

RADISAV D. VIDIC, Ph.D., P.E.
Nickolas A. DeCecco Professor and Chair
Department of Civil and Environmental Engineering
University of Pittsburgh, Pittsburgh, PA 15261-2294

EDUCATION

Ph.D. Environmental Engineering, University of Cincinnati, 1992
M.S. Environmental Engineering, University of Illinois, Urbana, 1989
B.S. Civil Engineering, University of Belgrade, 1987

TEACHING AND RESEARCH EXPERIENCE

2007 - 2025	Chair, Department of Civil and Environmental Engineering, University of Pittsburgh, Pittsburgh, PA
2016 – present	Visiting Professor, Department of Civil Engineering, University of Belgrade, Serbia
2006 - present	Professor of Chemical and Petroleum Engineering, University of Pittsburgh, Pittsburgh, PA
2003 - 2004	Fulbright Scholar, University of Belgrade, Serbia
2003 - present	Professor of Environmental Engineering, University of Pittsburgh, Pittsburgh, PA
1998 - 2003	Associate Professor of Environmental Engineering, University of Pittsburgh, Pittsburgh, PA
1999 - 2000	Visiting Scientist, Institute Chemische Technologie, Fraunhofer Gesellschaft, Karlsruhe, Germany
1992 - 1998	Assistant Professor of Environmental Engineering, University of Pittsburgh, Pittsburgh, PA
1990 - 1992	Research and Teaching Assistant, Department of Civil and Environmental Engineering, University of Cincinnati, Cincinnati, OH
1988 - 1989	Research and Teaching Assistant, Department of Civil Engineering, University of Illinois, Urbana, IL
1987 - 1988	Lecturer, Department of Civil Engineering, University of Belgrade, Serbia
1986 - 1987	Visiting Scholar, University of Lund, Sweden

PROFESSIONAL SOCIETIES AND RECOGNITION

2021 Elected Fellow of the American Society of Civil Engineers
2021 Ranked among World's Top 2% Scientists by Stanford University
2018 Associate Editor for *Membranes*
2014 Board of Visitors Faculty Award, Swanson School of Engineering, University of Pittsburgh
2014 Who's Who in Energy, Business Times
2014 Finalist, Shale Gas Innovation Contest (Ben Franklin Technology Partners)
2013 Who's Who in Energy, Business Times

2013 Member, Board of Directors, Shale Alliance for Energy Research (SAFER)
 2008 Professor of the Year, American Society of Civil Engineers, Pittsburgh Section
 2003 Fulbright Scholarship, University of Belgrade, Serbia
 2001 ASHRAE Poster Presentation Award
 2000 Professional Research Award from the Pennsylvania Water Environment Association
 2022 Produced Water Society Scholarship, awarded to my graduate student Ritesh Pawar
 2013 Water Environment Federation Student Paper Competition, Graduate Division, awarded to my graduate student Xuan Zheng
 2013 University Research Grand Prize for Excellence in Environmental Engineering and Science, American Academy of Environmental Engineers and Scientists
 2013 PennTec Student Research Award, awarded to my graduate student Xuan Zheng
 2011 Appointed to the US EPA Science Advisory Board Panel for the Review of Hydraulic Fracturing Study
 2009 ACS Graduate Student Award in Environmental Chemistry, awarded to my graduate student Heng Li
 2000 Third Place Award in AWWA Poster Session, American Water Works Association
 1993 Outstanding Doctoral Thesis Award, Association of Environmental Engineering Professors
 1991 Water Pollution Control Federation Award for Best Student Research Paper in the Ph.D. Category
 Nickolas A. DeCecco Professor, University of Pittsburgh, 2022
 William Kepler Whiteford Professor, University of Pittsburgh, 2007, 2012, 2017
 William Kepler Whiteford Faculty Fellowship, University of Pittsburgh, 1994, 1996 and 1998
 Society for Environmental Toxicology and Chemistry, “Chemicals in domestic and industrial wastewater: Occurrence, fate and use as tracers”, Session Co-Chair, 2022 North America Conference, Pittsburgh, PA, November 13-17, 2022.
 Scientific Committee, Second Conference on The Systems for Management of Environmental Protection, Novi Sad, Serbia and Montenegro, May 20-22, 2004
 Chair, International Program Committee, First International Conference on Environmental Recovery of Yugoslavia 2001, Belgrade, Yugoslavia, September 27-30, 2001
 Editorial Board, International Journal of Water and Waste Water Treatment, SciForschen, 2014-.
 Associate Editor – Membranes, 2023 – present
 Associate Editor - Water Research, 1996-2004
 Associate Editor – ASCE Journal of Environmental Engineering, 2004-2012
 Association of Environmental Engineering and Science Professors, 1992 – present
 Member, Fred Pohland Award, 2005-2007
 Membership Committee (Chair), 1995-2000
 American Society of Civil Engineers, 1989 - present
 Technical Committee Chair - 1995 ASCE National Environmental Engineering Conference
 Water Environment Federation, 1989 - 2007
 Program Committee, 1992-1999
 Hazardous Waste and Ground Water Committee, 1993 - 2000
 Program Committee, Pennsylvania Water Environment Association, 1993 - 2002
 Research Committee (Chair), Pennsylvania Water Environment Association, 1994 - 2000
 American Water Works Association, 1989 - 2007
 Student Activities Committee (Chair) - Pennsylvania Section, 1992 - 1999
 Strategic Planning Committee - Pennsylvania Section, 1994 - 2000

Program Committee - Pennsylvania Section, 1993 - 2003
 American Institute of Chemical Engineers, 1998 – 2007
 Chairman of the Mercury Control Session, AIChE Spring National Meeting, March 14-18, 1999, Houston, TX
 American Chemical Society, 1995 – present
 Symposium Organizer “Mercury and Other Trace Elements in Fuel: Emissions and Control”
 ACS Division of Fuel Chemistry, 235th American Chemical Society National Meeting, April 6-10, 2008, New Orleans, LA
 International Water Association, 1989 – present

PUBLICATIONS

Google Scholar (5/25)

h-index: 58
 Citations: 13,618

A. Journal Articles

1. Zhang, Z., Pawar, R.D. and **Vidic, R.D.** “Study of thermodynamic models and crystallization kinetics for gypsum precipitation in hypersaline solutions with electrochemical impedance spectroscopy (EIS),” *Desalination*, 613, 119025, 2025. <https://doi.org/10.1016/j.desal.2025.119025>
2. Chang, H., Ma, Z., Zhao, H., Qu, D., Liu, C., Yan, Z., Li, R., Qu, F., Liang, H., and **Vidic, R.D.** “Regulating gypsum scaling-induced wetting in membrane distillation by heterogeneous crystallization: Role of filter media” *Water Research*, 274, 123146, 2025. <https://doi.org/10.1016/j.watres.2025.123146>
3. Zhu, Y., Qu, F., Yan, Z., Liu, B., Tong, T., Liu, C., Chang, H., Liang, H. and **Vidic, R.D.** “In-line granular filtration for mitigating gypsum scaling in membrane distillation” *J. Membrane Science*, 713, 123259, 2025. <https://doi.org/10.1016/j.memsci.2024.123259>
4. Pawar, R. and **Vidic R.D.** “Impact of surfactants used in oil and gas extraction on produced water treatment by membrane distillation” *Desalination*, 586, 117906, 2024. <https://doi.org/10.1016/j.desal.2024.117906>
5. Zhu, Y., Chang, H., Yan, Z., Liu, C., Liang, Y., Qu, F., Liang, H. and **Vidic, R.D.** “Review of ammonia recovery and removal from wastewater using hydrophobic membrane distillation and membrane contactor.” *Separation and Purification Technology*, 328, 125994, 2024. <https://doi.org/10.1016/j.seppur.2023.125094>
6. Meng, Y., Zhong, Q., Liu, Y., Yan, Z., Liang, Y., Chang, H., Liang, H. and **Vidic, R.D.** “Evaluating membrane cleaning for organic fouling in direct contact membrane distillation” *Journal of Cleaner Production*, 410, 137319, 2023. <https://doi.org/10.1016/j.jclepro.2023.137319>
7. Shamlou, E.M., **Vidic, R.D.** and Khanna, V. “Optimization-based Technoeconomic Comparison of Multi-stage Membrane Distillation Configurations for Hypersaline Produced Water Desalination” *Desalination*, 543, 116098, 2022. <https://doi.org/10.1016/j.desal.2022.116098>
8. Shamlou, E.M., **Vidic, R.D.**, El-Halwagi, M. and Khanna, V. “Optimization-based Modeling and Analysis of Osmotically Assisted Reverse Osmosis Systems for Application

- in Zero Liquid Discharge Systems” *Desalination*, 539, 115948, 2022. <https://doi.org/10.1016/j.desal.2022.115948>
9. Pawar, R., Zhang, Z., Hanson, A.J., Blotvogel, J. and **Vidic R.D.** “Impact of organic and volatile compounds in produced water from unconventional reservoirs on direct contact membrane distillation permeate quality”, *Environmental Science & Technology: Water*, 2, 6, 1003-1012, 2022. <https://doi.org/10.1021/acsestwater.1c00496>
 10. Shalaby, S.M., Kabeel, A.E., Abosheisha, H.F., Elfakharany, M.K., El-Bialy, E., Shama, A. and **Vidic, R.D.** “Membrane distillation driven by solar energy: A review”, *J. Cleaner Production*, 366, 132949, 2022. <https://doi.org/10.1016/j.jclepro.2022.132949>
 11. Pawar, R., Zhang, Z. and **Vidic, R.D.** “Laboratory and pilot-scale studies of membrane distillation for desalination of produced water from Permian Basin,” *Desalination*, 537, 115853, 2022. <https://doi.org/10.1016/j.desal.2022.115853>
 12. Chang, H., Lu, M., Zhu, Y., Zhang, Z., Zhou, Z., Liang, Y. and **Vidic, R.D.** “Consideration of Potential Technologies for Ammonia Removal and Recovery from Produced Water,” *Environmental Science & Technology*, 56:6, 3305-3308, 2022. <https://doi.org/10.1021/acs.est.1c08517>
 13. Shamlou, E.M., **Vidic, R.D.** and Khanna, V. “Optimization-based modeling and economic comparison of membrane distillation configurations for application in shale gas produced water treatment” *Desalination*, 526, 115513, 2022. <https://doi.org/10.1016/j.desal.2021.115513>
 14. Chang, H., Yu, H., Li, X., Zhou, Z., Liang, H., Song, W., Ji, H., Liang, Y., **Vidic, R.D.** “Role of biological granular activated carbon in contaminant removal and ultrafiltration membrane performance in a full-scale system”, *J. Membrane Science*, 644, 120122, 2022. <https://doi.org/10.1016/j.memsci.2021.120122>
 15. Zhang, Z., Wadekar, S.S., Lokare, O. and **Vidic, R.D.** “Comparison of calcium scaling in direct contact membrane distillation (DCMD) and nanofiltration (NF)” *J. Membrane Science*, 638, 119647, 2021. <https://doi.org/10.1016/j.memsci.2021.119647>
 16. Zhang, Z., Lokare, O., Gusa, A. and **Vidic, R.D.** “Pretreatment of brackish water reverse osmosis (BWRO) concentrate to enhance water recovery in inland desalination plants by direct contact membrane distillation (DCMD)” *Desalination*, 508, 115050, 2021. <https://doi.org/10.1016/j.desal.2021.115050>
 17. Chang, H., Liu, B., Zhang, Z., Pawar, R., Yan, Z., Crittenden, J.C. and **Vidic, R.D.** “A Critical Review of Membrane Wettability for Membrane Distillation from the Perspective of Interfacial Interactions” *Environmental Science & Technology*, 55(3), 1395-1418, 2021. <https://doi.org/10.1021/acs.est.0c05454> - **Journal cover**
 18. Chang, H., Liu, S., Tong, T., He, Q., Crittenden, J.C., **Vidic, R.D.** and Liu, B. “On-site Treatment of Shale Gas Flowback and Produced Water in Sichuan Basin by Fertilizer Drawn Forward Osmosis for Irrigation” *Environmental Science & Technology*, 54(17):10926-10935, 2020. <https://pubs.acs.org/doi/10.1021/acs.est.0c03243>
 19. Tian L., Chang H., Tang P., Li T., Zhang X., Liu S., He Q., Wang T., Yang J., Bai Y., **Vidic, R.D.**, Crittenden, J.C., and Baicang, L. "Rare Earth Elements Occurrence and Economical Recovery Strategy from Shale Gas Wastewater in the Sichuan Basin, China" *ACS Sustainable Chemistry & Engineering*, 8(32):11914-11920, 2020. <https://doi.org/10.1021/acssuschemeng.0c04971>

