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Professional Experience

2007.7-present Associate Professor, Department of Civil and Environmental Engineering, Texas Tech University
2002-2007.6 Associate Professor, Deputy Director, Center for Water Research, Division of Environmental Science & Engineering and Department of Civil Engineering, National University of Singapore
2000-2001 Assistant Professor, Department of Civil Engineering, National University of Singapore
1999 Visiting Assistant Professor, Department of Chemical Engineering, Yale University (3 months)
1996-1999 Assistant Professor, Dept. of Civil & Structural Engineering, Hong Kong University of Science and Technology (HKUST)
1994-1995 Research Associate, Oak Ridge National Laboratory, Oak Ridge, TN
1993-1994 Postdoctoral researcher, Department of Civil and Environmental Engineering, University of California, Los Angeles, CA.
1990-1993 Graduate Student Research Assistant, Department of Civil and Environmental Engineering, University of California, Los Angeles, CA.
1984-1989 Assistant Professor, Institute of Environmental Sciences, Beijing Normal University, Beijing, China.
1982-1984 Graduate Student Research Assistant, Center of Environmental Sciences, Peking University, Beijing, China.

Education

1993 Ph.D. University of California, Los Angeles, CA (Adviser: Prof. M. Elimelech)
1984 M.Sc. Peking University, Beijing, China
1982 B.Sc. Peking University, Beijing, China

Honors and Awards

2010 Invited speaker at the *ECI Conference on Advances in Science and Engineering for Brackish Water and Seawater Desalination*, Cetraro, Italy.
2009 Invited speaker at the *5th Sino-US Chemical Engineering Conference*, Beijing, China.
2008 Invited speaker at the *2008 IWA North American Membrane Research Conference*, Amherst, Massachusetts.
2006 Keynote speaker at the *Croucher Foundation Advanced Study Institute (ASI): Leading-edge Strategies and Technologies for Sustainable Urban Water Management* at HKUST, Hong Kong.
2005 Invited speaker at *International Congress on Membranes and Membrane Processes (ICOM)*, Seoul, Korea.
2003 Award for student paper competition (graduate student S. Ma) at the *14th North American Membrane Society Annual Meeting*, Jackson Hole, WY.
2002 Award for student paper competition (graduate student K. L. Chen) at the *13th North American Membrane Society Annual Meeting*, Long Beach, CA.
1990 Arco Scholarship that covered full tuition fee at UCLA for three years (1990-1992).

Professional Society Memberships

- International Water Association
- American Geophysical Union

- North American Membrane Society
- Environmental Engineering Society in Singapore

Research Interests and Activities

- Membrane filtration processes (RO, UF, MF) for water reclamation and reuse
- Physicochemical Processes in Environmental Engineering Science
- Colloidal phenomena in aquatic systems
- Transport and fate of contaminants in subsurface environments
- Membrane bioreactor (MBR) for domestic and industrial wastewater treatment

Research Grants and Contracts

In US

- Demonstration of a High Recovery and Energy Efficient RO System for Small-Scale Brackish Water Desalination (PI, \$101,597, 2010-2012, funded by Texas Water Development Board)
- A sustainable Water Treatment System for Long Term Space Habitation (Co-PI, \$69,707, 01/2010-09/2010, funded by NASA)
- Seminal Wind-RO Desalination Demonstration Project (Co-PI, \$550,000, 2009-2011, funded by Texas Water Development Board and the Office of Rural Community Affairs)
- Great Plains Wind Power Test Facility: Wind-RO Desalination (Co-PI, 2008-2010, \$1,968,000, funded by U.S. Department of Energy)
- Assessment of Wind Turbine Performance at Schools (Co-PI, \$50,000, 2007-2008, funded by State Energy Conservation Office)

