

Jason D. Monnell

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Education

University of Pittsburgh Katz Business School	Coursework	MBA
The Pennsylvania State University	Chemistry	Ph.D. 2005
Union College (Schenectady, NY)	Biochemistry	B.S. 1998

Highlights of Research Accomplishments

- Determined the adsorption and conversion capacity of engineered sorbent-catalysts for Hg
- Formulated and evaluated nano-scale sorbents and oxidation catalysts for hydrogen sulfide.
- Designed and built a pilot-scale system to evaluate the potential of beneficial reuse of polluted surface and other impaired waters for cooling
- Assessed acid rock discharges created by highway construction and we are implementing best management practices and surface amendments to treat these discharges
- Chemically engineered activated carbon and silicas for combined As, Hg, and Se remediation
- Measured single molecule transconductance
- Customized analytical instrumentation for innovative measurements.
- Continuously developing new projects focusing on molecular-scale functional materials for environmental remediation and single molecule electronics.

Professional Preparation and Experience

Research Assistant Professor *University of Pittsburgh* 2007 to present

- Supervise day-to-day activities of over ten environmental engineering undergraduate, graduate, and post-doctoral research students
- Manage capital equipment and infrastructure
- Formally serve on faculty and academic committees.
- Continue previous position responsibilities
- Serve as departmental expert in analytical analyses and instrumentation including: AFM, STM, SEM (with EDS), TEM, GC/MS, FTIR, HPLC, GC, TGA, UV/VIS spectrophotometry as well as other bench scale techniques

Research Associate and Laboratory Manager *University of Pittsburgh* 2005 to 2007

- Conduct and direct sponsored research projects
- Write peer-reviewed research papers and grants to request research funding
- Teach upper and lower level environmental engineering and chemistry courses
- Critique and evaluate theses, dissertations and project final reports
- Review and revise environmental engineering curriculum
- Supervise undergraduate and graduate student research projects
- Schedule and supervise laboratory functions, materials, budget, and equipment to ensure resource availability, quality controls (QA/QC), and good laboratory practices (GLPs).

- Research Assistant *Pennsylvania State University* 1998 to 2005
- Measured differences in the structure of molecular attachments to metal surfaces
 - Determined ferroelectric and ferromagnetic properties of nano-sized materials
 - Quantified the transconductance of molecular electronic devices candidates
- Research Assistant *Union College* 1997 to 1998
- Performed quantitative analysis water and tissue samples of zebra mussels to determine uptake of heavy metal ions Pb^{2+} , and Cd^{2+}

Teaching Experience (Undergraduate and Graduate Courses)

Research Assistant Professor and Research Associate *University of Pittsburgh*
I have taught, evaluated and chosen the text, wrote the syllabi, lecture semi-notes, and significantly updated materials for the following six CEE courses.
Environmental Engineering Chemistry, lecture (3 cr.) – ‘06(F) -‘08(F)
Environmental Engineering Processes, lecture/laboratory (3 cr.) – ‘07+08’(F)
Advanced Environmental Analysis, laboratory (3 cr.) – ‘06(F)
Environmental Engineering Chemistry, laboratory – ‘06 (S), ‘07(S)
Environmental Engineering Microbiology, laboratory – ‘05(F)
Environmental Engineering Chemistry, laboratory – ‘05(F)

Teaching Assistant *Pennsylvania State University*
Led recitation (‘98-F) and taught laboratory (‘99-F, ‘00-S) for CHEM-12 Introduction to Chemistry

Peer Reviewed Publications

6. An-min Cao, **J. D. Monnell**, Christopher Matranga, Jia-min Wu, Liang-liang Cao, Di Gao, “Hierarchical Nanostructured Copper Oxide and its Application in Arsenic Removal”, *Journal of Physical Chemistry C*, 111, 18624-18628 (2007)
5. **J. D. Monnell**, J. J. Stapleton, S. M. Dirk, J. M. Tour, D. L. Allara, and P. S. Weiss, “Relative Conductances of Alkaneselenolate and Alkanethiolate Monolayers on Au{111}.” *J. Phys. Chem. B*, 109, (43), 20343-20349 (2005).
4. **J. D. Monnell**, “Molecular-Scale Properties of Functional Materials and Molecules,” Ph.D. Thesis, Department of Chemistry, The Pennsylvania State University, University Park, PA, USA (2005)
3. **J. D. Monnell**, J. J. Stapleton, T. Dunbar, W. A. Reinert, S. M. Dirk, J. M. Tour, D. L. Allara, and P. S. Weiss, “Ordered Local Domain Structures of Decaneselenolate and Dodecaneselenolate Assemblies on Au{111}.” *Journal of Physical Chemistry B*, 108, 9834-9841 (2004).
2. R. K. Smith, S. M. Reed, **J. D. Monnell**, P. A. Lewis, R. S. Clegg, K. F. Kelly, L. A. Bumm, J. E. Hutchison, and P. S. Weiss. “Phase Separation within a Binary Self-Assembled Monolayer on Au{111} Driven by an Amide-Containing Alkanethiol.” *Journal of Physical Chemistry B*, 105, 1119-1122 (2001).