20. Gusa, A.V., Tomani, A., Zhang, Z. and **Vidic, R.D.** "Sulfate precipitation in produced water from Marcellus Shale for the control of naturally occurring radioactive material" *Water Research*, 177, 115765, 2020. <https://doi.org/10.1016/j.watres.2020.115765>
21. Tavakkoli, S., Lokare, O., **Vidic, R.D.** and Khanna, V. "Shale gas produced water management using membrane distillation: An optimization-based approach" *Resources, Conservation & Recycling*, 158, 104803, 2020. <https://doi.org/10.1016/j.resconrec.2020.104803>
22. Chang, H., Liu, B., Crittenden, J.S., **Vidic, R.D.** "Resource Recovery and Reuse for Hydraulic Fracturing Wastewater in Unconventional Shale Gas and Oil Extraction" *Environmental Science & Technology*, 53, 13547-13548, 2019. <https://doi.org/10.1021/acs.est.9b06240>
23. Lokare, O. and **Vidic, R.D.** "Impact of operating conditions on measured and predicted concentration polarization in membrane distillation" *Environmental Science & Technology*, 2019, 53, 11869-11876, 2019. <https://doi.org/10.1021/acs.est.9b04182>
24. Wadekar, S., Wang, Y., Lokare, O. and **Vidic, R.D.** "Influence of chemical cleaning on physicochemical characteristics and ion rejection by thin film composite nanofiltration membranes" *Environmental Science & Technology*, 53, 10166-10176, 2019. <https://doi.org/10.1021/acs.est.9b02738>
25. Lokare, O., Ji, P., Wadekar, S., Dutt., G. and **Vidic, R.D.** "Concentration polarization in membrane distillation: I. Development of laser-based spectrophotometric method for in-situ characterization" *J. Membrane Science*, 581, 462-471, 2019. <https://doi.org/10.1016/j.memsci.2019.03.080>
26. Chang, H., Li, T., Liu, B., **Vidic, R.D.**, Elimelech, M., Crittenden, J.C. "Potential and implemented membrane-based technologies for the treatment and reuse of flowback and produced water from shale gas and oil plays: A review" *Desalination*, 455, 34-57, 2019. <https://doi.org/10.1016/j.desal.2019.01.001>
27. Gusa, A.V. and **Vidic, R.D.** "Development of Functionalized Proppant for the Control of NORM in Marcellus Shale Produced Water" *Environmental Science & Technology*, 53, 373-382, 2019. <https://doi.org/10.1021/acs.est.8b05710>
28. Tasker, T., Burgos, W., Ajemigbitse, M., Lauer, N., Gusa, A., Kuatbek, M., May, D., Landis, J., Alessi, D., Johnsen, A., Kaste, J., Headrick, K., Wilke, F.D.H., McNeal, M., Engle, M., Jubb, A., **Vidic, R.D.**, Vengosh, A., Warner, N. "Accuracy of methods for reporting inorganic element concentrations and radioactivity in oil and gas wastewaters from the Appalachian Basin, U.S. based on an inter-laboratory comparison" submitted for publication, *Environmental Science: Processes & Impacts*, 21, 224-241, 2019. <https://doi.org/10.1039/C8EM00359A>
29. Thomas, L., Tang, H., Kalyon, D.M., Seda Aktas, S. Arthur, J.D., Blotevogel, J., Carey, J.W., Filshill, A., Fu, P., Hsuan, G., Hu, T., Soeder, D., Shah, S., **Vidic, R.D.**, Young, M.H. "Toward better hydraulic fracturing fluids and their application in energy production: A review of sustainable technologies and reduction of potential environmental impacts" *Journal of Petroleum Science and Engineering*, 173, 793-803, 2019. <https://doi.org/10.1016/j.petrol.2018.09.056>
30. Wang, Y., Tavakkoli, S., Khanna, V., **Vidic, R.D.**, Gilbertson, L.M. "Life cycle impact and benefit trade-offs of a produced water and abandoned mine drainage cotreatment process" *Environmental Science & Technology*, 52, 13995-14005, 2018. <https://doi.org/10.1021/acs.est.8b03773>

31. Wadekar, S.S. and **Vidic, R.D.** “Insights into the rejection of barium and strontium by nanofiltration membrane from experimental and modeling analysis” *Journal of Membrane Science*, 564, 742-752, 2018. <https://doi.org/10.1016/j.memsci.2018.07.060>
32. Wadekar, S.S. and **Vidic, R.D.** “Comparison of ceramic and polymeric nanofiltration membranes for treatment of abandoned coal mine drainage” *Desalination*, 440, 135-145, 2018. <https://doi.org/10.1016/j.desal.2018.01.008>
33. Brantley, S.L., **Vidic, R.D.**, Brasier, K., Yoxtheimer, D., Pollak, J., Wilderman, C. and Wen, T. “Engaging over data on fracking and water quality”, *Science*, 359:6374, 395-397, 2018. <https://www.science.org/doi/10.1126/science.aan6520>
34. Lokare, O., Tavakkoli, S., Khanna, V. and **Vidic, R.D.** “Importance of feed recirculation for the overall energy consumption in membrane distillation systems”, *Desalination*, 428, 250-254, 2018. <https://doi.org/10.1016/j.desal.2017.11.037>
35. Wadekar, S., Mittal, D., Hayes, T., Lokare, O. and **Vidic, R.D.** “Optimization of nanofiltration membranes for treatment of abandoned mine drainage: Laboratory- and pilot-scale studies” *Industrial & Engineering Chemistry Research*, 56, 7355-7364, 2017. <https://doi.org/10.1021/acs.iecr.7b01329>
36. Tavakkoli, S., Lokare, O., **Vidic, R.D.** and Khanna, V. “A techno-economic assessment of membrane distillation for treatment of Marcellus shale produced water” *Desalination*, 416, 24-34, 2017. <https://doi.org/10.1016/j.desal.2017.04.014>
37. Wadekar, S. and **Vidic, R.D.** “Influence of active layer chemistry on physicochemical properties and performance of commercially available polyamide nanofiltration membranes” *Environmental Science & Technology*, 51, 5658-5665, 2017. <https://doi.org/10.1021/acs.est.6b05973>
38. Lokare, O., Tavakkoli, S., Rodriguez, G., Khanna, V. and **Vidic, R.D.** “Integrating membrane distillation with waste heat from natural gas compressor stations for produced water treatment in Pennsylvania”, *Desalination*, 413, 144-153, 2017. <https://doi.org/10.1016/j.desal.2017.03.022>
39. Lokare, O., Tavakkoli, S., Khanna, V. and **Vidic, R.D.** “Fouling in direct contact membrane distillation of produced water from unconventional gas extraction”, *J. Membrane Science*, 524, 493-501, 2017. <https://doi.org/10.1016/j.memsci.2016.11.072>
40. Lu, C., **Vidic, R.D.**, Liu, Q. and Monnell, J.D. “Using abandoned mine drainage (AMD) precipitate to remove mercury in flue gas from coal-fired power plants.” *Fresenius Environmental Bulletin*, 26(1A), 989-994, 2017
41. Tavakkoli, S., Lokare, O., **Vidic, R.D.** and Khanna, V. “A Systems-level analysis of waste heat recovery opportunities from natural gas compressor stations in the U.S.” *ACS Sustainable Chemistry & Engineering*, 4(7), 3618-3626, 2016.
42. He, C. and **Vidic, R.D.** "Impact of antiscalants on the fate of barite in the unconventional gas wells" *Environmental Engineering Science*, 33:10, 2016.
43. He, C., Zhang, T. and **Vidic, R.D.** “Co-treatment of abandoned mine drainage and Marcellus Shale flowback water for use in hydraulic fracturing” *Water Research*, 104, 425-431, 2016.
44. He, C. and **Vidic, R.D.** “Application of microfiltration for the treatment of Marcellus Shale flowback water: Influence of floc breakage on membrane fouling” *Journal of Membrane Science*, 510, 348-354, 2016.
45. Theregowda, R., **Vidic, R.D.**, Landis, A.E., Dzombak, D.A. and Matthews, H.S. “Integrating external costs with life cycle costs of emissions from tertiary treatment of

