

**JOANN SILVERSTEIN, Ph.D., P.E., B.C.E.E.**

Professor

Department of Civil, Environmental and Architectural Engineering

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<http://ceae.colorado.edu/~silverst/>

**EDUCATION**

- Ph.D.** *Civil Engineering*, University of California, Davis, 1982 (Environmental Engineering)  
**MS** *Civil Engineering*, University of California, Davis, 1980 (Environmental Engineering)  
**BS** *Civil Engineering*, University of California, Davis, 1977, (Summa Cum Laude)  
**BA** *Psychology*, Stanford University, 1967 (Honors)

**APPOINTMENTS**

- **2017 – present**, Associate Dean for Faculty Advancement, College of Engineering and Applied Science
- **2012 – 2015**, Director, Program in Environmental Design, CU Boulder
- **2011 – 2014**, Director, Sustainable by Design Residential Academic Program
- **2011 – 2015**, faculty appointment (0%), Graduate School, Environmental Design (ENVD) program, CU Boulder
- **2002-2010**, Department Chair, Civil, Environmental & Architectural Engineering, CU Boulder
- **1999 - present: Professor**, research and primary teaching undergraduate and graduate courses in Environmental Engineering, *Department of Civil, Environmental & Architectural Engineering, University of Colorado, Boulder, CO.*
- **1989 - 1999: Associate Professor**, research and primary teaching undergraduate and graduate courses in Environmental Engineering, *Department of Civil, Environmental & Architectural Engineering, University of Colorado, Boulder, CO.*
- **1982 - 1989: Assistant Professor**, research and primary teaching undergraduate and graduate courses in Environmental Engineering, *Department of Civil, Environmental & Architectural Engineering, University of Colorado, Boulder, CO*
- **1979 - 1982: Graduate Student Research Assistant**, Ph.D. dissertation project: control of activated sludge flocculation in Sequencing Batch Reactors. Environmental Engineering, *Department of Civil Engineering, University of California, Davis, CA.*
- **1978 - 1979: Graduate Teaching Assistant** in environmental engineering courses: solid waste management, water quality, wastewater design, and pilot plant laboratory. *Department of Civil Engineering, University of California, Davis, CA.*

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- **1976 - 1978: Engineering Assistant**, Water Quality Section, Division of Operations & Maintenance, State Water Project, *State of California Department of Water Resources*, Sacramento, CA. Projects on aquatic weed and algae control in reservoirs and canals, modeling of thermocline-induced oxygen depletion in reservoirs, and design of wind generator for automated water quality data monitoring in remote field sites.

## **AWARDS & PROFESSIONAL REGISTRATION**

- AEESP, Perry L. McCarty Founders Award, 2019
- Eminence Member, American Academy of Environmental Engineers, 2006
- CU-Lead Alliance, Faculty Appreciation Award, 2006
- Distinguished Achievement Award, CEAE Department, 2006
- Clarence Eckel Faculty Achievement Award, CU, Dept. CEAE, 2001
- Distinguished Engineering Educator, Society of Women Engineers, 2000
- Faculty Award for Women Scientists and Engineers, National Science Foundation, 1992-1997
- **Registered Professional Engineer, Colorado #26151**

## **CURRENT RESEARCH INTERESTS**

- Performance and resilience analysis of wastewater treatment systems based on degree of (de)centralization
- Nitrogen cycling in wastewater treatment, denitrification for rural water supplies
- Statistical modeling of wastewater nutrient removal process performance, impacts of water conservation on wastewater treatment
- Water demand monitoring and control for conservation, graywater reuse in residential applications
- Anaerobic respiration processes, including denitrification, perchlorate and iron (Fe(III)) respiration.
- Sustainable remediation of acid mine drainage using microorganism population enhancement

## **REFEREED JOURNAL PAPERS (\*student co-authors)**

Kohler, L.A., J. Silverstein, B. Rajagopalan, "Resilience of On-site Wastewater Treatment Systems after Extreme Storm Event," in press, J ASCE, Sustainable Water & Built Environment, in press

Suchetana, B.\*, B. Rajagopalan, J. Silverstein (2019) Modeling risk attributes of wastewater treatment plan violations of ammonia discharge limits in the United States, *Stochastic Environmental Research and Risk Assessment*, 33(3), 879-889

Suchetana, B.\*, B. Rajagopalan, J. Silverstein (2019) Investigating regime shifts and the factors controlling Total Inorganic Nitrogen concentrations in treated wastewater using non-homogeneous Hidden. Markov and multinomial logistic regression models, *Science of the Total Environment*, 646, 625-633. [doi.org/10.1016/j.scitotenv.2018.07.194](https://doi.org/10.1016/j.scitotenv.2018.07.194)

McKenna, A.\*, Silverstein, J., Sharvelle, S. Hodgson, B.\* (2018) Modeled Response of Wastewater Nutrient Treatment to Indoor Water Conservation. *Environmental Engineering Science*, 35, 437-446. DOI: 10.1089/ees.2017.0161

Silverstein, C.V.

