

Kerry J. Howe, Ph.D., P.E., BCEE

Associate Professor and Regents' Lecturer
Department of Civil Engineering
University of New Mexico
Albuquerque, NM 87131-0001

phone: 505-277-2702
fax: 505-277-1988
email: howe@unm.edu

EDUCATION

B.S. Civil and Environmental Engineering, University of Wisconsin-Madison, 1984.
M.S. Environmental Health Engineering, the University of Texas at Austin, 1986.
Ph.D. Environmental Engineering, University of Illinois at Urbana-Champaign, 2001.

REGISTRATION AND CERTIFICATION

Registered Professional Engineer, Wisconsin and New Mexico
Board Certified Environmental Engineer (BCEE), American Academy of Environ. Engineers

EMPLOYMENT HISTORY

2002-present: University of New Mexico (Albuquerque, NM).
2008-present: Associate professor.
2002-2008: Assistant professor.

1998-2001: University of Illinois at Urbana-Champaign (Urbana, IL). Research assistant.

1986-1998: Montgomery Watson Harza, Inc. (Pasadena, CA, Plantation, FL, and Tulsa, OK).
Started as Engineer; promoted to Principal Engineer before leaving company.
Participated in many types of water and wastewater treatment engineering projects as project engineer or project manager. Types of projects included treatability studies, facility evaluations, master plans, pilot studies, predesign, detailed design, construction management, and plant startup.

1986: CH2M-Hill (Corvallis, OR). Engineer. Worked as staff engineer on wastewater treatment studies and design projects.

MAJOR AWARDS

1. Regents' Lecturer, UNM, 2012.
2. Golden Spigot Award, award for service to the American Water Works Association, 2007.

3. Junior Faculty Teaching Excellence Award, UNM School of Engineering, 2006.
4. Outstanding Young Investigator, UNM Chapter of Sigma Xi. 2004.
5. Honor Award in the University Research category of the Excellence in Environmental Engineering competition, sponsored by the American Academy of Environmental Engineers. 2002. (awarded for Ph.D. Thesis)
6. François Fiessinger Memorial Scholarship, 3-year fellowship awarded by the Environmental Research and Education Foundation in a national competition. 1998.

PATENT APPLICATIONS

Patent application 12/880,359 filed “High Water Recovery from Desalination Systems using Ion Exchange Technology.”

PUBLICATIONS AND PRESENTATIONS

BOOKS

Howe, K.J., D.H. Hand, J.C. Crittenden, R.R. Trussell, and G. Tchobanoglous. *Principles of Water Treatment*. John Wiley and Sons, New York. ISBN 978-0-470-40538-3. 2012.

Crittenden, J.C., R.R. Trussell, D.H. Hand, K.J. Howe, and G. Tchobanoglous. *MWH’s Water Treatment: Principles and Design, 3rd ed.* John Wiley and Sons, New York. ISBN 978-0-470-40539-0. 2012.

Membrane Treatment for Drinking Water and Reuse Applications: A Compendium of Peer-Reviewed Papers. Edited by Kerry J. Howe. American Water Works Association, Denver, CO. ISBN 1-58321-475-5. 2006.

PEER-REVIEWED JOURNAL MANUSCRIPTS

- * Graduate student advised by K. Howe
- # Post-doctoral researcher supported by K. Howe

1. Leavitt*, J.J., S.E. Cabaniss, K.J. Howe, L.R. Connolly, J.R. Bargar, V. Stucker, R. Csencsitis, D. Pham, and P.E. Long. “The Effect of Uranium Biosorption to *G. uraniireducens* on Overall Uranium Transport,” in preparation for submission to *Environmental Science and Technology* in March, 2013.
2. Field*, E.L., K.J. Howe, and B.M. Thomson. “Effect of Solids Retention Time in Membrane Bioreactors on Reverse Osmosis Membrane Fouling,” in preparation for submission to *Water Research* in April, 2013.

3. Field*, E.L., K.J. Howe, and B.M. Thomson. "Spatial and Temporal Evolution of Foulants on the Surface of Reverse Osmosis Membranes in Wastewater Reuse Applications," in preparation for submission to *Environmental Engineering Science* in April, 2013.
4. Lee*, C.O., K.J. Howe, and B.M. Thomson. "Ozone and Biofiltration as an Alternative to Reverse Osmosis for Removing PPCPs and Micropollutants from Treated Wastewater," *Water Research*. Vol. 46, No. 4, pp. 1005-1014. 2012.
5. Leavitt*, J.J. K.J. Howe, and S.E. Cabaniss. "Equilibrium Modeling of U(VI) Speciation in High Carbonate Groundwaters: Model Error and Propagation of Uncertainty," *Applied Geochemistry*, Vol. 265, No. 12, pp. 2019-2026. 2011.
6. Nguyen, A.H., J.E., Tobiasson, and K.J. Howe. "Fouling Indices for Low Pressure Hollow Fiber Membrane Performance Assessment." *Water Research*. Vol. 45, No. 8, pp. 2627-2637. 2011.
7. Higgin*, R., K.J. Howe, and T.M. Mayer. "Synergistic Behavior between Silica and Alginate: Novel Approach for Removing Silica Scale from RO Membranes." *Desalination*, Vol. 250, No. 1, pp. 76-81. 2010.
8. Chen[#], D., K.J. Howe, J. Dallman, and B.C. Letellier. "Corrosion of Aluminum in the Aqueous Chemical Environment of a Loss of Coolant Accident at a Nuclear Power Plant." *Corrosion Science*. Vol. 50, No. 4, pp. 1046-1057. 2008.
9. Howe, K.J., A. Marwah*, K-P. Chiu, and S. Adham. "Effect of Membrane Configuration on Bench-scale MF and UF Fouling Experiments." *Water Research*. Vol. 41, No. 17, pp. 3842-3849. 2007.
10. Chen[#], D., K.J. Howe, J. Dallman, B.C. Letellier, M. Klasky, J. Leavitt*, and B.P. Jain. "Experimental Analysis of the Aqueous Chemical Environment Following a Loss-of-coolant Accident." *Nuclear Engineering and Design*. Vol. 237, No. 20-21, pp. 2126-2136. 2007.
11. Ghosh[#], A.K., K.J. Howe, A.K. Maji, B. Letellier, R. Johns, and T-Y. Chang. "Head Loss Characteristics of a Fibrous Bed in a Chemical Environment." *Journal of Nuclear Technology*. Vol. 157, No. 2, pp. 196-207. 2007.
12. Howe, K.J., A. Marwah*, K-P. Chiu, and S. Adham. "Effect of Coagulation on the Size of MF and UF Membrane Foulants." *Environmental Science and Technology*. Vol. 40, No. 24, pp. 7908-7913. 2006.
13. Howe, K.J. and M.M. Clark. "Effect of Coagulation Pretreatment on Membrane Filtration Performance." *Journal of the American Water Works Association*. Vol. 98, No. 4, pp. 133-146. 2006.
14. AWWA Membrane Technology Research Committee (primary authors I.C. Escobar, E.M. Hoek, C.J Gabelich, F.A. DiGiano, Y.A. Le Gouellec, P. Berube, and K.J. Howe).