In Singapore

- Quantifying and Interpolating the Electric Interactions on Ion Transport through Reverse Osmosis Membranes (PI, S\$268,065, 2007-2010, transferred to colleagues due to departure from NUS)
- Hybrid Photocatalysis / Membrane Pretreatment System for Organic Fouling Control in Reverse Osmosis Membrane Processes (PI, S\$98,580, 2007 –2010, transferred to colleagues due to departure from NUS)
- Analysis and Development of Advanced Membranes for Water and Wastewater Treatment (PI, S\$115,000, 2006 –2009, transferred to colleagues due to departure from NUS)
- Health & Environment Impacts of Nanomaterials (Co-PI, S\$485,000, 2006 –2007)
- Development of a Membrane Water Treatment System for Boiler Feed water Production (PI, S\$110,950, 2005 –2006, funded by NEA)
- Development of Highly Selective and Efficient Membrane Separation/Purification Processes for Biopharmaceutical Products, (PI, S\$100,000, 2004 –2007)
- Experimental Investigation of Organic Fouling on Reverse Osmosis (RO) Membranes (PI, S\$71,297, 2003 – 2006)
- Optimization of Membrane Bioreactor System for Primary Sewage Reclamation (PI, S\$300,000, 2003 –2004, funded by PUB)
- Advanced Treatment of Industrial Wastewater with Intermediate Organic Strength (PI, S\$35,000, 2003 – 2004, funded by ECO Industrial Environmental Engineering Pte Ltd)
- Development of an Integrated Membrane Process for Water Reclamation and Microbial Control (Co-PI, S\$200,000, 2002 –2004, funded by A*STAR, equivalent to NSF in US)
- Fouling Development in Full Scale Reverse Osmosis Process (PI, S\$99,900, 2001 –2003)
- Virus Removal by Membrane Filtration (PI, S\$79,827, 2001 – 2003)
- Water Reclamation from Secondary Effluent with Membrane Processes (PI, S\$120,000, 2001 – 2003)
- Development of a Quick and Reliable Method for Fouling Characterization in Reverse Osmosis Process (PI, S\$129,000, 2001 – 2003)

In Hong Kong

- Prediction of limiting permeate flux in ultrafiltration (HK\$98,000, 1997 – 1998)
- Cake formation in crossflow membrane filtration systems (HK\$540,000, 1997 – 2001)
- Minimisation of sludge production through energy uncoupling in an activated sludge process (HK\$380,000, 1998 – 2000)

Graduate Students (Graduated)

1. Zhao Yan (2010), PhD
Dissertation: Experimental Study of RO Membrane Organic Fouling for Wastewater Reclamation
Title and Affiliation: Research associate, Siemens Water Technologies Global R&D Center, Singapore
2. Gurdev Singh, (2007), PhD
Dissertation: Quantitative Analysis of Physicochemical Effects on Colloidal Fouling in Membrane Processes
Title and Affiliation: Postdoc. Fellow, Dept of Chemical Engrg, University of Ottawa, Canada
3. Liang Shuang (2007), PhD
Dissertation: Fouling and Accumulation of Dissolved Organic Matter in Membrane Bioreactors
Title and Affiliation: Associate Professor, Shandong University, China
4. Tay Kwee Guan (2006), PhD
Dissertation: Dynamics and Characterization of Membrane Fouling in a Long Reverse Osmosis Membrane Channel
Title and Affiliation: Research Associate, ESE, NUS, Singapore
5. Ma Shengwei (2005), PhD
Dissertation: Concentration Polarization in Spacer-Filled RO Membrane Systems
Title and Affiliation: Research Associate, University of Cyprus, Cyprus
6. Zhou Wenwen (2004), PhD
Dissertation: Study on Solute Transport Through RO/NF Membranes
Title and Affiliation: Scientist, CK-Life Sciences Int'l., (Holdings) Inc, Hong Kong
7. Yuan Liangyong (2003), MEng
Dissertation Title: Effects of SMP on MBR
Title and Affiliation: Program manager, Dayuan Environmental Inc., Singapore
8. Zou Yang (2003), MEng
Dissertation Title: Organic Fouling during Reverse Osmosis (RO) Process
Title and Affiliation: Developing Engineer, E-Lab Inc. Singapore
9. Chen Kai Loon (2003), MEng
Dissertation Title: Fouling Development in Full-Scale RO Process, Characterization and Modeling
Title and Affiliation: PhD graduate student, Yale University, USA
10. Vincent Ng (2000)
Master student, Study on salt rejection by RO membranes
Title and Affiliation:
11. Zhang Miaomiao (1999)
Master student, Study on colloidal fouling in ultrafiltration membrane.
Title and Affiliation: Environmental Engineer, CH2M, Seattle, USA

Past Post-doctoral Fellows

1. Dr. Sheng Pingxin
Research Area: Seawater desalination
2. Dr. Zhang Jinchang
Title and Affiliation: Professor, Beijing University of Chemical Technology
3. Dr. Zhang Guojun
Title and Affiliation: Associate Professor, Beijing University of Technology
4. Dr. Hu Xiang
Title and Affiliation: Assistant Professor, Beijing University of Chemical Technology