1. Z. J. Donhauser, B. A. Mantooth, K. F. Kelly, L. A. Bumm, **J. D. Monnell**, J. J. Stapleton, D. W. Price Jr., D. L. Allara, J. M. Tour, and P. S. Weiss. "Conductance Switching in Single Molecules through Conformational Changes." *Science* 292, 2303-2307 (2001).

Conference Proceedings + Preprints

5. Neufeld, R. D.; **Monnell, J.**; Smoke, J.; Gray, T. *Remediation of Acid Rock Discharges*, WEFTEC, Chicago, Illinois, S64: Metals and Mining Industry, 2pm, Tuesday, October 21, 2008.
4. Chen, X.; Bhardwaj, R.; **Monnell, J. D.**; Flora, J. R. V.; Borguet, E.; Vidic, R. D., *Impact of fly ash composition and flue gas components on mercury speciation*. Preprints of Symposia - American Chemical Society, Division of Fuel Chemistry 2008, 53, (1), 172-173
3. Li, H.; **Monnell, J. D.**; Vidic, R. D., *Activated carbon-based catalysts for selective hydrogen sulfide oxidation*. Preprints of Symposia - American Chemical Society, Division of Fuel Chemistry 2008, 53, (1), 176-177.
2. R. Neufeld; S. Kalainesan; **Monnell, J.**; Gray, T. *Best Management Practices for Sedimentation Basins at Construction Sites Impacted by Acid Rock Discharge*, CEMEPE/SECOTOX Conference, Skiathos island, Greece, Session II: 12.15-12.30, June 28, 2007.
- (1) **J. D. Monnell**; R. D. Vidic; D. Gang; A. Karash; E. J. Granite, In *Recent Advances in Trace Metal Capture Using Micro and Nano-Scale Sorbents*, Proceedings of the 23rd Pittsburgh Coal Conference, Pittsburgh, PA, September 25-28, 2006, 2006; University of Pittsburgh: pp Section 40-1 on CD-Rom. (Available upon request).

Reports

- (2) R. D. Neufeld, T. Gray, **J. D. Monnell** and J. Smoke, "Jonathan Run Acid Rock Discharge Mitigation Strategies", Final Project Report to the Pennsylvania Department of Transportation, FHWA-PA-2007-010-040111, March 2007
- (1) R. G Quimpo, R. D. Neufeld, **J. D. Monnell**, D. Spaeder, and G. Reese, "I-99 Environmental Research", Final Project Report to the Pennsylvania Department of Transportation, FHWA-PA-2007-003-030207, March 2007

Submitted Publications

Li, H.; Monnell, J. D.; Alvin, M. A. Vidic, R. D., *Factors affecting activated carbon-based catalysts for selective hydrogen sulfide oxidation* Submitted to Main Group Chemistry (7/2008)

Publications in Preparation

J. D. Monnell, B. Fruit, J. R. Hampton, P. P. Fulay, C. B. Murray, P. S. Weiss. "Ferrimagnetism of Mono- and Bilayered g-Fe₂O₃" In preparation for *Journal of Applied Physics*

J. D. Monnell, J. D. Smoke, S. Kalainesan, R. D. Neufeld. "Review of Best Practices for Management of Acid Rock Discharge", In preparation for *Journal of Transportation Engineering*

Timothy D. Dunbar, **Jason D. Monnell**, William A. Reinerth, James J. Arnold, Lloyd A. Bumm, Paul S. Weiss, James M. Tour, and David L. Allara, "The Formation, Properties and Molecular Organization of Alkane- and Areneselenolate Self-Assembled Monolayers on Au{111} Surfaces" In preparation for *Journal of the American Chemical Society*

J. D. Monnell, J. R. Hampton, J. H. Adair, P. S. Weiss. “Shape Dependence Ferroelectricity of Single Domain PbTiO_3 ” In preparation for *Applied Physics Letters*

Unofficial but never-the-less time consuming publications (6+ various editions)

Course materials and laboratory manuals for the courses I have taught at the University of Pittsburgh during academic years 2006, 2007, 2008 and 2009:
CEE-1523, CEE-2511, CEE-2501, CEE-3504, and CEE-2500

Presentations

(13) **J.D. Monnell** “Metal Impregnation Of Activated Carbon Fiber For Catalyzed Hydrogen Sulfide Oxidation” Pittsburgh Coal Conference, Pittsburgh, PA. September, 2008. Oral Presentation

(12) **J. D. Monnell** “Activated Carbon-Based Catalysts For Selective Hydrogen Sulfide Oxidation” American Chemical Society, New Orleans, April 2008

(11) **J. D. Monnell.** “Micro and Nano-Scale Sorbents for Trace Metal Capture”, Pittsburgh Coal Conference, Pittsburgh, PA. September 28, 2006. Oral Presentation

