MEAGAN S. MAUTER

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Carnegie Mellon University
Chemical Engineering, Eng. &Public Policy
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EDUCATION AND ACADEMIC EMPLOYMENT

Carnegie Mellon University, Pittsburgh, PA
Assistant Professor, Chemical Engineering/Engineering and Public Policy

Harvard Kennedy School, Cambridge, MA
Energy Technology Innovation Policy Fellow, Science Technology and Public Policy Program.
Energy Policy Fellow, Consortium for Energy Policy Research, Mossavar-Rahmani Center for Business and Government.
Advised by Venkatesh Narayanamurti.

Yale University, New Haven, CT
Ph.D. Chemical and Environmental Engineering. Advised by Menachem Elimelech & Chinedum Osuji.
M.S. and M.Phil. Chemical Engineering, Environmental Program

Rice University, Houston, TX
M.E.E. Environmental Engineering
B.S. Magna Cum Laude, Civil and Environmental Engineering,
B.A. Magna Cum Laude, History

Middle East Technical University, Ankara, Turkey
Global Engineering Exchange Program

Laurel School, Cleveland, OH
Cum Laude Society

RESEARCH EXPERIENCE IN ENGINEERING, POLICY, AND MODELING

NSF Science Engineering and Education for Sustainability Fellowship Recipient, *2012-2015*
Funding supports work on integrated forward osmosis systems for energy efficiency across the water, wastewater, and power sectors. Residence at Harvard Kennedy School, Carnegie Mellon University, and Ben Gurion University, Israel.

American Water Works Association, Abel Wolman Fellowship Recipient, *2009-2011*
Doctoral fellowship to pursue advanced training and research in the field of water supply and treatment. Designed and developed novel membrane architectures for energy efficient separation processes.

NSF Graduate Research Fellowship Recipient, *2006-2009*
Research interests included: (1) templated alignment of anisotropic nanomaterials in polymeric thin-films; (2) antimicrobial activity of nanomaterials; (3) engineered applications carbon-based nanotechnologies in environmental systems; (4) life-cycle impacts of nanomaterials in environmental systems.

US EPA Science To Achieve Results (STAR) Graduate Fellowship Recipient, *2006-2009*
Probed the environmental applications and implications of carbon-based nanomaterials, with an emphasis on the antimicrobial activity of SWNTs in environmentally relevant source waters.

Industrial Ecology Research Group, Yale University, *2007-2009*
Employed Life-Cycle Assessment as a tool to elucidate discrepancies between perceived and actual environmental impact.

Nanotechnology Policy Development Research at US EPA, *2005-2008*
Proposed theoretical model linking public trust in environmental regulatory agencies to public acceptance of emerging technologies. Investigated relationship between EPA's policy on emerging technology and the American public's acceptance of nanotechnology. Proposed innovative policy actions to proactively earn public trust.

Marine Biological Laboratory—Short Course in Microbial Diversity and Microbiology, *Summer 2007*
Seven week intensive course in environmental microbiology and microbial diversity. Developed skills in microscopy, PCR, phylogenetic analysis, and enrichment techniques.

Infrastructure Innovations, Assessment and Management at Washington University in St. Louis, *Summer 2004*
Modeled policies to improve the level of seismic safety in medium sized communities of the New Madrid Fault zone. Developed a system dynamics model of community goal dynamics to identify high leverage points for promoting structural upgrades to existing infrastructure.