Courses Developed and Taught

- Membrane Technology in Environmental Applications
- Membrane Treatment Process Modeling
- Industrial Wastewater Control
- Introduction to Environmental Engineering and Science
- Water Chemistry
- Physical and Chemical Wastewater Treatment
- Water Treatment Engineering
- Municipal Wastewater Engineering
- Hazardous Waste treatment and Site Remediation

- Subsurface Pollutant Transport

Short Courses Taught

- *Physical and Chemical Wastewater Treatment*, Hong Kong University of Science and Technology, October 31 - November 1, 1997.
- *Fundamentals of Industrial Water and Wastewater Treatment*, German Institute of Science and Technology, Singapore, March 17-21, 2003

Service on University Wide Committees

- Safety Officer of Water Laboratory (NUS)
- Faculty Industrial Attachment Committee (NUS)
- Departmental Board of Examination (NUS)
- Faculty Task Force of Environmental Engineering (NUS)
- Campus Green Committee (NUS)
- Tertiary Institutions Council for the Environment (NUS)
- Safety Officer of Environmental Engineering Laboratory (HKUST)
- Member of Departmental Outreach Committee (HKUST)
- Departmental Computing Committee (HKUST)

Reviewer for Scholarly Journals

- Environmental Science & Technology
- Journal of Membrane Science
- Journal of Environmental Engineering
- Water Environment Research
- Water Research
- Desalination
- Industrial and Engineering Chemistry Research
- Environmental Engineering Science
- Chemical Engineering Communications
- Chemical Engineering Science

Advisory Committees

- International Program Committee for Advanced Technology in the Environmental Field (ATEF 2006), 6-8 February, 2006, Lanzarote, Canary Islands, Spain
- Scientific Committee for the International Congress on Membranes and Membrane Processes (ICOM2005), 21-26 August 2005, Seoul, Korea.
- Expert Committee for International Conference on Integrated Concepts in Water Recycling, 14-17 February 2005, Wollongong, NSW Australia
- International Scientific Advisor Committee for the 2nd International Conference on Application of Membrane Technology, 27-29 September 2002, Beijing, China.

Professional Consulting

- “Pilot Test and Evaluation of NOVO-MOTIAN PVDF Hollow Fiber Membrane as Pre-treatment of RO process”, NOVO Environmental Technology Service Pte Ltd, June - December, 2003.
- “CFD study of spacer arrangement to reduce membrane fouling in spiral wound UF module”, GramTech, Singapore Pte Ltd, January-May, 2004.

Refereed Journal Publications (1163 citations by February 2011)

1. Liu, C, K Rainwater, L Song, Determinations and Analyses of Energy Efficiency in Reverse Osmosis Desalination Processes, *Journal of Membrane Science*, under review.
2. F Meng, Bg Liao, S Liang, F Yang, H Zhang, L Song, Morphological visualization, componential characterization and microbiological identification of membrane fouling in membrane bioreactors (MBRs), *Journal of Membrane Science* 361 (2010) 1–14
3. Zhao Y, L Song, SL Ong, Fouling of RO membranes by effluent organic matter (EfOM): Relating major components of EfOM to their characteristic fouling behaviors, *Journal of Membrane Science* 349 (2010) 75–82.
4. Zhao Y, L Song, SL Ong, Fouling behavior and foulant characteristics of reverse osmosis membranes for treated secondary effluent reclamation, *Journal of Membrane Science* 349 (2010) 65–74.
5. Song L, Concentration polarization in a narrow reverse osmosis membrane channel, *AIChE Journal*, 56 (1), 2010, 143-149.