- municipal wastewater for reuse in cooling systems” *Journal of Cleaner Production*, 112, 4733-4740, 2016.
46. Zhang, T., Hammack, R. and **Vidic, R.D.** “Fate of Radium in Marcellus Shale flowback water impoundments and assessment of associated health risks” *Environmental Science & Technology*, 49, 9347-9354, 2015.
 47. Duda, S., Baron, J.L., Wagener, M.M., **Vidic, R.D.** and Stout, J.E. “Lack of correlation between Legionella colonization and microbial population quantification using heterotrophic plate count and adenosine triphosphate bioluminescence measurement” *Environmental Monitoring and Assessment*, 187:393, 2015
 48. Sanchez, D., Jacobs, D., Gregory, K., Huang, J., Hu, Y., **Vidic, R.D.**, Yun, M. “Changes in carbon electrode morphology affect microbial fuel cell performance with *Shewanella oneidensis* MR-1” *Energies*, 8, 1817-1829, 2015.
 49. Zhang, T., Bain, D., Hammack, R. and **Vidic, R.D.** “Analysis of radium-226 in high salinity wastewater from unconventional gas extraction by inductively coupled plasma-mass spectrometry” *Environmental Science & Technology*, 49, 2969-2976, 2015.
 50. Liu, W., Chien, S.H., Dzombak, D.A. and **Vidic, R.D.** “Scaling control for heat exchangers in recirculating cooling systems using tertiary-treated municipal wastewater”, *Industrial & Engineering Chemistry Research*, 53, 16366-16373, 2014.
 51. He, C., Zhang, T., Zheng, X., Li, Y. and **Vidic, R.D.** "Management of Marcellus Shale produced water in Pennsylvania: A review of current strategies and perspectives" *Energy Technology*, 2, 968-976, 2014.
 52. Theregowda, R., **Vidic, R.D.**, Dzombak, D.A. and Landis, A. E. “Life cycle impact analysis of tertiary treatment alternatives to treat secondary municipal wastewater for reuse in cooling systems” *Environmental Progress & Sustainable Energy*, 34, 178-187, 2015.
 53. Choudhury, M.R., **Vidic, R.D.**, Dzombak, D.A. “Inhibition of copper corrosion by Tolyltriazole in cooling systems using treated municipal wastewater as makeup water” *Arabian Journal for Science and Engineering*, 39, 7741-7749, 2014.
 54. Zhang, T., Gregory, K.B., Hammack, R. and **Vidic, R.D.** “Co-Precipitation of radium with barium and strontium sulfate and its impact on the fate of Radium in treatment facilities for produced water from unconventional gas extraction” *Environmental Science & Technology*, 48:8, 4596-4603, 2014.
 55. Safari, I., Hsieh, M-K., Chien, S-H., Walker, M., Dzombak, D., **Vidic, R.D.**, Abbasian, J. “Effect of CO₂ stripping on pH in open-recirculating cooling water systems” *Environmental Progress and Sustainable Energy*, 33(1), 275-282, 2014.
 56. He, C., Wang, X., Barbot, E. and **Vidic, R.D.** “Membrane filtration of Marcellus Shale flowback water” *Journal of Membrane Science*, 462, 88-95, 2014.
 57. Chien, S.H., Liu, W., Dzombak, D.A. and **Vidic, R.D.**” Impact of tertiary treatment processes on the effectiveness of chloramination for biological growth control in recirculating cooling systems using treated municipal wastewater” *Journal of Environmental Engineering*, 140:2, 04013003-1-8, 2014.
 58. Brantley, S.L., Yoxtheimer, D., Arjmand, S., Grieve, P., **Vidic, R.D.**, Pollak, J., Llewellyn, G., Abad, J., and Simon, C. “Water resource impacts during unconventional shale gas development: the Pennsylvania experience” *International Journal of Coal Geology*, 126, 14-156, 2014.

59. He, C., Li, M., Liu, W., Barbot, E. and **Vidic, R.D.** "Kinetics and equilibrium of barium and strontium sulfate formation in Marcellus Shale flowback water" *Journal of Environmental Engineering*, 140(5), B4014001-1-9, 2014.
60. Brantley, S.L., Pollak, J., and **Vidic, R.D.** "Project asks what's in the water after fracking at depth" *EOS, Transactions of the American Geophysical Union*, 94, 409-411, 2013,
61. Murali Mohan, A., Hartsock, A., Bibby, K.J, Hammack, R.C., **Vidic, R.D.** and Gregory, K.B. "Microbial community changes in hydraulic fracturing fluids and produced water from shale gas extraction" *Environmental Science & Technology*, 47:22, 13141-1350, 2013.
62. Bibby, K.J., Brantley, S.L., Reible, D.D., Linden, K.G., Mouser, P.J., Gregory, K.B., Ellis, B.R. and **Vidic, R.D.** "Suggested reporting parameters for investigations of wastewater from unconventional shale gas extraction" *Environmental Science & Technology*, 47:23, 13220-13221, 2013.
63. He, C., Zhang, T. and **Vidic, R.D.** "Use of abandoned mine drainage for the development of natural gas resources" *Disruptive Science and Technology*, 1:4, 169-176, 2013. DOI: 10.1089/dst.2013.0014.
64. Murali Mohan, A., Hartsock, A., Hammack, R.C., **Vidic, R.D.** and Gregory, K.B. "Microbial communities in flowback water impoundments from hydraulic fracturing for recovery of shale gas" *FEMS Microbial Ecology*, 86, 567-580, 2013.
65. Theregowda, R., Hsieh, M-K., Walker, M.E., Landis, A. E., Abbasian, J., **Vidic, R.D.** and Dzombak, D.A. "Life cycle costs to treat secondary municipal wastewater for reuse in cooling systems" *Journal of Water Reuse and Desalination*, 3:3, 224-238, 2013.
66. Chien, S.H., Dzombak, D.A. and **Vidic, R.D.** "Comprehensive evaluation of biological growth control by chlorine-based biocides in power plant cooling systems using tertiary effluent" *Environmental Engineering Science*, 30:6, 324-332, 2013.
67. Dale, A., **Vidic, R.D.**, Khanna, V., Bilec, M. "Process based life-cycle assessment of natural gas from the Marcellus Shale" *Environmental Science & Technology*, 47:10, 5459-5466, 2013.
68. Safari, I., Walker, M.E., Hsieh, M.K., Dzombak, D.A., Liu, W., **Vidic, R.D.**, Miller, D.C. and Abbasian, J. "Utilization of municipal wastewater for cooling in thermoelectric power plants" *Fuel*, 111, 103-113, 2013.
69. **Vidic, R.D.**, Brantley, S.L., Vandenbossche, J.M., Yoxtheimer, D. and Abad, J.D. "Impact of shale gas development on regional water quality" *Science*, 340:6134, 1235009, 2013.
70. Barbot, E., Vidic, N., Gregory, K. and **Vidic, R.D.** "Spatial and Temporal Correlation of Water Quality Parameters of Produced Waters from Devonian-age Shale following Hydraulic Fracturing" *Environmental Science & Technology*, 47, 2562-2569, 2013.
71. Hsieh, M.K., Walker, M.E., Safari, I., Chien, S.H. Abbasian, J., **Vidic, R.D.** and Dzombak, D.A. "Ammonia stripping in open-recirculating cooling water systems," *Environmental Progress & Sustainable Energy*, 32:3, 489-495, 2013.
72. Choudhury, M.R., Hsieh, M.K., **Vidic, R.D.** and Dzombak, D.A. "Corrosion management in power plant cooling water systems using tertiary treated municipal wastewater as makeup water", *Corrosion Science*, 61, 231-241, 2012.
73. Chien, S.H., Chowdhury, I., Hsieh, M.K., Dzombak, D.A. and **Vidic, R.D.** "Control of biological growth in recirculating cooling systems using treated secondary effluent as makeup water with monochloramine", *Water Research*, 46(19), 6508-6518, 2012.

74. Liu, W., Chien, S-H., Dzombak, D.A. and **Vidic, R.D.** "Mineral scaling mitigation in cooling systems using tertiary-treated municipal wastewater" *Water Research*, 46(14), 4488-4498, 2012.
75. Chien, S.H., Hsieh, M.K., Li, H., Monnell, J., Dzombak, D.A. and **Vidic, R.D.** "Pilot-scale cooling tower to evaluate corrosion, scaling, and biofouling control strategy for cooling system makeup water," *Review of Scientific Instruments* 83(2), 024101, 2012.
76. Li, H., Dzombak, D.A. and **Vidic, R.D.** "Electrochemical impedance spectroscopy (EIS) based characterization of mineral deposition from precipitation reactions" *Industrial & Engineering Chemistry Research*, 51(7), 2821-2829, 2012.
77. Choudhury, M.R., Hsieh, M-K., **Vidic, R.D.**, Dzombak, D.A. "Development of an instantaneous corrosion rate monitoring system for metal and metal alloys in recirculating cooling systems" *Industrial & Engineering Chemistry Research*, 51:11, 4230-4239, 2012.
78. Hsieh, M.K., Chien, S.H., Li, H., Monnell, J.D., Dzombak, D.A. and **Vidic, R.D.** "Corrosion control when using passively treated abandoned mine drainage as alternative makeup water for cooling systems" *Water Environment Research*, 83:9, 807-814, 2011.
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B. Books and Book Chapters

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C. Refereed Conference Proceedings