SELECTED HONORS AND AWARDS

National Academy of Engineering, Frontiers of Engineering Symposium Participant, 2012
AWWA Academic Achievement Award – 1st Place Doctoral Dissertation, 2012
AEESP Outstanding Doctoral Dissertation Award – Honorable Mention
AWWA Abel Wolman Fellowship, 2009-2011
NSF Graduate Research Fellowship, 2006-2009
US EPA STAR Fellowship, 2006-2009
ACS Environmental Chemistry Graduate Student Award, 2009
Yale University Langer Research Symposium, First Place, 2009; Second Place, 2008
Environmental Sciences: Water Gordon Research Conference, Honorable Mention, 2007
US EPA Greater Research Opportunities Scholarship, 2004-2006
Yale University Faculty of Engineering Fellowship, 2006
Water Environment Association of Texas Scholarship, 2006
Rice Engineering Alumni Distinguished Senior Award, 2006
Paul A. Lederer Scholarship, Rice University Excellence in Engineering, 2005-2006
Louis J. Walsh Scholarship, Rice University Scholarship in Engineering, 2005-2006
Robert P. Shubinski Scholarship, 2006
Chi Epsilon Southwest District Scholarship (Solomon Cady Hollister Scholarship), 2006
Wagner Scholarship, Rice University, 2006
ABB/SWE Scholarship for Women in Engineering, 2004-2005
Shirley Berger University Scholarship, 2002-2006
Lawrence Leadership Scholarship, 2002

PUBLICATIONS

- Mauter, M.S., Fiat, A., Elimelech, M., and Herzberg, M.; "Quorum Sensing in *Escherichia coli* Initiated by Surface Density Immediately Following Attachment," *Environmental Science and Technology,* ***submitted.***
- Mauter, M.S., Elimelech, M., and Osuji, C. "Stable Sequestration of Single-Walled Carbon Nanotubes in Nanometer-Scale Aqueous Channels," *Journal of the American Chemical Society,* 134 (9), pp 3950–3953.
- Eckelman, MJ, Mauter, M.S., Isaacs, JA; Elimelech, M. "Exploring the Other Side of CNT Ecotoxicity: Impacts from Production," *Environmental Science & Technology, 46* (5), pp 2902–2910.
- Mauter, M.S., Wang, Y., Okemgbo, K., Kaetochi, Giannelis, E., Osuji, C., and Elimelech, M. "Antifouling Ultrafiltration Membranes via Post-Fabrication Grafting of Biocidal Nanomaterials," *ACS Applied Materials & Interfaces, 3* (8), pp 2861–2868.
- Mauter, M.S., Elimelech, M., and Osuji, C. "Nanocomposites of Vertically Aligned SWNTs by Magnetic Alignment and Polymerization of a Lyotropic Precursor," *ACS Nano, 4* (11), pp 6651–6658.
- Mauter, M.S. "Environmental Life-Cycle Assessment of Disposable Bioreactors in the Biopharmaceutical Industry," *Bioprocess International,* 7 (4), pp. 18-29.
- Kang, S., Mauter, M.S., and Elimelech, M. "Microbial Cytotoxicity of Carbon-based Nanotechnologies: Implications for River Water and Wastewater," *Environmental Science & Technology,* 43 (7), 2648-2653.
- Mauter, M.S., and Elimelech, M. "Environmental Applications of Carbon-Based Nanomaterials," *Environmental Science & Technology*, 42 (16), 5843-5859.
- Kang, S., Mauter, M.S., and Elimelech, M. "Physicochemical Determinants of Multiwalled Carbon Nanotube Bacterial Cytotoxicity," *Environmental Science & Technology*, 42 (19), 7528-7534.

PROFESSIONAL LEADERSHIP AND SERVICE

Reviewed papers for: *Environmental Science and Technology, Small, Journal of Membrane Science, Journal of Colloid and Interface Science, Applied Materials and Interfaces, Journal of Physical Chemistry, and ACS Nano.*
Co-Chair of Gordon Research Seminar, Membranes: Materials and Processes, *2012*
Co-Chair of Langer Research Symposium, Yale University, *2008*
Chair of Student Advocacy, Executive Committee Board Member, Graduate and Professional Student Senate at Yale University, *2006-2009*
President, Rice Engineering Societies Council (RESC), *2005 – 2006*
President, Rice University's Chi Epsilon Civil Engineering Honors Society, *2005 – 2006*
Vice President, Rice University's American Society for Civil Engineers (ASCE), *2005 – 2006*