6. Liang S., C. Liu, and L. Song, "Two-step optimization of pressure and recovery of cross flow reverse osmosis desalination process", *Environmental Science & Technology* 43 (9) (2009) 3272-3277.
7. Maung HO and L Song, "Effect of pH and ionic strength on boron removal by RO membranes", *Desalination* 246 (2009) 605-612.
8. Liang and Song, "Effect of solution chemistry on the fouling potential of dissolved organic matter in membrane bioreactor systems", *Journal of Membrane Science* 310 (2008) 503-511.
9. Singh G. and L Song, "Impact of Feed Water Acidification with Weak and Strong Acids on Colloidal Silica Fouling in Ultrafiltration Membrane Processes", *Water Research* 42(3) (2008) 707-713.
10. Singh G. and L Song, "Experimental correlations of pH and ionic strength effects on the colloidal fouling potential of silica nanoparticles in crossflow ultrafiltration", *Journal of Membrane Science* 303 (2007) 112-118.
11. Liang, S and L Song, "Characteristics and fouling behaviors of dissolved organic matter in submerged membrane bioreactor systems". *Environmental Engineering Science* 24(5) (2007) 652-662.
12. Tay, KG and L Song, "Differential pressure in membrane channel caused by foulant capture onto spacers". *Water Environment Research* 7 (2007) 788-794.
13. Liang, S, C Liu and L Song, "Soluble microbial products in membrane bioreactor operation: behaviors, characteristics, and fouling potential". *Water Research* 41 (2007) 95-101.
14. Song, L, S Liang and L Y Yuan, "Retarded transport and accumulation of soluble microbial products in a membrane bioreactor". *Journal of Environmental Engineering* 133 (2007) 36-43.
15. Song, L., Tay, K.G. and Singh, G. "Critical design considerations for harnessing reverse osmosis processes in water/wastewater treatment", *Water Science & Technology: Water Supply* 6(6) (2006) 61-70.
16. Song, L and G Singh, "Cake compressibility of silica colloids in membrane filtration processes". *Industrial & Engineering Chemistry Research* 45 (2006) 7633-7638.
17. Song, L and KG Tay, "Performance prediction of a long crossflow reverse osmosis membrane channel", *Journal of Membrane Science* 281(1-2) (2006) 163-169.
18. Song, L and SW Ma, "Numerical study on permeate flux enhancement by spacers in a crossflow reverse osmosis channel", *Journal of Membrane Science* 284 (2006) 102-109.
19. Singh, G and L Song, "Influence of sodium dodecyl sulfate on colloidal fouling potential during ultrafiltration", *Colloids and Surfaces A: Physicochemical and Engineering Aspects* 281(1-3) (2006) 138-146.
20. Liang, S, L Song, GH Tao, KA Kekre and H Seah, "A modeling study of fouling development in membrane bioreactors for wastewater treatment", *Water Environment Research* 78(8) (2006) 857-863.
21. Zhou, WW, L Song and KG Tay, "Estimation of concentration polarization on performance of spiral wound membrane modules", *Journal of Membrane Science* 27 (2006) 38-46.
22. Wang YH, Zhu JL, Zhang JC, Song LF, Hu JY, Ong SL, Ng WJ, "Selective oxidation of CO in hydrogen-rich mixtures and kinetics investigation on platinum-gold supported on zinc oxide catalyst," *Journal of Power Sources* 155 (2) (2006) 440-446.
23. Tay, KG, L Song, SL Ong and WJ Ng, "Nonlinear relationship between permeate flux and transmembrane pressure in full-scale RO process", *Journal of Environmental Engineering-ASCE* 131(11) (2005) 1481-1487.
24. Song, L and SW Ma, "Numerical studies of the impact of spacer geometry on concentration polarization in spiral wound membrane modules", *Industrial & Engineering Chemistry Research* 44(20) (2005) 7638-7645.
25. Song, L and G Singh, "Influence of various monovalent cations and calcium ion on the colloidal fouling potential", *Journal of Colloid and Interface Science* 289(2) (2005) 479-487.
26. Lew CH, Hu JY, Song L, Lee LY, Ong SL, Ng WJ, Seah H, "Development of an integrated membrane process for water reclamation", *Water Science And Technology* 51(6-7) (2005) 455-463.
27. Zhou, WW and L Song, "Experimental study of water and salt fluxes through reverse osmosis membranes", *Environmental Science & Technology* 39(9) (2005) 3382-3387
28. Wang YH, Zhang JC, Song L, Hu JY, Ong SL, Ng WJ, "Adsorption removal of phenol in water and simultaneous regeneration by catalytic oxidation", *Environmental Engineering Science* 22(5) (2005) 608-614.
29. Singh, G, and L Song, "Quantifying the effect of ionic strength on colloidal fouling potential in membrane filtration", *Journal of Colloids and Interface Science* 284(2) (2005) 630-638.