“Committee Report: Recent Advances and Research Needs in Membrane Fouling.” *Journal of the American Water Works Association*. Vol. 97, No. 8, pp. 79-89. 2005.

15. Koh, M., M.M. Clark, and K.J. Howe. “Filtration of Lake Natural Organic Matter: Adsorption Capacity of a Polypropylene Microfilter.” *Journal of Membrane Science*. Vol. 254, No. 1-2, pp. 169-175. 2005.
16. Howe, K.J. and M.M. Clark. “Fouling of Microfiltration and Ultrafiltration Membranes by Natural Waters.” *Environmental Science and Technology*. Vol. 36, No. 16, pp. 3571-3576. 2002.
17. Howe, K.J. K.P. Ishida, and M.M. Clark. “Use of ATR/FTIR Spectrometry to Study Fouling of Microfiltration Membranes by Natural Waters.” *Desalination*. Vol. 147, pp. 251-255. 2002.
18. Howe, K.J., and D.F. Lawler. “Acid-Base Reactions in Gas Transfer: A Mathematical Approach.” *Journal of the American Water Works Association*. Vol. 81, No. 1, pp. 61-66. 1989.

PUBLISHED TECHNICAL REPORTS

19. Goldman*, J.E., K.J. Howe, B.M. Thomson, and R. Fowlie. *Selective Salt Recovery from Reverse Osmosis Concentrate using Inter-Stage Ion Exchange*. WateReuse Research Foundation, Alexandria, VA. May, 2012.
20. Lee*, C.O., K.J. Howe, and B.M. Thomson. *Ozone and Biofiltration as an Alternative to Reverse Osmosis for Removing PPCPs and EDCs from Wastewater*. Final Report, New Mexico Environment Department, Albuquerque, NM. May, 2010.
21. Field*, E.F., K.J. Howe, and B.M. Thomson. *Effect of Solids Retention Time in Membrane Bioreactors on Reverse Osmosis Membrane Fouling*. Final Report, New Mexico Environment Department, Albuquerque, NM. April, 2010.
22. Lee*, C.O., K.J. Howe, and B.M. Thomson. *State of Knowledge of Pharmaceutical, Personal Care Product, and Endocrine Disrupting Compound Removal During Wastewater Treatment*. Final Report, New Mexico Environment Department, Albuquerque, NM. April, 2009.
23. Dallman, J., B.C. Letellier, J. Garcia*, J. Madrid, W. Roesch, D. Chen[#], and K.J. Howe. *Integrated Chemical Effects Test Project (Volumes 1 through 6)*. Nuclear Regulatory Commission Report NUREG/CR-6914. December, 2006.
24. Klasky, M., J. Zhang, M. Ding, B.C. Letellier, D. Chen[#], and K.J. Howe. *Aluminum Chemistry in a Prototypical Post-Loss-of-Coolant-Accident, Pressurized-Water-Reactor Containment Environment*. Nuclear Regulatory Commission Report NUREG/CR-6915. December, 2006.