INVITED LECTURES

- *Nanomaterials for Membrane-Based Water Treatment Applications.* Civil and Environmental Engineering Department, Rice University, 2010.
- *Applications and Implications of Nanomaterials for Membrane-Based Water Treatment.* Desert Research Institute, Ben Gurion University, 2011.
- *Nanomaterials for Water Treatment: Emerging Applications, Continuing Challenges.* Civil and Environmental Engineering Department, Lafayette College, 2011.
- *Templated Alignment of Single Walled Carbon Nanotubes in Aqueous Nanopores.* Department of Energy Engineering at Hanyang University, Seoul, Korea, 2012.
- *Stable Sequestration of Single-Walled Carbon Nanotubes in Nanometer-Scale Aqueous Channels.* Civil and Environmental Engineering Department, Korea University, 2012.
- *Nanomaterials for Membrane-Based Water Treatment.* School of Chemical and Biological Engineering, Seoul National University, 2012.

GRANT SUBMISSIONS

- "Enabling Energy Efficiency through Integrated Utilities: Technical and Social Challenges to Forward Osmosis Microbial Bioreactors." NSF SEES. 8/2012-7/2015 (Funded).
- "Impacts and technical solutions to produced water management in the Marcellus." EPRI. 2012 (Funded)
- "Engineered Applications of Carbon Nanotubes in Reverse Osmosis Membranes." NSF CBET: Environmental Engineering division with M. Elimelech and C. Osuji. (Funded)
- "Engineered Osmosis for Energy Efficient Separations: Optimizing Waste Heat Utilization." Industrial Energy Efficiency Grand Challenge Program of the DOE on behalf of Oasys Water, Inc. (Funded)
- "Osmotic Heat Engine for Energy Production from Low Temperature Geothermal Resources." Geothermal Technologies Program of the DOE on behalf of Oasys Water, Inc. (Funded)
- "Novel Thin Film Composite Membranes for Forward Osmosis." NSF GOALI on behalf of Oasys Water, Inc. with J. McCutcheon. (Funded)
- "Next Generation Membrane Development for Engineered Osmosis." Submitted to Advanced Research Projects Agency-Energy on behalf of Oasys Water, Inc. with J. McCutcheon. (Invited for full proposal, unfunded)
- Contributing Author on Submissions to the Following Granting Agencies: DOE Advanced Research Projects Agency-Energy, NSF Integrative Graduate Education and Research Traineeship (IGERT), DOE Small Business Innovation Research (SBIR), EPA Science to Achieve Results (STAR)

PROFESSIONAL PRACTICE

Oasys Water, Inc., *2009*

Authored federal grants generating $4M for research at venture backed start-up company. Directed feasibility analysis, technology development, and market scoping for secondary application of technology in energy capture and storage.

GE Healthcare—Independent Consultant on Life-Cycle Assessment, *2007-2009*

Managed evaluation of environmental impacts stemming from the transition to a disposable platform for bio-processing in the pharmaceutical industry. Integrated data sources from suppliers, distributors, and consumers of bioreactor systems.

Green City Blue Lake Institute, *2009*

Analyzed storm water impacts from proposed I-90 Innerbelt redevelopment plan to near-shore water quality in Lake Erie and the Cuyahoga River. Prepared and submitted comments on the draft and final environmental impact statements.

Coopedota, *2010*

Life-cycle assessment and process optimization for coffee plantation cooperative in the Terrazu region of Costa Rica.

The Center for Houston's Future, *2003*

Collaborated with 30 business and civic leaders to design scenarios for "Houston's Quality of Place in 2025" visioning process. Published and presented white papers on transportation, air quality, parks water and flooding, population and urban development, public design, and public finance.