- Hodgson, B.\*, Sharvelle, S. Silverstein, J., McKenna, A.\* (2018) Impact of Water Conservation and Reuse on Water Systems and Receiving Water Body Quality, *Environmental Engineering Science*, 35, 545-559. [doi.org/10.1089/ees.2017.0157](https://doi.org/10.1089/ees.2017.0157)
- Suchetana, B.\*, B. Rajagopalan, J. Silverstein (2017) Assessment of wastewater treatment facility compliance with decreasing ammonia discharge limits using a regression tree model, *Science of the Total Environment*, 598, 249-257. [doi.org/10.1016/j.scitotenv.2017.03.236](https://doi.org/10.1016/j.scitotenv.2017.03.236)
- Kohler, L.E.\*, J. Silverstein, B. Rajagopalan (2016) Predicting Life Cycle Failures of On-Site Wastewater Treatment Systems Using Generalized Additive Models, *Environ. Eng. Sci.*, 33(2):112-124.
- Kohler, L.E.\*, J. Silverstein, B. Rajagopalan (2017) Risk-Cost Estimation of On-site Wastewater Treatment Systems Using Extreme Value Analysis, *Water Environment Research*, 89(5),406-415.
- Kohler, L.E.\*, J. Silverstein, B. Rajagopalan (2016) Modeling On-site Wastewater Treatment System Performance Fragility to Hydroclimate Stressors, *Wat. Sci. Technol.*, 74.12:2917-2926.
- Suchetana, B.\*, B. Rajagopalan, J. Silverstein (2016) Hierarchical Modeling Approach to Evaluation of Spatial and Temporal Variability of Wastewater Treatment Compliance with Biochemical Oxygen Demand, Total Suspended Solids, and Ammonia Limits in the United States, *Environ. Eng. Sci.*, 33(7):514-524.
- Weirich, S.R.\*, J. Silverstein, and B. Rajagopalan, (2015) Resilience of Secondary Wastewater Treatment Plants: Prior Performance is Predictive of Future Process Failure and Recovery Time. *Environ. Eng. Sci.* 32(3):222-231.
- Weirich, S.R.\*, J. Silverstein, and B. Rajagopalan, (2015) Simulation of effluent BOD and ammonia for increasingly decentralized networks of wastewater treatment facilities. . *Environ. Eng. Sci.* 32(3):232-239
- Yacob, T.\*, Pandey, S.,\* Silverstein, J. Rajaram, H. Soluble Microbial Products Decrease Pyrite Oxidation by Ferric Iron at pH < 2, *Environmental Science & Technology*, 47(15):8658-8665, 2013
- Weirich, S. R.,\* Silverstein, J., & Rajagopalan, B. (2011). Effect of average flow and capacity utilization on effluent water quality from us municipal wastewater treatment facilities. *Water Research*, 45(14), 4279-4286. Doi:10.1016/j.watres.2011.06.002.
- Gutierrez-Padilla, Ma.G.,\* A. Bielefeldt, S. Ovtchinnikov, J. Silverstein, and M. Hernandez, Bacterial Kinetics of Sulfur Oxidizing Bacteria and their Biodeterioration Rates of Concrete Sewer Pipe Samples, *J. Environ. Eng (ASCE)*, 136:731-739, 2010.
- Gutierrez-Padilla, Ma.G.,\* A. Bielefeldt, S. Ovtchinnikov, M. Hernandez, and J. Silverstein, Biogenic sulfuric acid attack on different types of commercially produced sewer pipes. *Cement and Concrete Res.*, 40:293-301, 2010.
- Gutierrez-Padilla, G.D.,\* A. Bielefeldt, S. Ovtchinnikov, J. Pellegrino, and J. Silverstein. "Simple scanner-based image analysis for corrosion testing: Concrete application. *J. Mat. Proc. Technol.* 209:51-57, 2009.
- Choi, H.\* and JoAnn Silverstein. "Inhibition of perchlorate reduction by nitrate in a fixed biofilm reactor, *J. Hazardous Mat.*, 159:440-445, 2008.