25. Adham, S., K-P. Chiu, G. Lehman, K. Howe, A. Marwah*, C. Mysore, J. Clouet, Z. Do-Quang, and O. Cagnard. *Optimization of Membrane Treatment for Direct and Clarified Water Filtration*. AWWARF: Denver, CO. ISBN 978-1-84339-967-4. 2006.
26. Sadasivan, P., C.B. Dale, B.C. Letellier, A. Maji, K.J. Howe, F. Carles*, and C.E. Anderson. *Effect of Insulation Debris on Throttle-Valve Flow Performance*. Nuclear Regulatory Commission Report NUREG/CR-6902. March, 2006.
27. Dale, C.B, B.C. Letellier, A. Maji, K.J. Howe, and F. Carles*. *Screen Penetration Test Report*. Nuclear Regulatory Commission Report NUREG/CR-6885. October, 2005.
28. Ding, M., A. Abdel-Fattah, S. Fisher, B.C. Letellier, K.J. Howe, J. Garcia*, and C.J. Shaffer. *Characterization and Head-Loss Testing of Latent Debris from Pressurized-Water-Reactor Containment Buildings*. Nuclear Regulatory Commission Report NUREG/CR-6877. July, 2005.
29. Shaffer, C.J., M.T. Leonard, B.C. Letellier, D.V. Rao, A.K. Maji, K.J. Howe, A. Ghosh[#], J. Garcia*, W.A. Roesch, and J.D. Madrid. *GSI-191: Experimental Studies of Loss-of-Coolant-Accident-Generated Debris Accumulation and Head Loss with Emphasis on the Effects of Calcium Silicate*. Nuclear Regulatory Commission Report NUREG/CR-6874. May, 2005.
30. Johns, R.C., B.C. Letellier, K.J. Howe, and A.K. Ghosh[#]. *Small-Scale Experiments: Effects of Chemical Reactions on Debris-bed Head Loss*. Nuclear Regulatory Commission Report NUREG/CR-6868. March, 2005.
31. Howe, K.J. and M.M. Clark. *Coagulation Pretreatment for Membrane Filtration*. AWWA and AWWARF: Denver, CO. ISBN 978-1-58321-265-5. 2002.
32. Amy, G., J. Cho, Y. Yoon, S. Wright, M. Clark, E. Molis, C. Combe, Y. Wang, P. Lucas, Y. Lee, M. Kumar, K. Howe, and K-S. Kim. *NOM Rejection by, and Fouling of, NF and UF Membranes*. AWWA and AWWARF: Denver, CO. ISBN 978-1-58321-106-9. 2001.

CONFERENCE PROCEEDINGS

33. Howe, K.J., J.E. Goldman*, and B.M. Thomson. "Selective Recovery of Desalination Concentrate Salts Using Interstage Ion Exchange." *Proceedings of the AWWA Membrane Technology Conference*, Long Beach, CA, March 28-30, 2011.
34. Howe, K.J., C.O. Lee*, and B.M. Thomson. "Ozone and Biofiltration as an Alternative to Reverse Osmosis for Removing PPCPs from Wastewater," *Proceedings of the AWWA Annual Conference and Exposition*, Chicago, IL, June 20-24, 2010.
35. Howe, K.J., J.E. Goldman*, and B.M. Thomson. "Selective Recovery of Desalination Concentrate Salts Using Interstage Ion Exchange." *Proceedings of the AWWA Annual Conference and Exposition*, Chicago, IL, June 20-24, 2010.

36. Howe, K.J. "Impact Categories for Life Cycle Assessment of Sustainable Asphalt Pavements." *Proceedings of the International Workshop on Energy and Environment in the Development of Sustainable Asphalt Pavements*, Xi' An, China, June 8, 2010.
37. Bogus, S.M., and K.J. Howe. "Innovative Design-Build Approach to Project Based Learning." *Proceedings of the 2008 ASEE Gulf-Southwest Annual Conference*. Albuquerque, NM. March 27, 2008.
38. Howe, K.J., E. Livingston, A.T. Hanson, S.E. Cabaniss, B.M. Thomson, and D. Chen#. "Indirect Potable Reuse Using Membrane Bioreactors and Reverse Osmosis." *Proceedings of the 2007 AWWA Membrane Technology Conference*, Tampa, FL, March 18-21, 2007.
39. Howe, K.J., and N. Ahuja*. "Beneficial Use of Concentrate from Reverse Osmosis Facilities." *Proceedings of the 2006 AWWA Water Sources Conference*, Albuquerque, NM, February 5-8, 2006.
40. Ahuja*, N., and K.J. Howe. "Beneficial Use of Concentrate from Reverse Osmosis Facilities." *Proceedings of the 2005 AWWA Annual Conference*, San Francisco, CA, June 12-16, 2005.
41. Chiu, K-P., S. Adham, G. Lehman, K.J. Howe, C. Mysore, and Z. Do-Quang. "Optimization of Pretreatment for MF/UF Membrane Applications." *Proceedings of the 2005 AWWA Annual Conference*, San Francisco, CA, June 12-16, 2005.
42. Ahuja*, N., and K.J. Howe. "Strategies for Concentrate Management from Inland Desalination." *Proceedings of the 2005 AWWA Membrane Technology Conference*, Phoenix, AZ, March 6-9, 2005.
43. Marwah*, A., K.J. Howe, K-P. Chiu, and S. Adham. "Effect of Pretreatment on MF/UF Fouling by Foulants in Specific Size Ranges." *Proceedings of the 2005 AWWA Membrane Technology Conference*, Phoenix, AZ, March 6-9, 2005.
44. Chiu, K-P., S. Adham, K.J. Howe, C. Mysore, and Z. Do-Quang. "Bench-, Pilot-, and Full-Scale Studies of Pretreatment for MF/UF Membrane Applications." *Proceedings of the 2005 AWWA Membrane Technology Conference*, Phoenix, AZ, March 6-9, 2005.
45. Chiu, K-P., S. Adham, K.J. Howe, C. Mysore, and Z. Do-Quang. "Optimization of Pretreatment for MF/UF Membrane Performance." *Proceedings of the AWWA Water Quality Technology Conference*, San Antonio, TX, November 14-18, 2004.
46. Marwah*, A., K.J. Howe, K-P. Chiu, and S. Adham. "Bench-Scale Studies of Pretreatment for Membrane Filtration." *Proceedings of the 2004 AWWA Annual Conference*, Orlando, FL, June 13-17, 2004.