1. Vidic, R.D., Pawar, R. and Zhang, Z. "Water recovery and reuse from unconventional produced water using membrane distillation", SETAC North America, 43rd Annual Meeting, Pittsburgh, PA, November 13-17, 2022.
2. Pawar, R., Zhang, Z. and Vidic, R.D. "Scale-up of membrane distillation for treating produced waters from oil and gas industry", 2022 NAMS Annual Meeting, Tempe, AZ, May 14-18, 2022.
3. Zhang, Z., Pawar, R. and Vidic, R.D. "Verification of Pitzer model in predicting calcium precipitation at high salinities with Electrochemical Impedance Spectroscopy (EIS)", 2022 ACS Spring Conference, San Diego, CA, March 20-24, 2022.
4. Pawar, R., Zhang, Z. and Vidic, R.D. "Pilot-scale testing of membrane distillation for produced water desalination in various shale plays" 2022 Produced Water Society Seminar, Houston, TX, February 8-9, 2022.
5. Shamlou, E., Vidic, R.D. and Khanna, V. "Optimization Based Modeling and Analysis of Osmotically Assisted Reverse Osmosis for Application in Shale Oil and Gas Produced Water Treatment" 2021 AIChE Annual Meeting, Boston, MA. November 7-11, 2021.
6. Pawar, R., Zhang, Z. and Vidic, R.D. "Scaleup of Membrane Distillation for Desalination of Produced Water from Unconventional Reservoirs" 2021 AIChE Annual Meeting, Boston, MA. November 7-11, 2021.
7. Pawar, R., Zhang, Z. and Vidic, R.D. "Laboratory and pilot-scale evaluation of membrane distillation for desalination of produced water from unconventional reservoirs" 2021 Shale Insight Conference, Erie, PA, September 29-30, 2021.
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9. Zhang, Z., Wadekar, S.S., Lokare, O.R. and Vidic, R.D. "Comparison of calcium scaling in direct contact membrane distillation (DCMD) and nanofiltration (NF)", 2021 NAMS Annual Meeting, Estes Park, CO, August 30-September 2, 2021.
10. Pawar, R., Zhang, Z., Hanson, A., Blotevogel, J. and Vidic, R.D. "When is membrane wetting in membrane distillation accurately diagnosed?", 2020 AGU Fall Meeting, December 13-17, 2020 (virtual).
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12. Zhang, Z., Pawar, R.D. and Vidic, R.D. "Predicting the Conductivity Increase By Volatile Salts Penetration in Direct Contact Membrane Distillation (DCMD) Permeate Water" 2020 AIChE Annual Meeting, Houston, TX, November 16-20, 2020.
13. Pawar, R.D., Zhang, Z. and Vidic, R.D. "Impact of organic compounds in produced water on desalination by membrane distillation" 2020 AIChE Annual Meeting, Houston, TX, November 16-20, 2020.
14. Shamlou, E.M., Vidic, R.D. and Vikas Khanna "Optimization Based Design and Analysis of Osmotically Assisted Reverse Osmosis for Application in Shale Oil and Gas Produced Water Treatment" 2020 AIChE Annual Meeting, Houston, TX, November 16-20, 2020.
15. Sengupta, D. El-Halwagi, M.M., Kwon, J.S., Camacho, L.M., Freeman, B.D., Brennecke, J.F., Carlberg, P., Swogger, K., Khanna, V. and Vidic, R.D. "Deploying Intensified, Automated, Mobile, Operable, and Novel Designs "Diamond" for Treating Shale Gas Wastewater (SGWW)" 2019 AIChE Annual Meeting, Orlando, FL, November 10-15, 2019.
16. Shamlou, E.M., Vidic, R.D. and Khanna, V. "Geospatial Assessment of Waste Heat from Unconventional Oil and Gas Production" 2019 AIChE Annual Meeting, Orlando, FL, November 10-15, 2019.
17. Shamlou, E.M., Vidic, R.D. and Khanna, V. "Modeling and Techno-Economic Optimization of Desaliantion Technologies for Produced Water Treatment" 2019 AIChE Annual Meeting, Orlando, FL, November 10-15, 2019.
18. Pawar, R.D. and Vidic, R.D." In Situ Measurement of Concentration Polarization in Pressure Driven Membrane Systems Using Laser-Based Spectrophotometric Method" 2019 AIChE Annual Meeting, Orlando, FL, November 10-15, 2019.
19. Zhang, Z. and Vidic, R.D. "Membrane Distillation for Enhanced Water Recovery by Inland Brackish Water Desalination Plants" 28th Annual Meeting, North American Membrane Society, Pittsburgh, PA, May 11-15, 2019.
20. Gusa, A., Alkhashab, H., Flora, J.R.V. and Vidic, R.D. "Radium removal from dilute and high ionic strength solution using barium sulfate (BaSO₄): Comparison of experimental results and molecular simulations" ACS National Meeting & Exposition, Orlando, FL, March 31-April 4, 2019.
21. Shamlou, E.M., Mashayekhi, A., Vidic, R.D., Khanna, V. "Thermo-Economic Optimization Based Comparison of Membrane Distillation Vs Mechanical Vapor Recompression for Shale Gas Produced Water Treatment" 2018 AIChE Annual Meeting, 304g, Pittsburgh, PA, October 29-November 1, 2018.
22. Shamlou, E.M., Mashayekhi, A., Vidic, R.D., Khanna, V. "Thermo-Economic Optimization of Mechanical Vapor Recompression System for Shale Gas Produced Water

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 26. Tavakkoli, S., Lokare, O.R., Vidic, R.D. and Khanna, V. “Shale Gas Wastewater Management Using Membrane Distillation: An Optimization Based Approach,” American Institute of Chemical Engineers (AIChE) Annual Conference, Minneapolis, MN, Oct 29. – November 3, 2017.
 27. Lokare, O.R., Liu S., Tavakkoli, S., Khanna, V. and Vidic, R.D. “Comparison of DCMD and VMD for treatment of produced water from unconventional gas extraction” American Water Works Association (AWWA) – American Membrane Technology Association (AMTA), Membrane Technology Conference, Long Beach, CA, Feb 13-17, 2017.
 28. Lokare, O.R. and Vidic, R.D. “Pretreatment for the Control of Membrane Fouling in Direct Contact Membrane Distillation of High Salinity Produced Water from Shale Gas Extraction” American Water Works Association (AWWA) – American Membrane Technology Association (AMTA), Membrane Technology Conference, Long Beach, CA, Feb 13-17, 2017.
 29. Wadekar, S.S. and Vidic, R.D. “Optimization of abandoned mine drainage treatment by commercially available nanofiltration membranes.” American Water Works Association (AWWA) – American Membrane Technology Association (AMTA), Membrane Technology Conference, Long Beach, CA, Feb 13-17, 2017.
 30. Tavakkoli, S., Lokare, O.R., Vidic, R.D. and Khanna, V. “Techno-economic Assessment of Membrane Distillation for Shale Gas Produced Water Treatment” American Institute of Chemical Engineers (AIChE) Annual Conference, San Francisco, CA, Nov. 13-18, 2016
 31. Vidic, R.D., Brantley, S.L., Abad, J.D., Yoxheimer, D., Wilderman, C., Pollak J., Brasier, K. “Lessons Learned about Using Data to Understand Water Issues Related to Shale Gas Development in Pennsylvania: From Science to Sociology” 251st ACS National Meeting & Exposition, San Diego, CA, March 13-17, 2016.
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35. Wadekar, S.S. and Vidic, R.D. "Use of nanofiltration membranes for acid mine drainage treatment" 251st ACS National Meeting & Exposition, San Diego, CA, March 13-17, 2016.
36. Tavakkoli, S., Vidic, R.D. and Khanna, V. "An Industrial Ecology Approach for Managing Wastewater from Shale Gas Production, American Institute of Chemical Engineers (AIChE) Annual Conference, Salt Lake City, UT, Nov. 8 – 13, 2015.
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38. Tavakkoli, S.; Vidic, R. D.; Khanna, V., Exploiting Industrial Ecology for Managing Wastewaters from Shale Gas Operations, International Society for Industrial Ecology (ISIE), Surrey, England, Jul. 7 – 10, 2015.
39. He, C. and Vidic, R.D. "Application of AMD for produced water reuse: Equilibrium and kinetics of solid precipitation and solid waste management" 249th ACS National Meeting & Exposition, Denver, CO, March 22-26, 2015.
40. He, C., Cely, N. and Vidic, R.D. "Feasibility of reusing barite recovered from the produced for drilling mud formulation" 249th ACS National Meeting & Exposition, Denver, CO, March 22-26, 2015.
41. He, C. and Vidic, R.D. "Insight into anti-scaling mechanisms of phosphonates and organic polymers for the control of barium sulfate scales" 249th ACS National Meeting & Exposition, Denver, CO, March 22-26, 2015.
42. He, C. and Vidic, R.D. "Mobility of antiscalant-modified BaSO₄ particles through saturated proppant pack" 249th ACS National Meeting & Exposition, Denver, CO, March 22-26, 2015.
43. Zhang, T. and Vidic, R.D. "Origin of radioactivity in Marcellus Shale flowback water and potential concerns with radioactivity in wastes generated by unconventional gas industry" 249th ACS National Meeting & Exposition, Denver, CO, March 22-26, 2015.
44. Zhang, T. and Vidic, R.D. "Fate of NORM in flowback water and waste management strategies during water reuse for hydraulic fracturing in Marcellus Shale" 249th ACS National Meeting & Exposition, Denver, CO, March 22-26, 2015.
45. Li, Y. and Vidic, R.D. "Fate of radium in wastewater produced during unconventional gas extraction during carbonate precipitation reactions" 249th ACS National Meeting & Exposition, Denver, CO, March 22-26, 2015.
46. Vidic, R.D. "Water quality challenges associated with energy resource extraction from Marcellus Shale" 249th ACS National Meeting & Exposition, Denver, CO, March 22-26, 2015.
47. Zhang, T. and Vidic, R. "Health and Environmental Impacts of Naturally Occurring Radioactive Materials (NORM) Produced by Unconventional Gas Extraction From Marcellus Shale." International Pittsburgh Coal Conference (PCC), Pittsburgh, PA, Oct. 6-9, 2014.
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52. Vidic, R.D., Brantley, S.L., Abad, J.D., Vastine, J., Yoxtheimer, D., Wildermann, C. and Hooper, R.P. "Sharing water quality and quantity data in areas of the Marcellus Shale energy resource to encourage sustainable choices for communities" 246th ACS National Meeting and Exposition, Indianapolis, IN, September 8-12, 2013.
53. Gregory, K.B., Murali Mohan, A. and Vidic, R.D. "Microbial communities and the fate of uranium in simulated produced water impoundments from hydraulic fracturing" 246th ACS National Meeting and Exposition, Indianapolis, IN, September 8-12, 2013.
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70. Kwon, S., Borguet, E. and Vidic, R.D. "Understanding the Impact of Chemical and Morphological Heterogeneity of Carbonaceous Surfaces on Mercury Adsorption" AEESP/AAEE Education and Research Conference, Toronto, Canada, August 10-14, 2002.
71. Zhao, X., Johnson J. K., Kwon S., Vidic R. D., Borguet E., Adsorption of polar organics on graphite from experiment and molecular simulation., AIChE 2001 Annual Meeting: Interfacial phenomena in environmental systems, Reno, Nevada, November 4-9, 2001.
72. Kwon, S.J., Russell, J., Vidic, R.D., and Borguet, E.U. "Probing Chemical and Topological Heterogeneity of Carbonaceous Surfaces via Temperature Programmed Desorption of Simple Molecules from Model Carbonaceous Surfaces" IUVESTA 15th International Vacuum Congress, AVS 48th International Symposium, 11th International Conference on Solid Surfaces, San Francisco, CA, October 28 - November 2, 2001.
73. Kwon, S., Vidic, R.D., and Borguet, E. "Probing Carbonaceous Surface Chemical and Topological Heterogeneity by Temperature Programmed Propane Adsorption/Desorption" University of Pittsburgh, Science Fair 2001, September 13, 2001.
74. You, X. and Vidic, R.D. "Sulfur Impregnation of Activated Carbon through H₂S Oxidation" 25th Biennial Conference on Carbon, Lexington, KY, July 14-19, 2001.
75. Chen, A., Kwon, S.J., Borguet, E.U. and Vidic, R.D. "Impact of Pore Structure and Surface Oxygen on Elemental Mercury Uptake by Virgin Activated Carbon" 25th Biennial Conference on Carbon, Lexington, KY, July 14-19, 2001.
76. Kwon, S.J., Russell, J., Vidic, R.D. and Borguet, E.U. "Investigation of Polar Organic Adsorption/Desorption from a Model Carbonaceous Surface: Acetone on Graphite" 25th Biennial Conference on Carbon, Lexington, KY, July 14-19, 2001.
77. Kwon, S.J., Vidic, R.D. and Borguet, E.U. "Probing Carbonaceous Surface Chemical and Topological Heterogeneity by Temperature Programmed Propane Adsorption/Desorption" 25th Biennial Conference on Carbon, Lexington, KY, July 14-19, 2001.
78. You, X. and Vidic, R.D. "An Industrial Ecology Approach for Reducing Mercury in the Environment" 2001 Symposium on Sustainability, Clarkson University, Potsdam, NY, June 16-19, 2001.
79. Zhao, X., Johnson, K.J., Kwon, S., Vidic, R.D., and Borguet, E.U. "Propane adsorption on graphite wall: Experiment and Simulation" 2001 Midwest Thermodynamics and Statistical Mechanics Conference, East Lansing, MI, May 7-8, 2001.