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- Choi, H.\* and JoAnn Silverstein, "Effluent Recirculation to Improve Perchlorate Reduction in a Fixed Biofilm Reactor," *Biotech. Bioeng.*, 98:132-140, 2007.
- Bilgin A.A.,\* Harrington J.M. and Silverstein J "Enhancement of bacterial iron and sulfate respiration for in situ bioremediation of acid mine drainage sites: a case study. *Minerals and Metallurgical Processing (SME)*, 24 (3): 139-144 2007.
- Baeseman, J.L.\* ,R.L. Smith, and J. Silverstein, "Denitrification Potential in Stream Sediments Impacted by Acid Mine Drainage: Effects of pH, Various Electron Donors, and Iron, *Micorbial Ecol.*, 51(2):232-241, 2006.
- Bilgin, A.,\* J. Silverstein, and M. Hernandez. "Microbial neutralization of acid mine drainage in the presence of soluble ferri-Hydroxide complexes," :*Environ. Sci. Technol.*, 39:7826-7832, 2005.
- Bilgin, A.,\* J. Silverstein, and J.D. Jenkins,\* "Iron Respiration by *Acidiphilium cryptum* at pH 5." *FEMS Microbiology*, 49:137-143, 2004.
- Jo, K-H.\* and J. Silverstein, "Acclimation of activated sludge to degrade toxic levels of 2,4-dinitrophenol, *Wat. Sci. Technol.*, 50(6):45-50, 2004.
- E.A. Marchand\* and J. Silverstein, "The Role of Enhanced Heterotrophic Bacteria Growth on Iron Oxidation by *A. ferrooxidans*," *Geomicrobiol. J.*, 20(3):231-244, 2003
- E.A. Marchand\* and J. Silverstein, "The Influence of Heterotrophic Microbial Growth on Biological Oxidation of Pyrite," *Environ. Sci. Technol.*, 36:5483-5490, 2002.
- Kuchenrither, R.D., S. Sharvelle,\* and J. Silverstein, "Risk Exposure. Are treated wastewater and biosolids hazardous to your health?" *Wat. Environ. Tech.*, 38-40, May 2002.
- Pasmore, M., P\*. Todd, S. Smith, D. Baker, J. Silverstein, D. Coons, and C.N. Bowman, "Effects of ultrafiltration membrane surface properties on *Pseudomonas aeruginosa* biofilm initiation for the purpose of reducing fouling," *J. Membrane Sci.*, 194:15-32, 2001.
- Brion, G.\* and Silverstein, J., "Selection a Sensitive Bacteriophage Assay for Evaluation of a Prototype Water Recycling system," *J. Life Support and Biosphere Sci.*, 8:9-14, 2001.
- Peccia, J.,\* E.A. Marchand,\* J. Silverstein, and M. Hernandez, "Development and Application of Small-Subunit rRNA Probes for Assessment of Selected Thiobacillus Species and Members of the Genus Acidophilium," *Appl. Environ. Microbiol.*, 66(7):3065-3072, 2000.
- Oh, J.\* and J. Silverstein, "Oxygen inhibition of activated sludge denitrification," *Wat. Res.* 33(8):1925-1937, 1999.
- Glass, C.\* and J. Silverstein, "Denitrification of High-Nitrate, High-Salinity Wastewater," *Wat. Res.*, 33(1):223-229, 1999.
- Brion, G. and J. Silverstein, "Iodine Disinfection of a Model Bacteriophage, MS2, Demonstrating Apparent Rebound," *Wat. Res.*, 33(1):169-179, 1999.
- Jo, K-H. and J. Silverstein, "Substrate inhibition of degradation of 2,4-dinitrophenol in activated sludge," *Wat. Environ. Res.*, 70:94-100, 1998.
- Glass, C. and J. Silverstein, "Denitrification Kinetics of High Nitrate Concentration Water: pH Effect on Inhibition and Nitrite Accumulation," *Wat. Res.*, 32:831-839, 1998.
- Glass, C., J. Silverstein, and J. Oh, "Inhibition of denitrification by activated sludge by nitrite," *Wat. Environ. Res.*, 69:1086-1093, 1997.

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- Silverstein, J. and C. Glass,\* "Equal Opportunity and Equality in Environmental Engineering," Forum, *J. Environ. Eng. (ASCE)*, 124(7):581-583, 1998.
- Carlson, G.\* and J. Silverstein, "Effect of Molecular Size and Charge on Biofilm Sorption of Organic Matter," *Wat. Res.*, 32:1580-1592, 1998.
- Carlson, G.\* and J. Silverstein, "Effect of Ozonation on Sorption of Natural Organic Matter by Biofilm," *Wat. Res.*, 31:2467-2478, 1997.
- Marchin, G.L.,\* J. Silverstein and G.M. Brion,\* "Effect of Microgravity on *Escherichia coli* and MS-2 Bacteriophage Disinfection by Iodinated Resins," *Acta Astronautica*, 40(1):65-68, 1997.
- Silverstein, J., T.F. Hess,\* N. Al Mutaari,\* and R. Brown,\* "Enumeration of a Species of Toxic Compound Degrading Bacteria in a Multi-Species Activated Sludge Biomass," *Wat. Sci. Tech.*, 29:309-316, 1994.
- Silverstein, J., G. Brion,\* R. Barkley, A. Dunham,\* C. Hurst,\* P. Todd, J. Shulz, "Contaminant Accumulation in Space Recycle Systems." *Acta Astronautica*, 33:317-338, 1994.
- Hess, T.F.,\* J. Silverstein, and S.K. Schmidt, "Effect of glucose on 2,4-dinitrophenol degradation kinetics in sequencing batch reactors," *Wat. Environ. Res.*, 65(1):73-81, 1993.
- S.K. Schmidt, R. Smith, D. Sheker, T.F. Hess,\* J. Silverstein and P.M. Radehaus,\* "Interactions of Bacteria and Microflagellates in Sequencing Batch Reactors Exhibiting Enhanced Mineralization of Toxic Organic Chemicals," *Microbial Ecol.*, 23:127-142, 1992.
- Klees, R\* and J. Silverstein, "Improved Biological Nitrification Using Recirculation in Rotating Biological Contactors," *Wat. Sci. Tech.*, 26:545-553, 1992.
- Figueroa, L.A.\* and J. Silverstein, "The effect of particulate organic matter on biofilm nitrification," *Wat. Environ. Res.*, 64:728-733, 1992.
- deMendonça, M.,\* J. Silverstein, and N. Cook, "Short and Long-Term Responses to Changes in Hydraulic Loading in a Fixed Denitrifying Biofilm," *Wat. Sci. Tech.*, 26:535-544, 1992.
- Brion, G.M.\* and J. Silverstein. "Inactivation of a Model Coliphage Virus in Water by Iodine." *Trans. Soc. Auto. Engineers*, 101:1310-1316, 1992.
- Barkley, R. Hurst, C.,\* Dunham, A.,\* Silverstein, J. and Brion, G.\* "Generation of Iodine disinfection By-Products in a Water Recycle System." *Trans. Soc. Auto. Engineers*, 101:1317-1321, 1992.
- Hess, T.F.,\* Schmidt, S.K., Silverstein, J., and Howe, B.,\* "Supplemental Substrate Enhancement of 2,4-Dinitrophenol Mineralization by a Bacterial Consortium," *Appl. Environ. Microbiol.*, 56:1551-1558, 1990.
- Figueroa, L.A.\* and J. Silverstein, "Measurement of Extracellular Polysaccharides in Activated Sludge by Dye Absorption," *Biotech. Bioeng.*, 33:941-947, 1989.
- Silverstein, J. and E.D. Schroeder, "Performance of SBR Activated Sludge Processes with Nitrification/Denitrification," *J. Wat. Pollut. Control Fed.*, 55(4):377-384, 1983.