47. Chiu, K-P., S. Adham, K.J. Howe, C. Mysore, and Z. Do-Quang. "Optimization of Low Pressure Membrane Pretreatment." *Proceedings of the 2004 AWWA Annual Conference*, Orlando, FL, June 13-17, 2004.
48. Howe, K.J., A. Ghosh[#], A.K. Maji, B.C. Letellier, R. Johns, and T.Y. Chang. "Effects of Debris Generated by Chemical Reactions on Head Loss through Emergency-Core Cooling-System Strainers." *Proceedings of the NEA/NRC Workshop on Debris Impact on Emergency Coolant Recirculation*, Albuquerque, NM, February 25-27, 2004.
49. Howe, K.J. and M.M. Clark. "Integrating Coagulation Pretreatment with Membrane Filtration: Mechanisms for Fouling by Dissolved Organic Matter." *Proceedings of the 2001 AWWA Annual Conference*, Washington D.C. June, 2001.
50. Howe, K.J., M.M. Clark, and Y. Wang. "Effect of Coagulation on Ultrafiltration Membrane Performance." *Proceedings of the 2001 AWWA Membrane Technology Conference*, San Antonio, Texas. March, 2001.
51. Grace, D.M., K.J. Howe, G.W. Dunkelberger, and J.E. Singley. "The Lead and Copper Rule: Status of Utilities in Southeast Florida." *Proceedings of the 1993 Florida Water Resources Conference*, Orlando, Florida. pp. 189-194. 1993.
52. Grace, N.O., K.J. Howe, and G.W. Dunkelberger. "Ozonation of Two South Florida Groundwaters – A Comparative Evaluation." *Proceedings of the 11th Ozone World Congress*, International Ozone Association. San Francisco, California. August, 1993.
53. Gilmore, L.A., K.J. Howe, and G.J. Wohlgemuth. "Ozonation and Biofiltration of a South Florida Groundwater." *Proceedings of the 1992 Florida Water Resources Conference*, Daytona Beach, Florida. pp. 134-138. 1992.
54. Howe, K.J., M.A. Biggers, and R.C. Adams. "Compliance with the Surface Water Treatment Rule: A Case Study." *Proceedings of the 1991 Florida Water Resources Conference*, Pensacola, Florida. pp. 66-71. 1991.
55. Glaser, H.T., K.J. Howe, and G.L. Warren. "Production CAD Implementation for Water and Wastewater Treatment Plant Design." *Proceedings of Watercomp 89*, Melbourne, Australia. 1989.
56. Howe, K.J., H.T. Glaser, and G.L. Warren. "Two-Dimensional Computer-Aided Design Modeling for Detailed Design of Water System Facilities." *Proceedings of the 1989 AWWA Computer Specialty Conference*, Denver, Colorado. pp. 355-360. 1989.
57. Howe, K.J., and D.F. Lawler. "An Equilibrium Approach to pH Effects in Gas Transfer." *Proceedings of the 1986 AWWA Annual Conference*. Denver, CO: AWWA. pp. 301-314. 1986.

PRESENTATIONS AND POSTERS

58. Fowlie, R., K.J. Howe, and J.E. Goldman*. "Marketability and Selective Recovery of Salts from Brackish Water Desalination." Presented at *56th Annual New Mexico Water Conference: New Water New Energy*, Alamogordo, NM, December 13-14, 2011.
59. Thomson, B.M. and K.J. Howe. "Use of Low Quality Water for Algal Production: Constraints." Presented at *56th Annual New Mexico Water Conference: New Water New Energy*, Alamogordo, NM, December 13-14, 2011.
60. Leavitt*, J.J., S. Cabaniss, K.J. Howe, L.R. Comolli, J.R. Bargar, V. Stucker, R. Csencsits, D. Pham, and P. Long. "U(VI) adsorption to *G. uraniireducens* and *A. palmae*," *Poster presented at the American Geophysical Union (AGU) fall meeting*, San Francisco, CA, December 6-12, 2011.
61. Howe, K.J. "Designing and Building a Sustainable Future." Presented at the *American Society of Civil Engineers Seminar*, Albuquerque, NM, March 4, 2011.
62. Howe, K.J. "Designing and Building a Sustainable Future." Invited lecture for the *Bryant W. Lemon Distinguished Lecture Series*, University of New Mexico, Albuquerque, NM, February 24, 2011.
63. Goldman*, J.E., K.J. Howe, and B.M. Thomson. "Selective Recovery of Desalination Concentrate Salts Using Interstage Ion Exchange." Presented at the 14th annual Water Reuse and Desalination Research Conference, Tampa, FL, May 24-25, 2010.
64. Howe, K.J. "Radionuclides in Drinking Water: 1. Sources, Regulations, and Analytical Methods." Presented at the *Rocky Mountain Section AWWA/WEF Annual Conference*. Albuquerque, NM. September 14, 2009.
65. Howe, K.J. "Radionuclides in Drinking Water: 2. Occurrence, Treatment, and Implications." Presented at the *Rocky Mountain Section AWWA/WEF Annual Conference*. Albuquerque, NM. September 14, 2009.
66. Field*, E.L., K.J. Howe, and B.M. Thomson. "Effect of SRT in MBRs on RO Membrane Fouling." Presented at the *Rocky Mountain Section AWWA/WEF Annual Conference*. Albuquerque, NM. September 14, 2009.
67. Goldman*, J.E. and K.J. Howe. "Concentrate Minimization with Selective Salt Recovery." Presented at the *Rocky Mountain Section AWWA/WEF Annual Conference*. Albuquerque, NM. September 14, 2009.
68. Leavitt*, J.J., S. Cabaniss, and K.J. Howe. "Potential Error and Uncertainty in Uranium Speciation Calculations." Presented at the *Rocky Mountain Section AWWA/WEF Annual Conference*. Albuquerque, NM. September 14, 2009.