80. Kwon, S.J., Russell, J., Vidic, R.D., and Borguet, E.U. "Phase Separation in Two Dimensions on Carbonaceous Surfaces: Implications for Atmospheric Chemistry", Annual Chemistry Conference - Duquesne University, Pittsburgh, PA, July, 2000.
81. Kwon, S.J., Russell, J., Vidic, R.D., and Borguet, E.U. "Investigation of Adsorption/Desorption Kinetics on Carbonaceous Surfaces using Optical Differential Reflectivity and Temperature Programmed Desorption", 65th Birthday Symposium Honoring John T. Yates, Jr., R.K. Mellon Professor of Chemistry and Director, Pittsburgh, PA, July, 2000.
82. Lin, Y.E., Stout J.E., Yu, V.L., Vidic, R.D. and States, S.J. "Legionnaires' Disease in An Apartment Building: Disinfection Methods and Recommendations" 1st International Water Congress, International Water Association (Session A, No. 7), Paris, France, July 3 – 7, 2000.
83. Kwon, S.J., Vidic, R.D., and Borguet, E.U. "Combined Theoretical and Experimental Investigation of Mechanisms and Kinetics of Vapor-Phase Mercury Uptake by Carbonaceous Surface Adsorption of Mercury in Gas-Phase" DOE Contractors Meeting, Pittsburgh, PA, June 6-8, 2000.
84. Lin, Y.E., Stout, J.E., Vidic, R.D., and Yu, V.L. "Impact of pH, Alkalinity, Hardness, and Dissolved Organic Carbon on Efficacy of Copper-Silver Ionization for Legionella Eradication" 99th General Meeting, American Society for Microbiology, Chicago, IL, May 30 - June 3, 1999.
85. Liu, W., Vidic, R.D., and Brown, T.D. "Impact of Gas Constituents on Mercury Uptake by Sulfur-Impregnated Activated Carbons." 1999 AIChE Spring National Meeting, Houston, TX, March 14-18, 1999.
86. Vidic, R.D., Wei, L. "Application of Sulfur Impregnated Activated Carbons for the Control of Mercury Emissions from Coal Fired Power Plants" Air Quality Conference, McLean Virginia, December 1-4, 1998.
87. Liu, W. and Vidic, R.D. "Selecting a Proper Impregnate to Improve the Performance of Mercury Control by Different Adsorbents" Fifth International Activated Carbon Conference, Pittsburgh, PA, September 17-18, 1997.
88. Vidic, R. D. and Korpiel, J.A. "Impact of Sulfur Impregnation Method on Mercury Uptake by Activated Carbons" Emerging Technologies in Hazardous Waste Management VIII, I&EC Division - ACS, Birmingham, AL, September 9-11, 1996.
89. Vidic, R.D., Tessmer, C.H., and Uranowski, L.J. "Impact of Surface Properties of Activated Carbons on Oxidative Coupling of Phenolic Compounds." American Carbon Society Workshop, Charleston, SC, June 9-12, 1996.
90. Lin, Y.E., Stout, J.E., Vidic, R.D., McCartney, C., and Yu, V.L. "In Vitro Efficacy of Copper/Silver Ions in Killing Mycobacterium avium: A New Method for Disinfection of Hospital Water Distribution Systems." 96th General Meeting, American Society for Microbiology, New Orleans, May 19-23, 1996.
91. Vidic, R.D. "Control of Mercury Emission in Flue Gas by Activated Carbon Adsorption." Third International Activated Carbon Conference, Pittsburgh, PA, September 11-14, 1995.
92. Petrosky, C.J. and Vidic, R.D. "Pretreatment of Industrial Wastewater Containing Phthalate Esters by Centrifugation." 67th Annual Conference of Pennsylvania Water Environment Association, Champion, PA, June 12-15, 1995.

93. Lin, Y.S., Vidic, R.D., Stout, J.E., and Yu, V.L. "In Vitro Synergy of Copper and Silver Ions in Killing *Legionella*." 95th General Meeting, American Society for Microbiology, Washington, D.C., May 21-25, 1995.
94. Vidic, R.D. "Control of Disinfection By-Products in Drinking Water: Case Studies of Alternative Disinfection Technologies." NATO Advanced Studies Institute, Varna, Bulgaria, October 24 - November 4, 1994.
95. Vidic, R.D. "Control of Disinfection By-Products in Drinking Water: Regulations and Costs." NATO Advanced Studies Institute, Varna, Bulgaria, October 24 - November 4, 1994.
96. Vidic, R.D. "Polymerization of Phenolic Compounds Catalyzed by Activated Carbon Surface." Second International Activated Carbon Conference, Pittsburgh, PA, September 19-23, 1994.
97. Vidic, R.D., Suidan, M.T., and Brenner, R.C. "Effect of Dissolved Oxygen on Phenols Breakthrough from GAC Adsorbers." 16th Biennial IAWPRC Conference, Washington, D.C., May 24-30, 1992. Vidic, R.D., Suidan, M.T., and Brenner, R.C. "Prediction of GAC Adsorptive Capacity With and Without Molecular Oxygen." Symposium on Bioremediation of Hazardous Waste, EPA's Biosystems Technology Development Program, Chicago, IL, May 5-6, 1992.
98. Sorial, G.A., Suidan, M.T., Vidic, R.D., and Brenner, R.C. "Effect of GAC Characteristics on Adsorption of Organic Pollutants" 64th WPCF Annual Meeting, Toronto, Canada, October 7-10, 1991.
99. Vidic, R.D., Sorial, G.A., and Suidan, M.T. "Molecular Oxygen and the Adsorption of Phenols - Effect of Functional Groups." 64th WPCF Annual Conference, Toronto, Canada, October 7-10, 1991.
100. Sorial, G.A., Suidan, M.T., and Vidic, R.D. "Evaluation of Multicomponent Adsorption in Fixed Beds." National AIChE Meeting, Pittsburgh, PA, August 18-21, 1991.
101. Vidic, R.D. and Suidan, M.T. "The True Adsorptive Capacity of GAC." AIChE 1990 Annual Meeting, Chicago, IL, November 11-16, 1990.
102. Vidic, R.D. and Suidan, M.T. "Enhanced Removal of Organic Compounds in GAC Adsorbers." 63rd WPCF Annual Conference, Washington, D.C., October 7-11, 1990.
103. Vidic, R.D., Suidan, M.T., Traegner, U.K., and Nakhla, G.F. "Adsorption Isotherms: Helpful or Misleading." 62nd WPCF Annual Conference, San Francisco, CA, October 16-19, 1989.

F. Invited Presentations

1. "Application of membrane distillation for the recovery of high quality permeate from unconventional produced water" Department of Civil and Environmental Engineering, George Washington University (virtual), October 27, 2023.
2. "Fundamentals and scale-up of membrane distillation for treating produced waters from unconventional oil and gas industry", SLAC-Stanford Water Group (virtual), February 24, 2022.
3. "Membrane distillation for treatment of high salinity wastewaters: Fundamentals and applications", Department of Energy, Environmental and Chemical Engineering, Washington University, St. Louis, April, 5, 2019.

4. "Membrane distillation for Inland Brackish Water Desalination" Keynote presentation at Renewable Energy and Water Sustainability - 5th International Conference on Scientific Research (ISR-2019), Sharm El Sheikh, Egypt, March 26-29, 2019.
5. "Management of Produced Water from Unconventional (Shale) Gas Extraction" Tanta University, Tanta, Egypt, March 25, 2019.
6. "Produced Water: Opportunities and Challenges" Workshop on Environmental Legacies and Produced Water Related to Unconventional Gas Production, The National Academies of Science, Engineering and Medicine, Pittsburgh, PA, November 15, 2018.
7. "Impact of operating conditions in membrane-based separation processes on the characteristics of inorganic scales on membrane surface" Colloidal and Interfacial Science in Separation Processes, Division of Colloid and Surface Chemistry, 256th ACS National Meeting & Exposition, Boston, August 19-23, 2018.
8. "Management of Produced Water from Unconventional (Shale) Gas Extraction", Department of Petroleum Engineering, Louisiana State University, Baton Rouge, March 17, 2017.
9. "Health risks and management strategies for NORM generated by shale gas extraction" 2017 Geochemistry Division Medal Symposium, 253th ACS National Meeting & Exposition, San Francisco, CA, April 2-6, 2017.
10. "Regional Similarities and Differences: Environmental and Regulatory Context for Potential Use of Flowback and Produced Water" Roundtable on Unconventional Hydrocarbon Development, National Academies, Washington, DC, May 25-26, 2016.
11. "U.S. Experience on Wastewater Treatment, Disposal and Reuse" Joint US-UK Workshop on improving Understanding of Potential Environmental Impacts Associated with Unconventional Hydrocarbons, Arlington, VA, November 5-6, 2015.
12. "Use of Abandoned Mine Drainage for the Recovery of Barite from Marcellus Shale Produced Water" The Chemical Sciences Roundtable, National Research Council of the National Academies, Washington, DC, May 18-19, 2015.
13. "Sustainable Water Management for Unconventional Gas Extraction in Marcellus Shale" Keynote Presentation, NSF Workshop: Development of Green Fracturing Fluids and Sustainable Remediation and Containment Technologies, University of Arkansas at Little Rock, April 20-21, 2015.
14. "Environmental Challenges and Opportunities in Unconventional (Shale) Gas Extraction" Department of Chemical and Environmental Engineering, University of Arizona, Tucson, February 17, 2015.
15. "Water Quality Challenges Associated with Energy Resource Extraction from Marcellus Shale - NORM Issues" ASA, CSSA, & SSSA Annual Meetings, Long Beach, CA, November 2-5, 2014.
16. "Sustainable Water Management for Natural Gas Extraction From Marcellus Shale" North American Oil and Gas Conference, Calgary, AB, Canada, October 21-22, 2014.
17. "Abandoned Mine Drainage (AMD) as an Alternative Water Source for Hydraulic Fracturing" Shale Gas Insight, Pittsburgh, PA, September 24-25, 2014.
18. "Wastewater Reuse in Electric Power Production and Unconventional Gas Extraction" Roundtable on Science and Technology for Sustainability, The National Academies, Washington, DC, May 20-21, 2014.