## CONFERENCE PAPERS

Kohler, L. and Silverstein, J. *Resilience of On-site Wastewater Treatment Systems Following an Extreme Storm Event* presented at UNC Water and Health Conference, Chapel Hill, NC. October 26-30, 2015.

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Kohler, L. and Silverstein, J. *Effect of System Scale on Multi-objective Sanitation Planning* presented at the International Fecal Sludge Management Conference, Hanoi, Vietnam. January 18-21, 2015

Kohler, Laura\* and JoAnn Silverstein. Statistical Modeling of Onsite Wastewater Treatment Systems to Predict the Occurrence of Repairs and Failures, National Onsite Wastewater Recycling Association (NOWRA) annual meeting, Denver, November 2014.

Yacob, T.,\* J. Silverstein, and H. Rajaram. Complexation of Ferric iron by Soluble Microbial Products of Acidophilic Heterotrophs and the Resulting Effect on Pyrite Oxidation. Presentation, Fourth IWA Specialty Conference on NOM, Irvine, CA, July 2011.

Pandey, Sachin\*; Tesfayohanes W. Yacob\*; JoAnn Silverstein; Harihar Rajaram; Kristina Minchow; Jelena Basta; Prevention of Acid Mine Drainage Through Complexation of Ferric Iron by Soluble Microbial Growth Products H43J-1370, American Geophysical Union, Fall Meeting San Francisco, CA, December 5-9, 2011.

Yacob, T.\*, J. Silverstein, H. Rajaram, B. Andre\*, and J. Jenkins\*. Growth rate characteristics of acidophilic heterotrophic organisms from mine waste rock piles. Poster presentation, Fall Meeting, AGU, San Francisco, December 2010.

Gutierrez-Padilla, Ma-G.,\* A. Bielefeldt, M. Hernandez, J. Silverstein. Biokinetics of Sulfur Oxidizing Microorganisms and Monitoring of Microbially Induced Concrete Corrosion in Pipelines, Corrosion NACE/2006 61st Annual Conference and Exposition, San Diego, 2006.

Choi, H.\* and J. Silverstein, "Use of Internal Recirculation to Improve Perchlorate Reduction in a Fixed Biofilm Process, 2006 AWWA Annual Conference, San Antonio, TX, 2006

A. Azra Bilgin,\* James M. Harrington, and JoAnn Silverstein, "Enhancement of Bacterial Iron and Sulfate Respiration for in-situ Bioremediation of Acid Mine Drainage Sites: A Case Study," 2005 Soc. Mining, Metallurgy and Exploration (SME) Annual Meeting, Salt Lake City, Feb. 2005.

Nam, S-N., S. Kim, H. Choi,\* J. Yoon, J. Silverstein, and G. Amy, "Perchlorate Rejection by High-Pressure Membranes and Brine Stream Treatment by Chemical and Biological Processes," Membrane Tech. Conf., AWWA, 2005.

Weirich, S.\* and J. Silverstein, "A statistical approach to decentralized wastewater planning: Case study in a Colorado watershed," 242<sup>nd</sup> ACS Conference, Denver, September 2011

Silverstein, J. H. Rajaram, J. Jenkins\*, "Preventing Pyrite Oxidation: A Geomicrobial Strategy for Source Control of Acid Mine Drainage, Society Mining, Metallurgy and Exploration (SME) National Meeting, Denver, CO, 2009.

Andre, B. H.\* Rajaram, J. Silverstein, and T. Yacob\*, Pore-scale Rate Model of Acid Rock Drainage Geochemistry and Geomicrobiology, Society Mining, Metallurgy and Exploration (SME) National Meeting, Denver, CO, 2009.