69. Lee*, C.O., K.J. Howe, and B.M. Thomson. "State of Knowledge of Pharmaceutical, Personal Care Products, and Endocrine Disrupting Compound Removal during Municipal Wastewater Treatment." Presented at the *Rocky Mountain Section AWWA/WEF Annual Conference*. Albuquerque, NM. September 14, 2009.
70. Kowalchuk, E., J. Samson, B.M. Thomson, K.J. Howe, and J. Chwirka. "Selective Fluoride Removal from Drinking Water." Presented at the *Rocky Mountain Section AWWA/WEF Annual Conference*. Albuquerque, NM. September 14, 2009.
71. Thomson, B.M., K.J. Howe, R. Jim*, and E.L. Field*. "Fouling of RO Membranes used to Treat Municipal Wastewater." Presented at the *Rocky Mountain Section AWWA/WEF Annual Conference*. Albuquerque, NM. September 14, 2009.
72. Kowalchuk, E., J. Samson, B.M. Thomson, K.J. Howe, and J. Chwirka. "Development of a Fluoride Treatment Process for Small Communities in New Mexico" Poster presented at the *New Mexico Water Resources Research Institute Research Symposium*, Socorro, NM. August 11, 2009.
73. Howe, K.J. "Planned Indirect Potable Reuse using Membrane Bioreactors and Reverse Osmosis. Invited presentation at the *University of Massachusetts-Amherst*. Amherst, MA, June 29, 2009.
74. Howe, K.J. "Membrane Bioreactors and Reverse Osmosis for Indirect Potable Reuse in Cloudcroft, NM." Presented at the NMSPE Young Engineers Council Seminar Series. Albuquerque, NM. April 16, 2009.
75. Leavitt*, J.J., S. Cabaniss, and K.J. Howe. "Potential Error and Uncertainty in Uranium Speciation Calculations." Poster presented at the 237th American Chemical Society National Meeting and Exposition. Salt Lake City, UT. March 22-26, 2009.
76. Howe, K.J. "Low Pressure Membrane Basics: Pre- and Post-Treatment." Invited presentation at the *AWWA Membrane Technology Conference*. Memphis, TN. March 15-18, 2009.
77. Howe, K.J. "UNM Research on Membrane Fouling, Concentrate Management, and Water Reuse." Invited presentation at the *AWWA Membrane Technology Conference*. Memphis, TN. March 15-18, 2009.
78. Howe, K.J. "Review of Water Quality in the Rio Grande for Potable Use." Invited presentation at the *Rocky Mountain Section WEF/AWWA Seminar*. Albuquerque, NM. February 26, 2009.
79. Howe, K.J. "Research on Membrane Fouling, Concentrate Management, and Water Reuse." Presented at the *AWWA Water Quality Technology Conference*, Cincinnati, OH. November 16-19, 2008.

80. Thomson, B.M. and K.J. Howe. "Brackish Ground Water Desalination: Challenges to Inland Desalination Technologies." Presented at the *National Ground Water Association International Conference on Nonrenewable Ground Water Resources*, Portland, OR. October 13-14, 2008.
81. Jim*, R, E.L. Field*, B.M. Thomson, K.J. Howe, R. Kottenstette, and M. Cappelle. "Optimization of the MBR-RO Process for Treatment and Reuse of Municipal Wastewater: Field Studies." Poster presented at the *New Mexico Water Resources Research Institute Research Symposium*, Socorro, NM. August 12, 2008.
82. Jim*, R. K.J. Howe, and B.M. Thomson. "Investigation of Cleaning Methods of RO Membranes Utilized in Wastewater Treatment Processes." Presented at the *5th Annual Rocky Mountain Section WEF/AWWA Student Conference*. Golden, CO. May 13, 2008
83. Howe, K.J. "Desalination of Brackish Water in Arid Inland Areas: Some Things to Think About" Presented at the *Association of Water Professionals Workshop*, Albuquerque, NM. March 29, 2008.
84. Howe, K.J. "Brackish Groundwater Treatment." Presented at *New Mexico Society of Professional Engineers Issues Conference*, Albuquerque, NM. November 30, 2007.
85. Howe, K.J. "Engineers and Pollution." Presented at *UNM Society of Women Engineers meeting*, Albuquerque, NM. November 19, 2007.
86. Jim*, R., K.J. Howe, K.J., B.M. Thomson, E.L. Field*, R. Kottenstette. "Fouling of RO Membranes Treating Effluent from Wastewater Treatment Processes." Presented at the *2007 AWRA Annual Water Resources Conference*. Albuquerque, NM. November 12-15, 2007.
87. Howe, K.J. "Introduction to the Use of Reverse Osmosis for Treatment of Brackish Groundwater." *Lorman Seminar*, Albuquerque, NM. March 29, 2007.
88. Howe, K.J. "Evaluation of Pretreatment for Microfiltration/Ultrafiltration Systems." Invited presentation at the *University of Illinois at Urbana-Champaign*. Urbana, IL, October 27, 2006.
89. Howe, K.J., and N. Ahuja*. "Increasing Water Production from Reverse Osmosis by Controlling Precipitation and Scaling." Poster presented at *2006 AWWA Annual Conference*, San Antonio, TX, June 11-15, 2006.
90. Howe, K.J. "Controlled Precipitation of Minerals in RO Concentrate." Invited presentation at the *University of Central Florida*. Orlando, FL, March 31, 2006.
91. Howe, K.J. "Evaluation of Pretreatment for Microfiltration/Ultrafiltration Systems." Invited presentation at *Microfiltration IV (sponsored by the National Water Research Institute)*. Anaheim, CA, March 20-23, 2006.

