section AWWA and Illinois Water Environment Association, Springfield, Mar. 2014. Retention, survival and growth of *E. coli* and *C. jejuni* in dual-species biofilms with *P. aeruginosa* under nutrient-limited conditions.

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K. Huynh and A.I. Packman, Student Presentation Award, Watercon 2014, Illinois Section AWWA and Illinois Water Environment Association, Springfield, Mar. 2014, Visualizing groundwater flow with pressure sensitive paints.

K. Roche, NSF Graduate Research Fellowship, 2013, Role of turbulence in oxygen and nutrient availability in benthic biofilms.

A.C. Culotti, A.I. Packman, and W. Zhang, Student Presentation Award, Canadian Water Network workshop: Assessing pathogen fate, transport and risk in natural & engineered water treatment, Banff, Sept., 2012. Characterizing the deposition, colonization and growth of planktonic bacteria on environmental biofilms under simulated drinking water conditions and imposed environmental gradients.

J.D. Drummond, EPA STAR Graduate Research Fellowship, 2011, Reducing human health risks from waterborne diseases.

J. Shi, B. Jarrett, S. McNulty, S. Letuchy, K. Tsang, P. Pastén, G. Pizarro, and A. Packman, American Water Works Association Fresh Ideas Poster Competition, 1st prize in Drinking Water, Watercon 2011. Illinois Section AWWA and Illinois Water Environment Association, The Thirst Project: Arsenic and boron removal from the Lluta River, Chile.

J. D. Cullis, C. Gillis, M. Bothwell, C. Kilroy, A.I. Packman, and M.A. Hassan. Outstanding Student Presentation Award, 2010 AGU Fall Meeting. A conceptual model for the growth, persistence, and blooming behavior of the benthic mat-forming diatom *Didymosphenia geminata*.

S. Waller, M. Pryor, W. Soucie, A. Packman, and M. Hauser, Student Presentation Award: Best Student Presentation, 2008 AWWA Illinois Section Meeting, Assessing and managing biofilms in drinking water distribution systems.

C. Chen, A.I. Packman, D.T. Keane, J.-F. Gaillard, and B. Lau, Outstanding Student Presentation Award, 2006 AGU Fall Meeting. Use of 3D X-ray computed microtomography to observe *in situ* sediment structure and colloidal zirconia deposits at the pore scale.