A. Azra Bilgin\* and JoAnn Silverstein, "Determination of Community Composition and Physiological Structure in AMD Environments by PLFA Analysis," ISSM-ISEB Joint International Symposium, Jackson Hole, 2005

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J. Baeseman, R.L. Smith, J. Silverstein, "Seasonal Variability of Denitrification in Heavy Metal-Stressed Mountain Streams," ISSM-ISEB Joint International Symposium, poster, Jackson Hole, August 2005

J. Jenkins, J. Silverstein, "Bacterial Population Changes Resulting from Drainage through Mine Waste Rock," poster, ISSM-ISEB Joint International Symposium, Jackson Hole, August 2005.

Joy Jenkins and JoAnn Silverstein, "The Effect of Drainage Flow and Saturation Conditions on Microbial Pyrite Oxidation in Mine Waste Rock," Invited presentation, Society of Environmental Toxicology and Chemistry (SETAC) North America, 26th Annual Meeting, Baltimore, Nov. 2005.

April Tumey, JoAnn Silverstein, Harihar Rajaram, "Geomicrobial model of acid mine drainage production at the rock surface scale," poster, ISSM-ISEB Joint International Symposium, Jackson Hole, August 2005.

## **PATENT**

Silverstein, J. (inventor), Univ. Colorado (owner), "Biological Denitrification of Water," U.S. (#5,681,471, Oct. 28, 1997) and international (European Patent Office, no. 97903788.4-2104, 10/8/98), currently licensed by Univ. Colorado to Meridian Water Corporation.

## **RESEARCH GRANTS**

"Center for Comprehensive, Optimal and Effective Abatement of Nutrients (CLEAN)," USEPA, \$2,220,150 total award. CSU (Lead), CU Boulder (subcontract PI), NC State. 2013-2017.

"Subsurface Carbon Cycling in Acid Mine Drainage Bioremediation." PI, NSF, \$340,000, 2009-2012.

"Geomicrobial Strategy for Prevention of Acid Mine Drainage," PI (co-PI Hari Rajaram), NSF, \$196,000, 2005-2008.

"Perchlorate reduction in sewer conditions," PI, Geomatrix Engineering, \$30,800. 2005.

"Perchlorate Removal from Contaminated Groundwater." Co-PI with Gary Amy, Castaic Lake Water Agency, \$47,000, 2003-2004.

"Interactions between Microbial Nitrogen Cycling and Acid Mine Drainage Contaminants in Impacted Streams," PI. \$77,600, NSF, 2002-2004. (100%)

"Research Experience for Undergraduates in Environmental Engineering," PI. \$300,000. NSF. 2000-2004. (100%)

"Wastewater Bioprocessor Experiment Definition," \$275,000. NASA - Johnson Space Center NRA grant (1998-2000), co-PI.

"Development of Safe and Rapid Biofilm Inoculation Protocol to Enhance Commercialization of Biological Processes for Drinking Water Treatment," PI, Colorado Advanced Materials Inst., Entrepreneurs' Tech. Assistance Program (CAMI/ETAP), \$74,000, 1997-98. (100%)

"Bioremediation of Acid Mine Drainage," PI, Kennecott Copper, \$10,500, 1997-98. (100%)

"Ammonia and Manganese Removal from Wastewater in a Nitrifying Trickling Filter," co-PI, City of Boulder, CO, \$25,000, (1997-98). (80%)

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"Fiberoptic Oxygen Sensor for Mixed Waste Biological Treatment Oxygen Control," PI, Colorado Advanced Materials Institute, Entrepreneurs' Technical Assistance Program (CAMI/ETAP), \$93,500, (1996-97). (100%)

"Water Contaminant Distribution in Space Recycle Systems," co-PI, NASA Center of Research and Training (NSCORT) Center for Space Environmental Health, with CU Boulder, CU Health Sciences Center, Univ. Rochester Dept. Environmental Medicine, Martin-Marietta Aerospace Corp., \$5,500,000. (1991-96). (10%)

"Biodegradation of Xenobiotic Organic Contaminants," PI, Faculty Award for Women Scientists and Engineers, NSF, \$250,000. (1992-97). (100%)

"Denitrification of High Nitrate Strength Saltcrete Brine," Department of Energy, Los Alamos National Lab, PI, \$90,000 (5/94-10/95). (100%)

"Drinking Water Denitrification Demonstration in a Rural Community," PI, Electric Power Research Institute (\$100,000), National Water Research Institute, \$51,000, Global Environmental Technologies, Inc. (\$22,500), State of Colorado Department of Local Affairs (\$35,000), Town of Wiggins, Colorado (\$2,500), Nitrate Removal Technologies, LLC (\$54,000) Morgan County Rural Electric Assoc. (in-kind, \$30,000), Tri-State Generating and Transmission Assoc., Inc. (in-kind, \$20,000) awarded May 1995, cash total: \$265,000, in-kind total: \$50,000 (5/94 - 10/97) (100%)

## **COURSES TAUGHT**

Undergraduate:

Civil Engineering Systems  
Ecology and Design  
Environmental Engineering Fundamentals  
Water and Wastewater Treatment  
Thermodynamics and Heat Transfer  
Thermodynamics  
Environmental Engineering Senior Design  
Introduction to Civil Engineering  
Freshman Design Projects  
Sustainable Design Projects  
Water Quality Lab

Graduate:

Civil Engineering Systems (developed course for resident and on-line students)  
Small Community Water and Wastewater Systems (developed course for resident and on-line students)  
Wastewater Treatment  
Residential Water Reuse  
Pilot Plant Laboratory  
Aquatic Chemistry  
Hazardous/Industrial Waste Management  
Drinking Water Treatment

## **STUDENT RESEARCH SUPERVISION**

Ph.D. students



Silverstein, C.V.