92. Howe, K.J., and N. Ahuja*. "Controlled Precipitation of Minerals in RO Concentrate." Invited presentation at *Desalination Conference 2006: Concentrate on Concentrate*. El Paso, TX, March 15-17, 2006.
93. Howe, K.J., and N. Ahuja*. "Increasing Water Production from Reverse Osmosis by Controlling Precipitation and Scaling." Poster presented at *National Salinity Management and Desalination Summit*, Albuquerque, NM, Dec 8-9, 2005.
94. Ahuja*, N., and K.J. Howe. "Beneficial Uses of Concentrate from Reverse Osmosis Facilities." Presented at *Rocky Mountain Section AWWA Conference*. Albuquerque, NM, September 12-14, 2005.
95. Howe, K.J. "Innovative Strategies for Desalination Concentrate Management." Invited presentation at *New Mexico Tech*, Socorro, NM, November 12, 2004.
96. Howe, K.J. "Innovative Strategies for Desalination Concentrate Management." Invited presentation for *Sigma Xi Outstanding Young Investigator Presentation*, Albuquerque, NM, October 8, 2004.
97. Howe, K.J. "Innovative Strategies for Desalination Concentrate Management." Invited presentation at *Lawrence Livermore National Laboratory*, Livermore, CA, September 17, 2004.
98. Adham, S., K.J. Howe, A. Marwah*, and K-P. Chiu. "Optimization of MF/UF Membrane Treatment for Direct and Clarified Water Filtration." Poster presented at the *AWWA Annual Conference*, Orlando, FL, June 13-17, 2004.
99. Howe, K.J. "Technical Challenges to Concentrate Disposal from Inland Desalination." Presented at the *Conference on Identifying Technologies to Improve Regional Water Stewardship for the North - Middle Rio Grande Corridor*, Albuquerque, NM, April 21-22, 2004.
100. Howe, K.J. "Chemistry of Membrane Materials and Foulants." Invited presentation at the *Chemistry 101/102 Workshop at the 2001 AWWA Water Quality Technology Conference*, Nashville, Tennessee. November, 2001.
101. Clark, M.M. and K.J. Howe (co-presenters). "Organic Fouling of Membranes." Invited presentation at the *Research Directions Workshop at the 2001 AWWA Membrane Technology Conference*, San Antonio, Texas. March, 2001.
102. Howe, K.J. "Protection of a Wellfield Contaminated with VOCs." Presented at the *AWWA Southwest Section Annual Conference*. New Orleans, Louisiana. August, 1994.
103. Howe, K.J. "Pilot Evaluation of Ozone and Biological Treatment." Presented at the *AWWA Florida Section Annual Conference*. Plantation, Florida. May, 1992.

104. Adams, R.C. and K.J. Howe. "Tracer Studies for Compliance with the Surface Water Treatment Rule." Presented at the *AWWA Florida Section Annual Conference*. Plantation, Florida. May, 1992.
105. Howe, K.J., F. Coulter, G.J. Wohlgemuth, and M.A. Biggers. "Comparative Analysis: Membrane Softening versus Lime Softening/Ozone for Meeting the 1986 SDWA Amendments – A Case Study." Poster presented at the *AWWA Membrane Processes Conference*. Orlando, Florida. March, 1991.

EXTERNALLY-FUNDED RESEARCH PROJECTS AT UNM

Total external funding = \$3,000,000, total as PI = \$2,500,000.

<u>No.</u>	<u>Description</u>	<u>Amount</u>
1.	Title: Experimental Investigation of Debris Transport in Water Flumes PIs: PI Arup Maji and co-PI Kerry Howe Sponsor: Los Alamos National Laboratory Date: 28 Oct 2002	\$93,000
2.	Title: Optimization of Membrane Treatment for Direct and Clarified Water Filtration PI: Kerry Howe Sponsor: MWH Americas, Inc. (and AwwaRF) Date: 04 Mar 2003	\$100,000
3.	Title: Isolation of Nanocolloidal Matter in Natural Waters: A Preliminary Investigation PI: Kerry Howe Sponsor: WERC Date: 10 Mar 2003	\$10,000
4.	Title: Coagulation-Assisted Microfiltration and Ultrafiltration for Removal of Arsenic from Drinking Water PI: Kerry Howe Sponsor: WERC Date: 28 Aug 2003	\$59,500
5.	Title: Identification of Membrane Foulants in Natural Waters PI: Kerry Howe Sponsor: NM Water Resources Research Institute Date: 03 Nov 2003	\$4,500
6.	Title: Debris Head Loss and Chemical Effects Testing PIs: PI Kerry Howe and co-PI Arup Maji Sponsor: Los Alamos National Laboratory	\$284,999