30. Zhang, JC, YH Wang, L Song, J Y Hu, S L Ong, W J Ng and L Y Lee, Feasibility investigation of refinery wastewater treatment by combination of PACs and coagulant with ultrafiltration. *Desalination* 174(3) (2005) 247-256.
31. Tay, KG and L Song, "Characterization of membrane fouling in full-scale reverse osmosis process", *Desalination* 177 (2005) 95-107.
32. Zhang, JC; L Song, JY Hu, SL Ong, WJ Ng, LY Lee, YH Wang, JG Zhao, RY Ma, "Investigation on gasoline deep desulphurization for fuel cell applications", *Energy Conversion And Management* 46(1) (2005) 1-9.
33. Hu JY, Song LF, Ong SL, Phua ET, Ng WJ, "Biofiltration pretreatment for reverse osmosis (RO) membrane in a water reclamation system," *Hemosphere* 59(1) (2005) 127-133.
34. Ma, SW, L Song, SL Ong, WJ Ng, "A 2-D Streamline Upwind Petrov/Galerkin Finite Element Model for Concentration Polarization in Spiral Wound Reverse Osmosis Modules", *Journal of Membrane Science* 244(1-2) (2004) 129-139.
35. GJ Zhang, ZZ Liu, L Song, JY Hu, SL Ong, WJ Ng, "Post-treatment of banknote printing works wastewater ultrafiltration concentrate", *Water Research* 38(16) (2004) 3587-3595.
36. Song, L, KL Chen, SL Ong, and WJ Ng, "A new normalization method for determination of colloidal fouling", *Journal of Colloid and Interface Science* 271 (2004) 426-433.
37. Chen, KL, L Song, SL Ong and WJ Ng, "Prediction of membrane fouling in full-scale RO process", *Journal of Membrane Science* 232 (2004) 63-72.
38. Zhang, GJ; ZZ Liu, L Song, JY Hu, SL Ong, WJ Ng, "One-step cleaning method for flux recovery of an ultrafiltration membrane fouled by banknote printing works wastewater", *Desalination* 170(3) (2004) 271-280
39. Hu JY, Ong SL, L Song, YY Feng, WT Liu, TW Tan, LY Lee, WJ Ng, "Removal of MS2 bacteriophage using membrane technologies", *Water Sci Technol* 47(12) (2003) 163-168.
40. Song, L and Ong SL, "Emerging Research Needs for Membrane Processes", *Water Environment Research* 75(4) (2003) 99-100.
41. Feng, YY, ZM He, L Song, SL Ong, JY Hu, ZG Zhang, WJ Ng, "Kinetics of beta-mannanase fermentation by bacillus licheniformis", *Biotechnol Lett* 25(14) (2003) 1143-1146.
42. Song, L, JY Hu, SL Ong, WJ Ng, M Elimelech, M Wilf, "Emergence of thermodynamic restriction and its implications for full-scale reverse osmosis processes", *Desalination* 155(3) (2003) 213-228.
43. Hu, JY, T Yuan, SL Ong, L Song, WJ Ng, "Identification and quantification of bisphenol A by gas chromatography and mass spectrometry in a lab-scale dual membrane system", *Journal of Environmental Monitoring* 5(1) (2003) 141-144.
44. Feng, YY, SL Ong, JY Hu, L Song, XL Tan, WJ Ng, "Effect of particles on the recovery of Cryptosporidium oocysts from source water samples of various turbidities", *Applied and Environmental Microbiology* 69(4) (2003) 1898-1903.
45. Song, L, JY Hu, SL Ong, WJ Ng, M Elimelech, M Wilf, "Performance limitation of the full-scale reverse osmosis process", *Journal of Membrane Science* 214(2) (2003) 239-244.
46. Ong, SL, WW Zhou, L Song, WJ Ng, " Evaluation of feed concentration effects on salt/ion transport through RO/NF membranes with the Nernst-Planck-Donnan model ", *Environmental Engineering Science* 19(6) (2002) 429-439.
47. Ong, SL, JY Hu, LY Lee, WJ Ng, L Song, "Packed bed columns for high rate nitrogen and carbon removals", *Water Science and Technology* 46(11-12) (2002) 57-62.
48. Ng, WJ, SL Ong, KY Tan, JY Hu, LY Lee, L Song, " Toxicity assays to determine the start-up strategy for an anaerobic sequencing batch reactor (anSBR)", *Water Science and Technology* 46(11-12) (2002) 343-348.
49. Song, L, S Hong, JY Hu, SL Ong, WJ Ng, "Simulations of full-scale reverse osmosis membrane process", *Journal of Environmental Engineering-ASCE* 128(10) (2002) 960-966.
50. Liu, WT, CL Huang, JY Hu, L Song, SL Ong, WJ Ng, "Denaturing gradient gel electrophoresis polymorphism for rapid 16S rDNA clone screening and microbial diversity study" *Journal of Bioscience and Bioengineering* 93(1) (2002) 101-103.
51. Zhang, M, and L Song, "Mechanisms and parameters affecting flux decline in cross-flow microfiltration and ultrafiltration of colloids", *Environmental Science & Technology* 34 (2000) 3767-3773.
52. Zhang, M, and L Song, "Pressure-dependent permeate flux in ultra- and microfiltration", *Journal of Environmental Engineering-ASCE* 126(7) (2000) 667-674.