Suchetana, Bihu (2017), co-advised with Rajagopalan Balaji  
Kohler, Laura (NSF Graduate Research Fellow, May 2016), Research Associate, Centre for Affordable Water and Sanitation Technology (CAWST), Calgary, Alberta, Canada  
Weirich, Scott (May 2012), Project Coordinator, Utilities Department, City of Everett, WA.  
Yacob, Tesfayohannes (Dec. 2012), Assistant Professor, Messiah College, Mechanicsburg, PA  
Jenkins, Joy, (NSF Graduate Research Fellow, 2006) Senior Scientist, USEPA  
Andre, Ben, co-advised (2009) Senior Scientist, DOE, Lawrence Berkeley Labs  
Melamed, Megan, co-advised (2006), Scientist, NOAA, Boulder Lab.  
Choi, Hyeoksun (2005), Research Professor, Pohang University of Science & Technology, South Korea  
Baeseman, Jenny (2004), Executive Director, Scientific Committee on Antarctic Research, London  
Bilgin, A. Azra (2003), Associate Professor, Adana Turkish National University, Research Associate, Univ. Colorado, Boulder  
Marchand, Eric, (USEPA STAR Fellow, 2000) Professor, Univ. Nevada Reno  
Oh, Jeill (1998) Professor, Pohang University, Korea  
Glass, Charles (ONR PhD Fellow, 1997) Associate Professor, Howard University  
Jo, Kwan Hyung, (1995) Professor, Chungwoon University  
Al Mutairi, Nayef (1997) Professor, Kuwait University  
Bukhari, Alaadin (1996) Professor, King Faud University of Petroleum and Minerals  
Leroy Henry Miller co-advised (1996) Senior Scientist, NOAA  
Brion, Gail (1995) Professor, University of Kentucky  
Mendonca, Marcia (1994) Asst. professor, Northern Arizona Univ., 1994-1999.  
Carlson, Gary (1995) Process Engineer, Hydrocon, Inc.  
Hogrewe, Bill (1990) Rural Development Specialist, Rural Community Assistance Partnership (RCAP)  
Hess, Tom (1990) Professor, Bioresources Engineering, University of Idaho  
Klees, Rita (1989) Scholar In Residence, Mortenson Center in Engineering for Developing Communities, Univ. Colorado, Boulder  
Barrett, Joy (1989) Director Training and Technical Services, Rural Community Assistance Partnership (RCAP)  
Figueroa, Linda (1989) Professor, Colorado School of Mines

MS thesis students: 43 who completed degrees

Undergraduate student researchers: 22 funded by NSF-REU, SMART, UROP

Director and PI, NSF-sponsored Research Experience for Undergraduates Program (1999-2004), sponsored 40 undergraduate summer research interns.

## **UNIVERSITY SERVICE**

### CEAE Department

- Chair, Primary Unit Evaluation Committee, tenure review, 2016 - 2017
- Awards Committee 2015 - 2018
- Executive Committee, Mortenson Center in Engineering for Developing Communities, 2011-2014
- Department Chair, 2002 – 2010
- Executive Committee: 1998-2000 (representative from Environmental Engineering group), 1985-87.
- Personnel Committee, 1998-present
- ABET 1999-2000 and 2006 -2007 Directed Accreditation General Review Preparation Committee, 1998-99. Wrote Self-Study Report, Directed Outcomes Assessment for Environmental and Water Resources Engineering Track Curriculum, and coordinated Fall 1999 ABET visit under EC 2000 Rules.

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- ABET: Wrote Interim Review Self-Study Report (summer 2001) and was liaison to ABET re-visit, fall 2001.
- Operations Committee, 1992-1998
- Curriculum Committee, 1987-91
- Graduate Committee, 1982-87.
- PRP Self-Study Committee, 1988-89.
- GAANN (Ph.D. Fellowship) co-PI, Executive Committee, Chair, 1995-97.
- Search Committees: Environmental Engineering, chair, (1997, 1988, 1987); member, (1995, 1993, 1985). Member: Illumination Engineering (1998), Water Resources Engineering (1985, 1993), Geotechnical Engineering (1985), Structural Engineering (1984), Architectural Engineering/Building Systems (1986), Construction Engineering (1985)