(10) **J. D. Monnell.** “Molecular-Scale Materials and Molecules for Environmental Engineering”, The University of Pittsburgh, Pittsburgh, PA. May 15, 2006. Poster Presentation

(9) **J. D. Monnell.** “Molecular-Scale Materials and Molecules for Environmental Engineering”, National Energy Technology Laboratory, Pittsburgh, PA. May 11, 2006. Invited Oral Presentation

(8) **J. D. Monnell.** “Assessing Surface Adsorbate Properties”, Environmental Engineering Seminar, The University of Pittsburgh, Pittsburgh, PA. Jan 12, 2005. Invited Oral Presentation

(7) **J. D. Monnell.** “Assessing Surface Adsorbate Properties”, Analytical Chemistry Seminar, The Pennsylvania State University, University Park, PA. May 7, 2004. Oral Presentation

(6) **J. D. Monnell**, J. J. Stapleton, S. M. Dirk, J. M. Tour, D. L. Allara and P. S. Weiss. “Comparing the Structures and Properties of Alkanethiolate and Alkaneselenolate Monolayers on $\text{Au}\{111\}$ ”, American Physical Society Meeting, Montreal, Quebec, Canada. March 23, 2004. Oral Presentation.

(5) **J. D. Monnell**, J. J. Stapleton, J. J. Jackiw, T. D. Dunbar, W. A. Reinert, S. M. Dirk, J. M. Tour, D. L. Allara, and P. S. Weiss. “Ordered Local Domain Structures of Decaneselenolate and Dodecane-selenolate Assemblies on $\text{Au}\{111\}$,” American Chemical Society National Meeting, New York, NY. September 8, 2003. Contributed Poster.

(4) **J. D. Monnell.** “Molecular Electronics: Characterizing Single Molecule Switches with the Scanning Tunneling Microscope,” Union College, Department of Chemistry, Schenectady, NY. October 16, 2001. Invited Oral Colloquium.

(3) **J. D. Monnell**, Z. J. Donhauser, K. F. Kelly, L. A. Bumm, G. S. McCarty, B. A. Mantooth, M. E. Anderson, A. M. Rawlett, D. W. Price, J. M. Tour, D. L. Allara, P. S. Weiss. “Scanning

Tunneling Microscopy Characterization of Molecular Switches,” American Chemical Society National Meeting, Washington, DC. August 21, 2000. SciMix Poster.

(2) **J. D. Monnell**, T. C. Werner, M. K. Carroll. “Bio-Accumulation of Lead and Cadmium in Captive Zebra Mussels,” Steinmetz Symposium, Union College, Schenectady, NY. May 14, 1998. Oral Presentation.

(1) **J. D. Monnell**, T. C. Werner, M. K. Carroll. “Bio-Accumulation of Lead and Cadmium in Captive Zebra Mussels,” National Conference on Undergraduate Research Meeting, Salisbury State University, Salisbury, MD. April 25, 1998. Contributed Poster.

Funded Grants (Including PI and Co-PI)

\$94,428 FUNDED --NETL “Catalysts for Selective Hydrogen Sulfide Oxidation” (Co-PI)
\$10,000 FUNDED -- U.S. EPA (Co-PI with Di Gao)

Memberships

American Chemical Society (ACS)

Association of Environmental Engineers and Science Professors (AEESP)

USRowing

Synergistic Activities

University of Pittsburgh School of Engineering Nanoscience Advisory Board	2008 - present
Symposium Organizer – ACS Conference	Fall 2008
NSF review panelist (SBIR/STTR)	2007-Present
Reviewer for Environmental Science and Technology	2007-Present
Reviewer for Industrial & Engineering Chemistry Research	2008-Present
AEESP Governmental Affairs Committee	2006-Present
Penn State Environmental Chemistry Symposium Organizing Committee	2004

Students Directly Advised

Graduate Students

2006-08 Huixing Li (co-with R. D. Vidic)

Undergraduate Students

2008 Bradley Harken (NSF-funded – co-advised with Amy Landis), Emma Wolff (PITT-EXCEL program co-with Amy Landis)

2006-07 Carrie DuMars (co-with R. D. Vidic)

2005-06: B. Fruit (co-with P. P. Fulay)

Advisors

Ph.D.: Paul S. Weiss (Pennsylvania State University)

B.S.: T. C. Werner and M. K. Carroll (Union College)

Collaborators (Past 5 Years)

J. H. Adair (Penn State), D. L. Allara (Penn State), M.A. Alvin(NETL), L. A. Bumm (U. Oklahoma), E. Broitman (CMU), L. Casson (U. Pitt), D. A. Dzombak (CMU), P. P. Fulay (U. Pitt), D. Gang (WVU-Tech), Di Gao (U. Pitt.) A. J. Gellman (CMU), E. J. Granite (NETL), J. R. Hampton (Wash. Jeff. U.), K. F. Kelly (Rice U.), J. Miller (CMU), C. B. Murray (IBM), R. D. Neufeld (U. Pitt), R. Quimpo(Pitt), J. M. Tour (Rice U.), R. D. Vidic (U. Pitt).