19. "Abandoned Mine Drainage (AMD) as Alternative Water Source for Hydraulic Fracturing" Produced Water Disposal & Reuse Initiative 2014: Utica and Marcellus, Canonsburg, PA, March 26-27, 2014.
20. "Opportunities and Challenges in Unconventional (Shale) Gas Extraction" Illinois Institute of Technology, March 26, 2014.
21. "Environmental Challenges of Unconventional Gas Extraction" Plenary lecture at XIII Seminario Internacional del Medio Ambiente y Desarrollo Sostenible – XIII Simads, November 6-9, 2013, Bucaramanga, Colombia.
22. "Applying Innovative Techniques to Reduce the Amount of Water Used in Unconventional Operation" North Africa Oil & Gas Summit, October 23-25, Tunis, Tunisia.
23. "Environmental Challenges and Opportunities in Shale Gas Extraction" Keynote Presentation at 2013 Mid-Atlantic Conference of the American Water Resources Association, West Windsor, NJ, September 26, 2013.
24. "Treatment Options for Reuse of Flowback and Produced Water" Shale Insight 2013, Philadelphia, PA, September 25, 2013.
25. "Use of Abandoned Mine Drainage for Hydraulic Fracturing in Marcellus Shale" Innovative Water Management Workshop, Petroleum Technology Transfer Council, Morgantown, WV, August 22, 2013.
26. "Reuse of Produced Water for Hydraulic Fracturing" 3rd Annual Shale Play Water Management: Marcellus & Utica 2013, Pittsburgh, PA, March 26-27, 2013.
27. "Challenges and Opportunities for the Use of Abandoned Mine Drainage in Hydraulic Fracturing" SPE Workshop: Water Treatment for Unconventional Production, Forth Worth, TX, March 4-6, 2013
28. "Wastewater Management for Unconventional Gas Extraction" 22nd Annual Southwest Florida Water Resources Conference" Ft. Myers, FL, January 25, 2013.
29. "Water Quality, Quantity, and Management: Lessons from the Marcellus Shale Region" Top engineering technologies for gas industry, Ostrava, Czech Republic, October 24-25, 2012.
30. "Water Management for Unconventional Gas Resource Extraction" 2012 Annual Conference of the Pennsylvania Society of Professional Engineers, Pittsburgh, PA, September 14, 2012.
31. "Flowback and Produced Water in Shale Gas Extraction: Water Quality and Management Options" Identification of Fundamental Interfacial and Transport Phenomena for the Sustainable Deployment of Hydraulic Shale Fracturing – Role of Chemicals Used, NSF Workshop, Arlington, VA, May 14-15, 2012.
32. "Water Quality, Quantity and Management Strategies for Unconventional Shale Plays" Produced Water Management: Strategies for Compliance, Cost Reduction, and Efficiencies, EUCL, Pittsburgh, PA, May 8-9, 2012.
33. "Water Quality, Quantity and Management: Lessons from the Marcellus Shale Region" Hydrofracking in Focus – What Every Citizen Needs to Know, A Science and Management Forum, Cary Institute of Ecosystem Studies, Millbrook, NY, May 5, 2012.
34. "Environmental Challenges for Unconventional Shale Gas Extraction" University of Cincinnati, Cincinnati, OH, May 4, 2012.
35. "Use of Abandoned Mine Drainage for Hydraulic Fracturing" SPE Workshop: Reducing Environmental Impact of Unconventional Resource Development, San Antonio, TX, April 23-25, 2012.

36. "Recycling and Reuse of Wastewater in Marcellus Shale" Shale Gas Water Management Initiative 2012, Pittsburgh, PA, March 28-29, 2012.
37. "Use of AMD in the Development of Marcellus Shale: Technical Uncertainties and Challenges" in *Feasibility and Challenges of Using Coal Mine Drainage for Marcellus Shale Natural Gas Extraction*, RAND Corporation, Pittsburgh, PA, December 14, 2011.
38. "Examining Limitations of Recycling Technologies And Potential Improvements to These Methods to Reduce the Amount of Water Needed for Hydraulic Fracturing" Shale Gas Water Management Initiative 2011, Dallas, TX, November 30 – December 1, 2011.
39. "Water Management for Sustainable Development of Marcellus Industry" Science 2011, Pittsburgh, PA, October 6, 2011.
40. "Strategies for Effective Water and Waste Water Management in Shale Plays" Marcellus Infrastructure Finance and Development Summit 2011, Pittsburgh, PA, October 5, 2011.
41. "Marcellus Shale Impacts and Opportunities: Sustainable Water Management in Marcellus Shale Industry" Annual ASCE/EWRI/CS4 Sustainability Conference, Pittsburgh, PA, September 22, 2011.
42. "Techno-Economic Assessment of Water Management Solutions: Assessing The Economics Of Technologies, And Emerging Solutions For Shale Gas Water Management" Shale Gas Water Management Initiative – Marcellus Initiative 2011, Pittsburgh, PA, April 13-14, 2011.
43. "Should Pittsburgh Permit Marcellus Drilling" Marcella L. Finegold Memorial Public Debate (discussion), William Pitt Debating Team, Pittsburgh, PA, April 6, 2011.
44. "Developing the Law of Marcellus Shale" The University of Pittsburgh Law Review and the Innovation Practice Institute (Expert panel discussion), Pittsburgh, PA, April 5, 2011.
45. "The Water-Shale Nexus: Exploring Strategies and Technologies for Water Treatment, Reuse and Disposal", Eagle Ford E&P Efficiency & Expansion Forum, San Antonio, TX, March 14-15, 2011
46. Vidic, R.D. "Water management options for Marcellus shale development" Global Shale Gas Water Management Initiative 2010, Dallas, TX, October 27-29, 2010.
47. "Global Challenges to Sustainable Water Management" Global Issues Lecture Series, Global Studies Program of the University Center for International Studies, Pittsburgh, PA, October 19, 2010.
48. "Looking Towards the Future of Marcellus Shale Exploration" ASCE/EWRI/CS4 Pittsburgh Regional Water Conference: Protecting and Utilizing our Greatest Asset, Pittsburgh, PA, September 9, 2010.
49. "Phytoremediation of Arsenic Contaminated Groundwaters: The Role of Rhizosphere Microbiota" School of Environmental Studies, China University of Geosciences, Wuhan, China, May 12, 2010.
50. "Reuse of Impaired Waters for Cooling in Coal-Fired Power Plants" School of Resource and Environmental Science, Wuhan University, Wuhan, China, May 13, 2010.
51. Frack Water Management panel discussion at Marcellus Shale Policy Conference, Pennsylvania Environmental Council and Duquesne University, Pittsburgh, PA, May 3-4, 2010
52. "Sustainable Water Management for Marcellus Shale Development" Marcellus Shale Natural Gas Stewardship: Understanding the Environmental Impact, Temple University Summit, Philadelphia, March 18, 2010.

53. "Control of Mercury Emissions from Coal-Fired Power Plants in the US: Regulations and Technology Status", Vinca Institute of Nuclear Sciences, July 27, 2009.
54. "Reuse of Treated Municipal Wastewater in Power Plant Cooling Systems" Faculty of Civil Engineering, University of Belgrade, July 16, 2009.
55. "Control of Mercury Emissions from Coal-Fired Power Plants: Regulations and Technology Status" Department of Civil and Environmental Engineering, University of Cincinnati, February 25, 2008.
56. "Phytoremediation of Arsenic Contaminated Groundwaters: The Role of Rhizosphere Microbiota" Department of Civil and Environmental Engineering, Temple University, November 2, 2007.
57. "Mercury Speciation in Coal-Fired Power Plant Flue Gas: Role of Fly Ash in Catalyzing Mercury Transformations" Department of Civil and Environmental Engineering, University of South Carolina, September 20, 2007.
58. "Phytoremediation for Environmental Cleanup" Department of Civil Engineering, University of Belgrade, July 16, 2007.
59. "Use of Membranes for Treatment of Municipal Wastewater" Faculty of Natural and Mathematical Sciences of the University of Kragujevac and Serbian Chemical Society, February 26, 2004.
60. "Future of Higher Education in Serbia" workshop organized by the Student Union of Belgrade University and GEPS, December 16, 2003.
61. "Engineering Studies in the US – Civil Engineering Program" Faculty of Technical Sciences, University of Novi Sad, October 31, 2003.
62. "Higher Education in The US – Example of Engineering Studies" Plenary lecture at the Second GEPS Conference, Novi Sad, Serbia and Montenegro, 11, 2003.
63. "Phytoremediation: Using plants for environmental cleanup" Plenary lecture at the 5th Regional Conference on Environment and Food Quality, Novi Sad, Serbia and Montenegro, September 4-5, 2003.
64. "Bridging the pressure gap from UHV to atmospheric conditions: Adsorption of mercury by graphite and activated carbon" Presented at Environmental Engineering Science and Management Seminar Series, Carnegie Mellon University, Pittsburgh, PA, April 4, 2003.
65. Discussion of "An Effective Biocide Combination Treatment Program for Cooling Water Systems", 63rd Annual International Water Conference, Pittsburgh, PA, October 20-24, 2002 (published in Conference proceedings).
66. "Impact of Surface Heterogeneity of Carbonaceous Sorbents on Mercury Uptake" Plenary lecture at the 2002 International Activated Carbon Conference, Pittsburgh, PA, September 26-27, 2002.
67. "Sulfur Impregnation Approach for the Production of Economical Mercury Adsorbents" Department of Chemistry, University of Kentucky, Lexington, KY, October 12, 2001.
68. "Development of Novel Sorbents for the Control of Mercury Emissions from Coal-Fired Power Plants" Department of Chemical and Petroleum Engineering, University of Pittsburgh, Pittsburgh, PA, September 21, 2001.
69. "Applied Industrial Ecology – Reducing Mercury in the Environment" University of Pittsburgh, Science Fair 2001, September 13, 2001.
70. "Disinfection Modalities for the Control of Legionella in Water Distribution Systems" NSF Workshop, Holiday Inn, Pittsburgh, October 30-31, 2000.