53. Song, L. "Thermodynamic modeling of solute transport through reverse osmosis membrane", *Chemical Engineering Communications* 180 (2000) 145-167.
54. Song, L. "Permeate flux in crossflow ultrafiltration under intermediate pressures", *J. Colloid and Interface Sci.*, 214(2) (1999) 251-263.
55. Wang, L, and Song L. "Flux decline in crossflow microfiltration and ultrafiltration: experimental verification of fouling dynamics", *Journal of Membrane Science* 160(1) (1999) 45-54.
56. Song, L and Yu S. "Concentration polarization in crossflow reverse osmosis", *AIChE Journal* 45(5) (1999) 921-928.
57. Song, L, "A new model for the calculation of the limiting flux in ultrafiltration", *Journal of Membrane Science* 144 (1998) 173-185.
58. Song, L, "Flux decline in crossflow microfiltration and ultrafiltration: mechanisms and modeling of membrane fouling", *Journal of Membrane Science* 139(2) (1998) 183-200.
59. Song, L, and M Elimelech, "Theory of concentration polarization in crossflow filtration", *Journal of the Chemical Society, Faraday Transactions* 91 (1995) 3389-3398.
60. Song, L and M Elimelech, "Particle deposition onto a permeable surface in laminar flow" *Journal of Colloid and Interface Science* 173 (1995) 165-180.
61. Song, L and M Elimelech, "Transient deposition of colloidal particles in heterogeneous porous media", *Journal of Colloid and Interface Science* 167 (1994) 222-234.
62. Song, L, PR Johnson, and M Elimelech, "Kinetics of colloid deposition onto heterogeneously charged surfaces in porous media", *Environmental Science & Technology* 28(6) (1994) 1164-1171.
63. Song, L and M Elimelech, "Calculation of particle deposition rate under unfavorable particle-surface interactions", *Journal of the Chemical Society, Faraday Transactions* 89 (1993) 3443-3452.
64. Song, L and M Elimelech, "Dynamics of colloid deposition in porous media: modeling the role of retained particles", *Colloids and Surfaces A* 73 (1993) 49-63.
65. Song, L and M Elimelech, "Deposition of Brownian particles in porous media: modified boundary conditions for the sphere-in-cell model", *Journal of Colloid and Interface Science* 153 (1992) 294-297.
66. Elimelech, M and L Song, "Theoretical investigation of colloid separation from dilute aqueous suspensions by oppositely charged granular media", *Separations Technology* 2 (1992) 2-12.

Regional Journal Publications

1. Zhou, WW, L Song, SL Ong and WJ Ng, "A method for predicting salt rejection through RO membranes", *Advances in Asian Environmental Engineering* 3(1) (2003) 12-21.
2. Hu, JY, SL Ong, WJ Ng, JH Shan and L Song, "An Investigation on Biostability of Reclaimed water", *Advances in Asian Environmental Engineering* 2(1) (2002) 37-43.
3. Ng, WJ, SL Ong, JY Hu, YJ Sun, LY Lee, L Song and WL Wong, "Membrane cleaning in the MSBR", *Advances in Asian Environmental Engineering* 2 (2) (2002) 43-50.