#### College of Engineering & Applied Science

- Associate Dean for Faculty Advancement, 2017 – present
- Director, College Pacesetters team, National Center for Women in Information Technology (NCWIT), 2018 - present
- Dean's Administrative Council, 2002-2010.
- Diversity Action Committee, 2010-2015.
- Faculty Advisory Board, Women in Engineering Program, 1993 - 1998
- Faculty Liaison, BioEngineering Program, 2001-2003
- Member, Vice Chancellor's Ad Hoc Committee for Dean's Performance Review, 1999.
- Search Committee for Dean of College of Engineering, 1995.
- Search Committee for Director, Women in Engineering Program, 1997.
- Search Committee for Assistant Director for Student Affairs, SEED (Minority Engineering), 1998 and 1999.
- Ad-hoc Committee on Women in Engineering Program, 1994.
- Faculty Advisory Board, Minority Engineering Program, 1990-92.
- Dean's Ad-hoc Committee on Minorities and Women in Engineering, 1986.

#### Boulder Campus

- Board of Directors, Center of the American West, 2015 – present
- Steering committee, First Year Experience Education Values
- ARPAC, Program Review Internal Review Committee, Theater & Dance, 2016
- Director, Program in Environmental Design, 2012-2015
- Founding director, Sustainable by Design Residential Academic Program in Williams Village North, 2011-present
- Faculty Advisory Committee, Office of Diversity Equity and Community Engagement (ODECE), 2011 – 2015.
- Faculty Advisory Council, Colorado Diversity Initiative, AGEP program, 2002 - 2008
- ARPAC Internal Review Committee, College of Architecture and Planning, 2010-2011.
- ARPAC Internal Review Committee, Dept. Applied Mathematics, 2009.
- Boulder Campus Salary Equity Committee, 2007-present
- Vice Chancellor's Advisory Committee (VCAC), Campus Promotion and Tenure Committee, 2004 – 2006
- Search Committee for Vice Chancellor for Research and Dean of the Graduate School 2006-2007
- Faculty Advisory Council, Center of the American West, 2001-present
- PRP-Internal Review Committee, Environmental Studies Program, 2001
- Vice-Chancellor's Program Review Panel, (Liaison and PRP Report preparation for Electrical and Computer Engineering, Chemical Engineering and Computer Science Departments) 1995-98.

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- Committee on Graduate Research and Creative Work Awards, 1990-2001
- Hazardous Material Advisory Board, 1994-96, Chair, 1995-96.
- Vice-Chancellor's Salary Equity Committee, 1990-91.
- Boulder Faculty Assembly Comm. on Faculty Women, Chair, (member BFA Exec. Comm.) 1989-93.
- Search Committee for Director, Residence Hall Academic Program in Environmental Science, 1997.

#### CU System

- Emerging Leaders Program, 2005
- President's Council on Global Change and Environmental Sciences, 1993-95.
- System-wide Graduate School Committee, 1996-98

#### **DIVERSITY**

- Director, College Pacesetters team, National Center for Women in Information Technology (NCWIT), 2018 - present
- Member, ODECE Faculty advisory Committee, 2011-2015
- Member, Diversity Action Committee, College of Engineering and Applied Science, 2010-2012
- Member, Faculty Advisory Council, Colorado Diversity Initiative, Univ. Colorado.
- Author of one book chapter and several papers on women and minorities in engineering
- Advisor/mentor to ten women doctorates in Civil Engineering from CU Boulder (two are Hispanic-American women) and one African-American man. Of these ten, five have gone on to teaching/research careers in universities where they in turn are mentoring women and minority students.
- Member of the first Faculty Advisory Board of Women in Engineering Program in the College of Engineering at the University of Colorado
- Faculty Advisory Board, Minority Engineering Program.
- Co-PI and Chair of Awards Committee, Graduate Assistantships in Areas of National Need (GAANN) grant from US Dept. Education, with focus to award fellowships to outstanding scholars in Civil Engineering who are also women and/or minority students. 9/18 GAANN Scholars were women; 1/18 was a minority (Hispanic-American) student.
- Member and Chair for six years, Boulder Faculty Assembly Committee on Faculty Women. Major activities: salary equity survey resulting in >\$100,000 in annual salary increases for women and minority faculty; report on women non-regular faculty at CU; parental leave policy for faculty.
- Vice Chancellor's Salary Equity Committee: evaluation of over 200 minority and women faculty vitae using method of comparison with 600 white male counterparts as well as statistical analysis to determine past discrimination and to recommend salary adjustments to alleviate.
- Member of Committee to prepare "Minority Graduate Education" program proposal to the National Science Foundation for CU Boulder.

#### **PROFESSIONAL SERVICE**

- Member, Scientific Review Panel, Water Environment Research Foundation scoping study on Wastewater Processor for Developing Country Sanitation, Bill and Melinda Gates Foundation, 2011-2012.
- Member, Eminence Membership Committee, American Academy of Environmental Engineers and Scientists, 2012 – present.
- ASCE Department Heads Council, 2005-2010.