71. "Uptake of Elemental Mercury Vapors by Sulfur Impregnated Activated Carbons" Institute for Technical Chemistry, Forschungszentrum Karlsruhe, Karlsruhe, Germany, March 9, 2000.
72. "Novel Technologies for the Control of Legionella in Institutional Water Distribution Systems", WAREM – Water Resources Institute, University of Stuttgart, Stuttgart, Germany, January 25, 2000.
73. "Chemical Compatibility of Organic Polymers with Polar and Non-Polar Solvents: Membrane Filtration of Industrial Wastewater" Dow Chemicals, Stade, Germany, December 14, 1999.
74. "Impact of Surface Functional Groups on Activated Carbon Uptake of Phenolic Compounds." Institute for Chemical Technology, University of Karlsruhe, Karlsruhe, Germany, November 11, 1999.
75. "Application of Impregnated Activated Carbons for the Control of Elemental Mercury Emissions from Coal Fired Power Plants" National Technical Workgroup Mercury Workshop, Atlanta, GA, November 18-20, 1998.
76. "Development of Economical Sorbents for Mercury Emissions Control from Coal-Fired Power Plants" Plenary lecture at the 1998 International Activated Carbon Conference, Pittsburgh, PA, September 18, 1998.
77. "Control of Mercury Emissions from Coal-Fired Power Plants" Plenary lecture at the 1997 International Activated Carbon Conference, Pittsburgh, PA, September 17, 1997.
78. "Remediation Technology Status Report: Treatment Walls" Emerging Technologies in Hazardous Waste Management VIII, I&EC Division - ACS, Birmingham, AL, September 9-11, 1996. "Adsorption Technology for the Control of Mercury Emissions from Combustion Processes." Presented at Environmental Science and Engineering Seminar Series, Carnegie Mellon University, Pittsburgh, PA, March 1, 1996.
79. "Control of Disinfection By-Products in Drinking Water: Regulations and Costs." NATO Advanced Studies Institute, Varna, Bulgaria, October 24 - November 4, 1994.
80. "Control of Disinfection By-Products in Drinking Water: Case Studies of Alternative Disinfection Technologies." NATO Advanced Studies Institute, Varna, Bulgaria, October 24 - November 4, 1994.

GRADUATE STUDENT ADVISING

MS Students

Name	Year	Source of Support	Dissertation Title
Curtis J. Petrosky	1994	Part-time	Pretreatment of Industrial Wastewater Containing Phthalate Esters by Centrifugation
J. Brendan McLaughlin	1995	American Industrial Recycling	Activated Carbon Adsorption for the Removal of Mercury from Flue Gas Emissions
Yu-sen Eason Lin	1995	VA Medical Center	Disinfection of <i>L. pneumophila</i> with Cu/Ag ionization
Jacob A. Bourdeau	1996	Pitt CRDF	Effect of Ash and Metal Content of the Catalytic Properties of Activated Carbon for Oxidative Coupling of Phenolic Compounds

Charles H. Tessmer	1996	PEDA	The Effect of Oxygen-Containing Surface Functional Groups on the Catalytic Behavior of Granular Activated Carbon
Lois J. Uranowski	1996	Self	The Effect of Surface Metal Oxides on Activated Carbon Adsorption of Phenolics
George S. Sarapa	1996	Allegheny County Health Department	Use of GIS in groundwater monitoring
Min-Tsang Chang	1996	U.S. EPA	Kinetics of vapor-phase mercury uptake by different adsorbents
John A. Korpiel	1996	PEDA	Effect of sulfur impregnation method on activated carbon adsorption of vapor-phase mercury
Edward C. McCall	1998	VA Medical Center	Efficacy of biocides against Legionella in the biofilm of a model plumbing system
Douglas P. Siler	1999	Teaching Assistantship	Effect of chloride salt impregnation on activated carbon adsorption of vapor-phase mercury
Thomas J. O'Toole	1999	Part-time	Sanitary wastewater treatment plant evaluation
Seokjoon Kwon	1999	U.S. DOE	Evaluation of sulfur impregnation processes on different substrates for the production of elemental mercury sorbents
Joe M. Klinvex	2000	Part-time	Iron and manganese removal from drinking water
Yang Gao	2000	VA Medical Center	Inactivation of Legionella by monochloramine, chlorine dioxide and DBNPA in a pilot-scale water plumbing system
Xiaozhou You	2002	Dominion Center	Sulfur impregnation on activated carbon through hydrogen sulfide oxidation
John L. Stuart	2002	Chester fellowship	Evaluation of mercury uptake by activated carbons under simulated flue gas conditions
John A. Bendick	2003	Allegheny County Health Department	Feasibility of cross-flow microfiltration for combined sewer overflows
Claude Modise	2003	Fraunhofer Center	Use of polymeric microfiltration membranes to remove microorganisms and organic pollutants from primary sewage effluent
Sevil Caniyilmaz	2005	Mascaro Sustainability Initiative	Removal of arsenic during Fe-Mn oxidation and microfiltration
Chantal Blake	2006	Mascaro Sustainability Initiative	Optimizing the use of arsenic hyper-accumulating ferns for treatment of arsenic contaminated water
Ana Maria Benvides	2007	Mascaro Sustainability Initiative	The effect of arsenic speciation on arsenic uptake and fate in the presence of the hyper-accumulating species Pteris Cretica
Xihua Chen	2007	U.S. DOE	Impact of fly ash composition and flue gas components on mercury speciation
Ravi Bhardwaj	2007	Corning, Inc.	Development of novel sorbents for mercury control
Huixing Li	2008	US DOE	Selective catalytic oxidation of hydrogen sulfide from syngas

Wei Sun	2009	US DOE	Use of abandoned mine drainage solids for the control of mercury emissions from coal-fired power plants
Yinghua Feng	2009	US DOE	Management of blowdown from closed loop cooling systems using impaired waters
Shih-Hsiang Chien	2009	US DOE	Regulatory assessment of wastewater use for cooling in thermoelectric power plants
Scott Duda	2010	ASHRAE	Use of non-chemical devices to control biofouling in cooling towers
Meng Li	2011	US DOE	Removal of divalent cations from Marcellus Shale flowback water through chemical precipitation
Xihun Wang	2012	US DOE	Membrane filtration of Marcellus Shale flowback water
Xuan (Katie) Zhang	2013	Self support	Solids removal from a mixture of flowback and AMD
Liang Tang	2014	US DOE	Thermodynamic model for membrane distillation
Emily Wolff	2015	US DOE	Use of acrylic co-polymer membrane for membrane distillation
Zhewei Zhang	2018	Self support	Use of membrane distillation for water recovery from brackish water RO concentrate

Ph.D. Students

Name	Year	Source of Support	Dissertation Title
Wei Liu	1998	U.S. DOE	Development of novel adsorbents for the control of vapor-phase mercury emissions
Yu-Sen E. Lin	1999	VA Medical Center	Use of copper/silver ions for disinfection of Legionella and Mycobacterium in water distribution systems
Seokjoon Kwon	2002	U.S. DOE	Environmentally relevant adsorption on carbonaceous surfaces studied by optical differential reflectance and temperature programmed desorption
Xue Feng	2005	NSF	Application of single walled carbon nanotubes in environmental engineering: Adsorption and desorption of environmentally relevant species studied by infrared spectroscopy and temperature programmed desorption
Wenguo Feng	2005	NSF	Hydrogen sulfide adsorption/oxidation on carbonaceous surfaces and its application in vapor phase mercury control
Zhe Zhang	2007	VA Medical Center	Use of chlorine dioxide for Legionella control in hospital water systems
Heng Li	2010	US DOE	Mineral deposition in recirculating cooling systems using treated municipal wastewater: Kinetics, mechanism and modeling

Shih (Sean) Chien	2012	US DOE	Use of chlorine, chloramine, and chlorine dioxide to control biological growth in power plant recirculating cooling system using treated municipal wastewater
Wenshi Liu	2013	US DOE	Control of chemical precipitation in recirculating cooling system using treated municipal wastewater
David Sanchez	2013	IGERT/NSF	Understanding the influence of the electrode material on microbial fuel cell performance
Tieyuan Zhang	2015	US DOE	Origin and fate of Radium in flowback and produced water from Marcellus Shale
Can He	2016	US DOE	Fate of sulfate during hydraulic fracturing in Marcellus shale
Shardul Wadekar	2018	SAFER	Separation potential characterization and its role in selecting nanofiltration for the removal of inorganic ions
Omkar Lokare	2018	US DOE	Development of direct contact membrane distillation for Marcellus shale produced water treatment
Alen Gusa	2019	NSF	Management of TENORM waste generated by unconventional gas extraction
Zhewei Zhang	2022	US DOE	Calcium scaling in direct contact membrane distillation (DCMD) at high salinities
Ritesh Pawar	2023	US DOE	Fundamentals and scale-up of membrane distillation for treating produced waters from oil and gas industry

Post-Doctoral Scientists

Haiqing Chang, 2019-2020

Yoshihiko Inagaki, 2018-2019

Shiyun Zhu, 2011-2012

Theodore Novitsky, 2010 - 2011

Elise Barbot, 2009-2012

Hui Liu, 2007-2008

Aiguo Chen, 1999-2000

COURSES TAUGHT

CEE 1503 Introduction to Environmental Engineering

This is an undergraduate level course that covers fundamentals of environmental science and engineering as applied to water and wastewater treatment, air quality control, and solid and hazardous waste management.

CEE 2501 Environmental Engineering Chemistry

This course is offered to both undergraduate and graduate level students and is designed to assist students in developing and understanding fundamentals of water chemistry as applied

to the description and evaluation of natural environments and environmental quality control systems.

CEE 2502 Physical/Chemical Principles of Environmental Engineering

This course is predominantly a graduate level course that is designed to assist students in understanding basic principles and applications of thermodynamics, fluid mechanics, reaction equilibria and kinetics, diffusion, and mass transfer to natural environments and environmental quality control systems.

CEE 2508 Atmospheric Pollution Control

The course is designed to assist students in understanding sources and transport of air pollutants and design of control technologies for particulate and gaseous emissions with emphasis on stationary sources of air pollutants.

CEE 3501 Environmental Engineering Processes I

This graduate level course is designed to assist students in understanding theory and applications of physical and chemical principles to water and wastewater treatment and disposal including mixing, equalization, coagulation, sedimentation, filtration, disinfection, adsorption, chemical precipitation, gas transfer, and solids handling.

CEE 3503 Environmental Engineering Process Laboratory

The course is designed to assist students in understanding and designing laboratory simulations for developing design and control parameters for unit operations and processes applicable to environmental quality control systems.