Book Chapters

1. Song L and KG Tay, "Advanced Membrane Fouling Characterization in Full-Scale Reverse Osmosis Processes", In: *Membrane and Desalination Technologies*, Wang L.K., N.K. Shamma and Y.T. Hung, The Humana Press, Inc., Totowa, NJ, 2008, pages 101-133.
2. Song, L., and Elimelech, M., "Dynamics of Colloid Deposition in Porous Media: Modeling the Role of Retained Particles", In: *Colloids in the Aquatic Environment*, Tadros, Th. F. and Gregory, J. Editors, Elsevier Science Publishers, 1993, pages 49-63.
3. Elimelech, M., and Song L., "Deposition of Colloids in Porous Media: Theory and Numerical Solution", In: *Transport and Remediation of Subsurface Environments: Colloidal, Interfacial, and Surfactant Phenomena*, Sabatini, D. A. and Knox, R. C. Editors, ACS Symposium Series 491, 1992, pages 26-39.

Papers in Conference Proceedings

1. Song L, "Energy analysis and cost minimization of RO desalination processes", SCMA 2010 Annual Conference and Membership Meeting, September 27-29, 2010, South Padre, Texas
2. Song L, "Energy analysis and cost minimization of RO desalination processes", the ECI Conference on Advances in Science and Engineering for Brackish Water and Seawater Desalination, May 8-12, 2010, Cetraro, Italy.
3. Song L. "Mass transfer and concentration polarization in a narrow reverse osmosis channel", 5th Sino-US Chemical Engineering Conference, October 13-16, 2009, Beijing, China.
4. Song L, "Performance and energy efficiency of full-scale reverse osmosis desalination", IWA North American Membrane Research Conference, August 10-13, 2008, Amherst, MA

5. Ma Shengwei and Lianfa Song, "Finite Element Simulation on Concentration Polarization and Permeate Flux in a Spacer-filled Reverse Osmosis Channel", *The 5th Chinese Environmental Scholars Workshop*, 11-17 November, 2006, Tongji University, Shanghai, China
6. Song L, "Critical design considerations for harnessing reverse osmosis processes in water/wastewater treatment", *Croucher Foundation Advanced Study Institute (ASI): Leading-edge Strategies and Technologies for Sustainable Urban Water Management*, September 16-20 2006, HKUST, Hong Kong
7. Song, L, KG Tay and G Singh, "Performance modeling of full scale desalination processes with highly permeable RO membranes", *International Conference on Decentralised Water and Wastewater Systems*, July 10-12, 2006, Esplanade Hotel, Fremantle, Australia
8. Zhao Y and L Song, "Characterization of foulants on RO membrane treating", *North American Membrane Society Annual Meeting*, May 12-17, 2006, Renaissance Chicago Hotel, Chicago, IL.
9. Ma, SW and L Song*, "Spacer Configuration on Concentration Polarization and Permeate Flux in Spiral Wound Reverse Osmosis Modules", *North American Membrane Society Annual Meeting*, May 12-17, 2006, Renaissance Chicago Hotel, Chicago, IL.
10. Song L, "New concepts and methods for fouling characterization and modeling in reverse osmosis membrane filtration processes", invited speech, in *Proceeding of International Congress on Membranes and Membrane Processes 2005*, August 21-26, 2005, Seoul, Korea.
11. Ma SW and L Song, "Numerical study of the impact of spacer filament geometry on concentration polarization in a reverse osmosis membrane channel", in *Proceeding of International Congress on Membranes and Membrane Processes 2005*, August 21-26, 2005, Seoul, Korea.
12. Zhou, W, L Song, SL Ong, and WJ Ng, "The role of electrostatic interaction in salt rejection during reverse osmosis process", in *Proceedings of Water Environment Membrane Technology*, 273-280, June 7-10, 2004, Seoul, Korea
13. Tay, KG, L Song, SL Ong and WJ Ng, "A Simulation Study of Cleaning Efficiency in Full-Scale RO Processes", in *Proceedings of Water Environment Membrane Technology*, 1353-1360, June 7-10, 2004, Seoul, Korea
14. Fu, Y, L Song, and WJ Ng, "Protocol and Equipment for Measurement of Reverse Osmosis membrane Potential", In the *Proceedings of 13th KAIST-KU-NTU-NUS Symposium on Environmental Engineering*, 188-200, 17-18 June 2004, Singapore
15. Song, L, LY Yuan, SL Ong and WJ Ng, "Accumulation of Soluble Microbial Products in Membrane Bioreactor", in *Proceedings of Recent Advances in Environmental Bioscience and Biotechnology - First International Tokyo Tech Bio-Symposium*, 29-30 January 2003, Tokyo Institute of Technology, Tokyo, Japan
16. Song, L, SL Ong, JY Hu, W Liu and WJ Ng, "A Novel Fouling Characterization Technique for Full-Scale RO Processes", In *Proceeding of Water Reuse and Desalination Conference*, 25-26 February, 2003, Suntec Singapore International Convention & Exhibition Centre, Singapore.
17. Liu, WT, YH Kong, JY Hu, LF Song, SL Ong and WJ Ng, "Microbial Ecology of An Acetate-Fed Sequential Batch Membrane Bioreactor (Abstract)", *American Society for Microbiology*, May 2002. (Paper presented at American Society for Microbiology annual meeting, 19-23 May 2002, Salt Lake City, UT.
18. Wong, MT, L Song, WJ Ng and W Liu, "Effect of pH on the Microbial Population Structure of Submerged Membrane Bioreactors", June 2002. In the *Proceedings of 12th KAIST-KU-NTU-NUS Symposium on Environmental Engineering*, 27-29 June 2002, Taipei, Taiwan
19. Song, L, SL Ong, JY Hu, WT Liu and WJ Ng, "New Development of the study of salt transport through RO membranes", In the *Proceeding of One Day Seminar on Desalination: Conversion of Seawater to Freshwater*, 30 August 2002, York Hotel, Singapore.
20. Hu, JY, L Song, SL Ong, YY Feng, LY Lee and WJ Ng, "Comparison of membrane technologies on QB bacteriophage rejection", In *Proceedings of the 2nd International Conference on Application of Membrane Technology*, edited by the membrane industry association of China, September 2002, Beijing, China.
21. Song, L, SL Ong, JY Hu, WT Liu and WJ Ng, Principles and design of full-scale RO process for water reclamation, In *Proceedings of the 2nd International Conference on Application of Membrane Technology*, edited by the membrane industry association of China, Beijing, China, September 2002, 112-119.