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- Member, Professional Advisory Committee, Dept. Chemical and Environmental Engineering, Univ. California, Riverside, 2011-present.
- Member, Working Group to Develop Research Plan for Assessing the Impact of Nutrients in Receiving Waters, Water Environment Federation, 2010.
- Member, Board of Visitors, NSF, Chemical, Biological, Environmental, Transport (CBET), Engineering Directorate, NSF, 2009.
- Project Advisory Committee, Water Research Foundation (formerly AwwaRF) “Biological Denitrification Demonstration,” Thornton, CO, 2008-2009.
- Project Advisory Committee, Water Research Foundation (formerly AwwaRF) “Biological Denitrification Demonstration,” Glendale, AZ, 2008-2009.
- Member, Ad hoc Panel to review amicus brief on land application of biosolids in San Bernadino County, CA, Water Environment Federation, 2008.
- Member, standing Committee on Biological Treatment of Drinking Water, American Water Works Association, 2008-present.
- Liaison, Rocky Mountain Water and Wastewater Operators Short School.
- Chair, External Review Committee, Dept. Civil Engineering, Univ. Arizona, 2007.
- Membership Nominating Committee, American Academy of Environmental Engineers and Scientists, AAEEES), 2006 –present.
- Research Advisory Board, *National Water Research Institute*, 1995 - 2005
- *Assoc. Environ. Engineering and Science Professors, AEESP, (formerly AEPP)*, member since 1982, Awards Committee (PhD dissertations), Distinguished Lecturers (now “Lecturers”) Committee, Demographics Committee, Board of Directors 1994-1997 (Secretary, 1994-1996)
- *National Research Council*, Committee to Evaluate the Use of Treated Municipal Wastewater Effluents and Sludge in the Production of Crops for Human Consumption, 1994-1996
- Technical Advisory Board, *Teledyne Water Pik Company*, Fort Collins, CO, 1994-1996
- External Peer Review Committee, *Rockwell Corp. and EG&G/Rocky Flats*, reports on feasibility of methods for mixed waste disposal for Federal Facilities Compliance Agreement, 1988-89.
- Technical Advisor, *City of Boulder, Colorado Biosolids Study Review Group*, 1996-1997
- Technical Advisor, *City of Broomfield, Colorado*, Wastewater Facilities Plan, 1998.
- Expert testimony, Land Application of Biosolids, *Colo. Water Quality Control Commission*, 1997.
- Expert testimony, Land Application of Biosolids, *Joint Legislative Committee on Agriculture, Natural Resources and Energy, Colorado General Assembly*, 1998.
- Chair, *Current Research* session, WEF Biosolids Management Conf., Denver, CO, 1995.
- Organizing Committee, ASCE Environ. Eng. Div. National Conf., Boulder, CO, 1994.
- Tenure and Promotion Review: Univ. California Riverside, Texas A&M Univ., Univ. Connecticut, Univ. Hawaii, Univ. California, Davis, Univ. Maryland, Penn State Univ., Univ. Nevada Las Vegas, Univ. Kentucky, Southern Illinois Univ., Auburn Univ., Univ. New Mexico, Virginia Tech., Univ. Nebraska, Univ. Massachusetts, Amherst, Univ. South Florida
- Peer Review  
*PROPOSALS*: National Science Foundation (mail and panels: CAREER, IGERT, PIRE, SBIR, GRFP, CBET, S&T Center, EPSCoR), USAID, Colorado, Wyoming and National Water Research Centers (USGS and Dept. Interior), National Water Research Institute, Water Environment Research Foundation, NY Solid Waste and Combustion Research Center  
*JOURNALS*: *J. Environ. Eng. (ASCE)*, *Wat. Res.*, *Wat. Environ. Res.*, *Environ. Sci. Tech.*, *Wat. Sci. Tech.*, *J. Separ. Sci.*, *Environ. Prog.*, *Aquaculture Eng.*, *Biotechnology & Bioengineering*

## ENGINEERING CONSULTING

*Bill and Melinda Gates Foundation*, Panel to Evaluate Sanitation Technologies, 2012

Silverstein, C.V.

*National Water Research Institute* Blue Ribbon Panel to Review Nitrogen and Selenium Management Program, Count of Orange, California, 2006.

*National Water Research Institute* Panel to Review Santa Clarita Valley Joint Sewerage System Chloride Source Report, Sanitation Districts of Los Angeles County, October 2002.

*Aquatic Environmental Services*. Evaluation of Pinery Wastewater Treatment Plant, Douglas County, CO.

*Eldorado Springs Water Initiative*. Evaluation of Wastewater Collections and Treatment Alternatives for the Eldorado Springs community.

*US Air Force*. Develop Operations to Improve Nitrification and Denitrification at USAF Academy Wastewater Treatment Plant.

*Cornish Consultants*. Evaluation of Temperature Phased Anaerobic Digestion for a 100-MGD Treatment Plant.

*David Evans & Assoc.* Evaluation of US Air Force Academy wastewater treatment process performance and recommendations for improvements.\*

*NSF, International (Washington, DC)*, development of test protocol for package biological processes for drinking water treatment to remove nitrate.\*

*Nitrate Removal Technologies, LLC (Golden, Colorado)* Commercialization of patented drinking water denitrification process.\*

*San Gabriel Basin Water Quality Authority (West Covina, California)*, Feasibility of biofilm denitrification process for destruction of perchlorate contaminant in drinking water wells.