- Date: 04 Dec 2003
7. Title: 1-day Short Course: Wastewater Collection System and Lift Station Design \$3,929
 PIs: PI Bruce Thomson and co-PI Kerry Howe
 Sponsor: NM Highway and Transportation Department
 Date: 22 Mar 2004
 8. Title: 2-day Short Course: Design of Wastewater Treatment Systems for Small Communities \$5,000
 PIs: PI Bruce Thomson and co-PI Kerry Howe
 Sponsor: NM Highway and Transportation Department
 Date: 22 Mar 2004
 9. Title: High Pressure Safety Injection Throttle Valve Testing and Sump Screen Penetration Testing \$237,000
 PIs: PI Kerry Howe and co-PI Arup Maji
 Sponsor: Los Alamos National Laboratory
 Date: 15 Apr 2004
 10. Title: Rio Rancho Water Reuse Study \$55,850
 PIs: PI Kerry Howe and co-PI Bruce Thomson
 Sponsor: MWH Americas, Inc. (and City of Rio Rancho)
 Date: 01 July 2004
 11. Title: Investigation of Long-Term Stability of Residuals from Drinking Water Arsenic Treatment in an Landfill Environment \$63,000
 PIs: PI Bruce Thomson and co-PI Kerry Howe
 Sponsor: WERC
 Date: 02 Aug 2004
 12. Title: Physical Modeling of Scaled Water Distribution System Networks \$15,271
 PIs: PI Kerry Howe and co-PI Bruce Thomson
 Sponsor: Sandia National Laboratories
 Date: 13 Oct 2004
 13. Title: Controlled Precipitation and Beneficial Use of RO Concentrate \$92,000
 PIs: Kerry Howe
 Sponsor: Sandia National Laboratories
 Date: 01 March 2005
 14. Title: Membrane Flux Experiments and Fouling Assessment for the City of Appleton, Wisconsin \$5,000
 PIs: Kerry Howe
 Sponsor: Carollo Engineers
 Date: 01 April 2005

- | | | |
|-----|---|-----------|
| 15. | <p>Title: Development of a Methodology to Assess the Stability of Arsenic Residuals from Pilot Studies [Cost share for WERC project (#12)]</p> <p>PI: PI Bruce Thomson and co-PI Kerry Howe</p> <p>Sponsor: Sandia National Laboratories</p> <p>Date: 04 April 2005</p> | \$39,600 |
| 16. | <p>Title: Chemical Effects Testing</p> <p>PIs: PI Kerry Howe and co-PI Arup Maji</p> <p>Sponsor: Los Alamos National Laboratory</p> <p>Date: 24 May 2005</p> | \$137,000 |
| 17. | <p>Title: Physical Modeling of Scaled Water Distribution System Networks, Phase II</p> <p>PI: Kerry Howe</p> <p>Sponsor: Sandia National Laboratories</p> <p>Date: 01 Oct 2005</p> | \$25,809 |
| 18. | <p>Title: Optimization of the MBR-RO Process for Treatment and Reuse of Municipal Wastewater: Field Studies</p> <p>PIs: PI Bruce Thomson and co-PIs Kerry Howe, Steve Cabaniss</p> <p>Sponsor: Sandia National Laboratories</p> <p>Date: 28 July 2006</p> | \$150,000 |
| 19. | <p>Title: Optimization of the MBR-RO Process for Treatment and Reclamation of Municipal Wastewater</p> <p>PIs: PI Kerry Howe and co-PI Bruce Thomson</p> <p>Sponsor: New Mexico Environment Department (Governor's Water Innovation Fund)</p> <p>Date: 14 Dec 2007</p> | \$150,000 |
| 20. | <p>Title: Development of Selective Recovery Methods for Desalination Concentrate Salts</p> <p>PIs: PI Kerry Howe and co-PI Bruce Thomson</p> <p>Sponsor: WateReuse Foundation</p> <p>Date: 17 Oct 2008</p> | \$400,000 |
| 21. | <p>Title: Development of A Fluoride Treatment Process for Small Communities in NM</p> <p>PIs: PI Bruce Thomson and co-PI Kerry Howe</p> <p>Sponsor: New Mexico Environment Department (Governor's Water Innovation Fund)</p> <p>Date: 13 Jan 2009</p> | \$134,726 |
| 22. | <p>Title: International Workshop on Energy and Environment in the Development of Sustainable Asphalt Pavements</p> <p>PIs: PI Rafiqul Tarefder and co-PIs Linbing Wang, Kerry Howe</p> | \$40,000 |

Sponsor: National Science Foundation
 Date: 1 Feb 2010

23. Title: STP Chemical Effects Analysis \$935,000
 PIs: Kerry Howe
 Sponsor: South Texas Project Nuclear Operating Company
 Date: 1 Oct 2011

COURSES TAUGHT AT UNM

CE 160 – Introduction to civil engineering
 CE 202 – Engineering statics
 CE 335 – Introduction to water and wastewater treatment
 CE 531 – Physical/chemical treatment processes
 CE 532 – Advanced physical/chemical treatment processes
 CE 534 – Environmental engineering chemistry
 CE 492/598 – Sustainable engineering
 CE 497/499 – Design construction integration, design of civil engineering systems
 CE 691 – Graduate seminar

ICES AND IDEA SCORES

Weighted averages:

ICES (2002 to 2008): Content = 5.5 of 6.0
 Instructor = 5.7 of 6.0
 Course = 5.5 of 6.0
 IDEA (2008 to 2012): Instructor = 4.6 of 5.0
 Course = 4.5 of 5.0

<u>Sem</u>	<u>Semester</u>	<u>Class</u>	<u>Responses</u>	<u>content</u>	<u>instructor</u>	<u>course</u>
ICES Scores below are on a 6-point scale						
1	Fall, 2002	CE 531	4	5.7	5.3	5.7
2	Spring, 2003	CE 532	4	5.8	5.8	6.0
3	Fall, 2003	CE 202	23	5.4	5.9	5.6
3	Fall, 2003	CE 531	6	5.7	5.7	5.7
4	Spring, 2004	CE 532	5	6.0	6.0	5.8
5	Fall, 2004	CE 531	6	5.6	5.8	5.6
6	Spring, 2005	CE 335	14	5.7	5.9	5.8
6	Spring, 2005	CE 532	4	5.5	5.8	5.8
7	Fall, 2005	CE 531	10	5.9	6.0	5.8
8	Spring, 2006	CE 335	14	4.8	5.1	4.9
8	Spring, 2006	CE 532	4	5.8	5.8	5.8
9	Fall, 2006	CE 531	5	6.0	5.5	5.8
9	Fall, 2006	CE 491/598	10	5.6	6.0	5.5