SPONSORED RESEARCH PROJECTS
(Principal Investigator)

BRIDGE NEXUS: Building Next-Gen Research and Innovation toward Educational Excellence in Egypt's Water-Energy-Food Nexus under Climate Change

Agency: U.S. AID

Amount: \$2.86 million (Pitt share: \$402,000)

Duration: 1/25 – 4/28 (cancelled by presidential executive order)

Bench and Pilot-Scale Demonstration of Air Gap Membrane Distillation

Agency: U.S. DOE – Research Support Services (Leidos)

Amount: \$329,150

Duration: 10/22 – 12/23

Kinetic Modeling and Experimental Validation of Mineralization in High Salinity Brine Solutions with and without Scale Inhibitors

Agency: National Alliance for Water Innovation

Amount: \$1.13 million (Pitt share: \$134,000)

Duration: 10/21 – 12/23

Deploying Intensified, Automated, Mobile, Operable, and Novel Designs "DIAMOND" for Treating Shale Gas Wastewater

Agency: U.S. DOE

Amount: \$5.3 million (Pitt share: \$1.7 million)

Duration: 01/19 – 06/22

Field testing of Air Gap Membrane Distillation Technology

Agency: University of North Dakota, Energy and Environmental Research Center

Amount: \$206,302

Duration: 06/21 – 12/21

Scale up and Demonstration of Membrane Distillation

Agency: U.S. DOE

Amount: \$847,500 (Pitt share: \$542,500)

Duration: 01/19 – 12/21

Fate and Control of Naturally Occurring Radioactive Material (NORM) Produced by Unconventional Gas Industry

Agency: NSF

Amount: \$270,178

Duration: 04/15 – 03/18

Development of Membrane Distillation Technology Utilizing Waste Heat for Treatment of High Salinity Wastewaters (Co-PI: V. Khanna)

Agency: U.S. DOE

Amount: \$654,183

Duration: 10/14 – 09/17

Technical and Logistical Feasibility of Abandoned Mine Drainage Treatment and Use in Unconventional Shale Gas Well Treatments

PI: R. Vidic
Agency: SAFER
Amount: \$98,684
Duration: 03/15 – 02/16

Fate of Radium During Lime-Soda Ash Softening of Water Produced During Unconventional Gas Extraction

PI: R. Vidic
Agency: Shell
Amount: \$96,805
Duration: 10/14 – 09/15

Sustainable Management of Flowback Water during Hydraulic Fracturing of Marcellus Shale for Natural Gas Production

Agency: U.S. DOE
Amount: \$794,226
Duration: 10/10 – 1/15

Fate of Naturally Occurring Radioactive Material (NORM) in Flowback and Produced Waters from Natural Gas Development

Agency: U.S. DOE
Amount: \$275,000
Duration: 10/10 – 11/14

Use of Treated Municipal Wastewater as Power Plant Cooling System Makeup Water: Tertiary Treatment versus Expanded Chemical Regimen for Recirculating Water Quality Management

Agency: U.S. DOE
Amount: \$740,550
Duration: 10/08 – 6/12

Biological Control in Cooling Water Systems using Non-Chemical Water Treatment Devices

Agency: ASHRAE
Amount: \$179,715
Duration: 07/08 – 4/10

Reuse of Treated Internal or External Wastewaters in the Cooling Systems of Coal-based Thermoelectric Power Plants

Agency: U.S. DOE
Amount: \$617,703
Duration: 7/06 – 6/09

Evaluation of Biofilm Monitoring and Control Using BioGeorge and VMP for Cooling Tower Applications

Agency: Veolia Water Solutions
Amount: \$27,142
Duration: 05/09 – 09/09

Catalysts for Selective Hydrogen Sulfide Oxidation

Agency: U.S. DOE – NETL
Amount: \$196,857
Duration: 9/06 – 5/08

Evaluation of a Novel Carbon Material (Carbon Honeycomb) for Mercury Control

Agency: Corning, Inc.
Amount: \$84,000
Duration: 6/06 – 9/08

Mercury Speciation in Coal-Fired Power Plant Flue Gas

Agency: U.S. DOE – University Coal Research
Amount: \$400,000
Duration: 8/05 – 7/08

Development of Novel Mercury Adsorbents through Applied Industrial Ecology (Co-PI: Dr. E. Borguet)

Agency: National Science Foundation
Amount: \$376,180
Duration: 8/02 – 7/06

Application of Ceramic Membrane Module to Combined Sewer Overflows (Co-PI with Dr. R.D. Neufeld)

Agency: Three Rivers Wet Weather Demonstration Program – ACHD
Amount: \$293,494
Duration: 1/02 – 12/03

Modeling In-Duct Mercury Control by Powdered Sorbent Injection

Agency: U.S. DOE - NETL
Amount: \$35,551
Duration: 8/02 – 9/03

Adsorption on Nanotubes (Co-PI with Dr. E. Borguet)

Agency: National Energy Technology Laboratory (NETL); Student Partnership Program
Amount: \$35,000
Duration: 01/02-01/03

Environmental and Public Health Recovery and Protection in Yugoslavia

Agency: University Center for International Studies
Amount: \$24,800
Duration: 5/02 – 4/03

Catalytic Oxidation of Hydrogen Sulfide on Activated Carbon for Simultaneously Upgrading Low Quality Natural Gas and Producing Effective Elemental Mercury Sorbents

Agency: DOMINION Center for Environment and Energy

Amount: \$15,000

Duration: 9/01 – 12/02

Modeling Sorbent Injection for Mercury Control

Agency: U.S. DOE - NETL

Amount: \$33,510

Duration: 2/01 – 10/01

Combined Theoretical and Experimental Investigation of Mechanisms and Kinetics of Vapor-Phase Mercury Uptake by Carbonaceous Surfaces (Co-PIs: Dr. E.U. Borguet and Dr. J.K. Johnson)

Agency: U.S. DOE - FETC (University Coal Research Program)

Amount: \$360,931

Duration: 9/98 – 3/01

Experimental Investigation of Mercury Capture by Novel Sulfur Impregnated Activated Carbons Under Simulated Flue Gas Conditions

Agency: U.S. DOE - FETC

Amount: \$50,102

Duration: 9/98 - 2/99

Development of Novel Activated Carbon-Based Adsorbents for the Control of Mercury Emissions from Coal-Fired Power Plants

Agency: U.S. DOE - FETC (University Coal Research Program)

Amount: \$261,055

Duration: 9/96 - 8/98

Uptake of Mercury Vapor by Activated Carbon

Agency: U.S. Environmental Protection Agency

Amount: \$88,556

Duration: 10/94 - 9/96

Groundwater Quality Database for Allegheny County

Agency: Allegheny County Health Department

Amount: \$24,000

Duration: 9/94 - 8/96

Mercury Control in Coal-Fired Power Plant Flue-Gas

Agency: Pennsylvania Energy Development Authority

Amount: \$101,103

Duration: 9/94 - 6/96

Effect of Activated Carbon Characteristics on the Adsorption of Phenolic Compounds

Agency: University of Cincinnati Engineering Research Center
Amount: \$10,000
Duration: 5/94 - 4/95

Control of Mercury Concentration in Gaseous Emissions

Agency: American Industrial Recycling, Pittsburgh, PA
Amount: \$15,300
Duration: 1/94 - 9/94

Catalytic Properties of Activated Carbon

Agency: University of Pittsburgh Central Research Development Fund
Amount: \$13,000
Duration: 1/93 - 1/94

Educational Grant for Equipment Purchase

Agency: N-Con Systems, Inc., Larchmont, NY
Amount: \$15,750
Duration: One-time grant - 1993

CONSULTING EXPERIENCE

Veolia Water Technologies - Assessment of the produced water treatment plant in WV, 2019

Shell Exploration and Production - Downhole risks for mineral scaling, 2011-2015

RAND Corporation - Feasibility and challenges of using acid mine drainage for Marcellus Shale natural gas extraction activities, 2011.

Rice Energy - Use of acid mine drainage for hydrofracturing operations, 2011

DTE Energy Services - Water treatment needs and opportunities in Marcellus shale play, 2011

Range Resources - Management of water impoundments for water quality, 2010-2011

Gas Technology Institute – Techno-Economic Assessment of Water Management Solutions, 2010-2011

NA Water Solutions - ceramic membranes for flowback water treatment, 2010

BG Group – Water risks for shale gas operations in the US, 2010

Stericycle (Lake Forest, IL) - implementation of chlorine dioxide disinfection practice in US hospitals, 2005-2006.

European Agency for Reconstruction - Key expert for “Feasibility Study for Hazardous and Medical Waste Management in Serbia”, Belgrade, Serbia and Montenegro, 2003-2004.

Public Health Institute of Belgrade - Update of hazard indicators for the city of Belgrade, Serbia and Montenegro, 2003-2005

REC CO SCG - Key expert for “Regional Strategy for Hazardous Waste Management in Serbia” funded by the Stability Pact for Southeastern Europe, 2003.

REC CO SCG - Expert for hazardous and industrial waste generation and treatment for "SWAMAP Municipal Solid Waste Management Plan", 2002-2003

Allegheny County Wet Weather Demonstration Program - Comprehensive assessment of CSO/SSO management requirements in the county, 2000-2002.

Energy and Resource Technology, Inc., Taiwan - Design of air pollution control system for thermal soil treatment plant, 2000-2001.

Halox, Inc. (Bridgeport, CT) - Use of novel chlorine dioxide generating system for the control of biofilms in institutional water distribution systems, 2000.

NUCON International, Inc. (Columbus, OH) - Mercury sorbent manufacturing and testing program, 1999.

Nemacolin Woodlands Resort (Farmington, PA) - Critical evaluation of the drinking water treatment plant process with emphasis on process optimization and safety, 1999.

ICF Consulting Group (Fairfax, VA) - Development of Drinking Water Criteria Document for Legionella, 1998.

Nichols & Slagle Engineering, Inc. (Pittsburgh, PA) - Expansion of the Leetsdale Borough wastewater treatment plant, PA, 1998.

Metcalf & Eddy, Inc. (San Diego, CA) - Development of membrane bioreactors for water reclamation in San Diego, CA, 1998.

Institute for Water Resources “Jaroslav Černi” - Membrane filtration technology in the City of Zrenjanin water treatment plant, Serbia and Montenegro, 1997-1998.

Vencon Management, Inc. (New York, NY) - Alanco Flue Gas Desulfurization technology demonstration program, 1997.

Advanced Technology Systems, Inc. (Pittsburgh, PA) - Continuous emission monitoring program for mercury in Allegheny County, 1996.

Allegheny County Health Department (Pennsylvania) - Integrated Groundwater Monitoring Program and Wellhead Protection Program for the County, 1994-1995.