TEACHING AND MENTORING EXPERIENCE

Certificate in the Fundamentals of Teaching: Engineering, completed December, 2010 at Yale University
Environmental Transport Processes, Teaching Fellow, Fall 2007
Technology and the Environment, Teaching Fellow, Spring 2008
Thermodynamics for Chemical Engineers, Teaching Fellow, Fall 2008
Chemical Reactors and Chemical Kinetics, Teaching Fellow, Spring 2009
Creativity and New Product Design, Teaching Fellow, Fall 2009, 2010
Advised A. Patrick Behrer and Vanessa Palmer at Harvard Kennedy School, Summer 2012
Advised Kaetochi Okemgbo through Yale's Science, Technology and Research Scholars (STARS) Program, 2009-2011
Supervised research of Jasmine Deyba, 2009
Supervised research of Matthew Altonji, 2008

PRESENTATIONS

- *Produced Water Management in the Marcellus Play: Anticipating Best-Practice Outcomes from Firm Attributes.* Gordon Research Conference in Industrial Ecology, Les Diablerais, Switzerland, 2012.
- *Stable Sequestration of Single-Walled Carbon Nanotubes in Nanometer-Scale Aqueous Channels.* Ninth U.S.-Korea Forum on Nanotechnology, Seoul, Korea, 2012
- *Structural Barriers and Institutional Response to Managing Produced Water in the Appalachian Basin.* IWA World Congress on Water, Climate and Energy, Dublin, Ireland, 2012
- *Nanomaterials for Membrane-Based Water Treatment Applications.* IWA Nano and Water, Monte Verita, Switzerland, 2011.
- *Antifouling Ultrafiltration Membranes via Post-Synthesis Grafting of Biocidal Nanomaterials.* Advances in Materials and Processes for Polymeric Membrane Mediated Water Purification; Asilomar; 2011.
- *Vertical Alignment of Single-Walled Carbon Nanotubes (SWNTs) in Polymer Membranes.* Gordon Research Seminar, Membranes: Materials and Processes, Colby-Sawyer College, June 2010.
- *Polymerizable lyotropic liquid crystalline matrix for magnetic alignment of nanorods and nanotubes in polymer thin films.* American Chemical Society, 84th Colloid and Surface Science Symposium, Akron, 2010.
- *Templated alignment of single-walled carbon nanotubes in polymer films.* American Chemical Society, 239th National Meeting, San Francisco, 2010.
- *Single-walled carbon nanotube (SWNT) composite membranes for reduction of biofouling in water treatment.* American Chemical Society, 239th National Meeting, San Francisco, 2010.
- *Environmental Life-Cycle Assessment of Disposable Bioreactors.* BioProduction 2009, Disposables for Biopharmaceutical Manufacturing; Barcelona; 2009.
- *Engineered Applications of Carbon Nanotubes in Reverse Osmosis Membranes.* Environmental Implications and Applications of Nanotechnology; UMASS Amherst; 2009.
- *Vertical Alignment of Single Wall Carbon Nanotubes (SWNTs) in Thin Polymer Films.* American Physics Society, March Meeting; Philadelphia; 2009.
- *Vertical Alignment of Single Wall Carbon Nanotubes (SWNTs) for Polymeric Membrane Applications.* Advances in Materials and Processes for Polymeric Membrane Mediated Water Purification; Asilomar; 2009.
- *Physiochemical Determinants of CNT toxicity.* Gordon Research Conference, Environmental Sciences: Water; 2008 (honorable mention award).
- *Carbon-based Nanotechnologies in River Water and Wastewater.* Chemodynamics of Ecosystems Conference; Monte Verita, Switzerland; 2008.
- *Earning Trust and Preventing Stigma: A Case Study of Nanotechnology at the EPA.* SETAC Conference; Baltimore; 2005.
- *Issues on the Horizon: The Value of Foresight at the EPA.* EPA Brownbag Series, 2005
- *Modeling Community Goal Dynamics*: *A System Dynamics Approach to Increasing the Level of Safety without the Stimulus of Disaster.* Mid-America Earthquake Center Annual Research Symposium; Charleston; 2004
- *The Identification and Characterization of Novel A-kinase Anchoring Proteins in the Human Heart.* Case Western Reserve University Summer Research Symposium; Cleveland; 2002

PROFESSIONAL AFFILIATIONS

Tau Beta Pi Engineering Honors Society (TBP)
Chi Epsilon Civil Engineering Honors Society
International Society for Industrial Ecology (ISIE)

American Physics Society (APS)
American Chemical Society (ACS)
American Water Works Association (AWWA)
American Institute of Chemical Engineers (AICHE)