10	Spring, 2007	CE 335	14	5.4	5.4	5.3
10	Spring, 2007	CE 532	7	5.9	5.6	5.6
11	Fall, 2007	CE 531	6	5.6	5.8	5.6
11	Fall, 2007	CE 499	8	5.0	5.4	5.0
12	Spring, 2008	CE 534	7	5.3	6.0	5.3
12	Spring, 2008	CE 491/598	6	5.5	5.8	5.5
IDEA Scores below are on a 5-point scale						
13	Fall, 2008	CE 531	7		4.9	4.7
13	Fall, 2008	CE 497/499	14		4.4	4.4
14	Spring, 2009	CE 532	8		5.0	4.9
14	Spring, 2009	CE 497/499	25		4.5	4.4
15	Fall, 2009	Sabbatical				
16	Spring, 2010	Sabbatical				
17	Fall, 2010	CE 531	6		5.0	5.0
18	Spring, 2011	CE 532	6		5.0	4.8
19	Spring, 2011	CE 534	8		4.6	4.3
20	Fall, 2011	CE 531	6		3.5	3.3
21	Fall, 2011	CE 492/598	9		4.9	4.6
22	Spring, 2012	CE 497/499	18		4.5	4.6
23	Fall, 2012	CE 531	8		5.0	4.9

PARTICIPATION IN COURSES IN INSTRUCTION AND TEACHING

1. Teaching in the College and University Setting (3-credit, semester course at the University of Illinois at Urbana-Champaign, 2000)
2. Science and Engineering Education Scholar's Program (week-long course sponsored by NSF, 2000)
3. ExCEED Teaching Workshop (week-long course sponsored by ASCE, 2003)

GRADUATE STUDENTS ADVISED

Name	Degree	Year	Thesis/project title
Elizabeth Herrick (Anderson)	M.S.	2005	Effects of Phosphate and Silica on Coagulation-Assisted Microfiltration for Arsenic Removal
Khalid Mehboob	M.S.	2005	Effect of Dissolved Calcium and Silica on Microfiltration of Rio Grande Water
Ashish Marwah	M.S.	2005	Effect of Pretreatment and Foulant Size on Membrane Filtration Performance
Rajarishi Immani	M.S.	2005	Effects of Silica and Vanadium on Arsenic Removal using Ferric Coagulation
Felix Carles	M.S.	2005	Debris Penetration Through Sump Screens and Throttle Valve Blockage
Consuelo Silva (Otero)	M.S.	2005	Modeling Threat Assessments of Water Supply Systems using Markov Latent Effects Methodology

Janet Garcia (Leavitt)	M.S.	2006	Effects of Organic Complexing Agents on Aluminum Solubility and Colloid Formation
Sariah Jurado (Bujanda)	M.S.	2006	Consequence Analysis of a Water Distribution System using EPANET
Roslyn Higgin	M.S.	2007	Investigation of Biofouling and Silica Scaling on Reverse Osmosis Membranes
Katharyn Lee	M.S. (MWR)	2007	Evaluation of Selected Ground Water Abatement Strategies for Two Produced Water Impact Sites
Rochelle Jim	M.S.	2008	Investigation of Cleaning Methods for RO Membranes Utilized in Municipal Wastewater Treatment and Reclamation Processes
David Steen	M.S.	2008	Analysis of Treatment Alternatives for the Encinal Springs Water System, Pueblo of Laguna, NM
Elizabeth Field	M.S.	2009	Effect of Solids Retention Time in Membrane Bioreactors on Reverse Osmosis Membrane Fouling
Carson Odell Lee	M.S.	2010	Ozone and Biofiltration as an Alternative to Reverse Osmosis for Removing PPCPs and EDCs from Wastewater
Janet Leavitt	Ph.D.	2011	Biosorption of Uranium and its Effect on Uranium Transport in Groundwater
Joshua Goldman	Ph.D.	2011	Selective Salt Recovery from Reverse Osmosis Concentrate using Inter-stage Ion Exchange

CURRENT GRADUATE STUDENTS / POST-DOC ADVISEES

Lana Mitchell (M.S.)
 Kyle Hammond (M.S.)
 Magdalena Sims (M.S.)
 Kathryn Gillen (M.S. WRP)
 Janet Leavitt (PostDoc)

PROFESSIONAL AFFILIATIONS

American Academy of Environmental Engineers
 American Water Works Association
 American Society of Engineering Education
 Association of Environmental Engineering and Science Professors

NATIONAL SERVICE ACTIVITIES

State Representative, American Academy of Environmental Engineers
 Membrane Technology Research Committee Member, AWWA
 Membrane Processes Committee Member, AWWA
 Reviewer for:
 Journal American Water Works Association
 Environmental Science & Technology

Water Research
Journal of Membrane Science
Journal of Water Supply: Research and Technology (Aqua)
ASCE-Environmental Engineering
ASCE-Practice Periodical of Hazardous, Toxic, and Radioactive Waste Management
Environmental Progress
WaterReuse Foundation
Water Research Foundation
Water Environment Research Foundation
Ohio Sea Grant Program
Qatar National Research Program