22. Ng, WJ, SL Ong, JY Hu, YJ Shan, LY Lee and L Song, "Membrane cleaning in the MSBR", In *The 11th Joint KAIST-KYOTO-NTU-NUS symposium in Environmental Engineering*, edited by Isao Somiya, Kyoto University, June 2001, 312-323.
23. Hu, JY, SL Ong, WJ Ng, JH Shan and L Song, "An investigation on biostability of reclaimed water", In *The 11th Joint KAIST-KYOTO-NTU-NUS symposium in Environmental Engineering*, edited by Isao Somiya, Kyoto University, June 2001, 291-301.
24. Ong, SL, JY Hu, WJ Ng, L Song and LY Lee, "Nitrogen removal using modified SBR in sewage treatment", In *The 11th Joint KAIST-KYOTO-NTU-NUS symposium in Environmental Engineering*, edited by Isao Somiya, Kyoto University, June 2001, 56-65.
25. Song, L, JY Hu, LY Lee, SL Ong and WJ Ng, "Statistical evaluation of treatment works performance data. In *The 11th Joint KAIST-KYOTO-NTU-NUS symposium in Environmental Engineering*, edited by Isao Somiya, Kyoto University, June 2001, 128-141.
26. Ng, WJ, SL Ong, KY Tan, JY Hu, LY Lee and L Song, "Toxicity assays to determine the start-up strategy for an anSBR", In the *Proceedings of Asian Waterqual 2001 Asia-Pacific Regional Conference*, 12-15 September 2001, Fukuoka, Japan.
27. Song, L, SL Ong, JY Hu, KB Chia, LY Lee and WJ Ng, "Effects of residual COD on microbial growth kinetics in a nitrifying UCBR", In the *Proceedings of Asian Waterqual 2001 Asia-Pacific Regional Conference*, 12-15 September 2001, Fukuoka, Japan.
28. Ong, SL, JY Hu, LY Lee, WJ Ng and L Song, "Packed bed columns for high rate nitrogen and carbon removals", In the *Proceedings of Asian Waterqual 2001 Asia-Pacific Regional Conference*, 12-15 September 2001, Fukuoka, Japan.
29. Ong, SL, JY Hu, TW Tan, LY Lee, WJ Ng and L Song, "Reclamation of domestic sewage using ultrafiltration integrated ultra-compact biofilm reactor", In the *Proceedings of Asian Waterqual 2001 Asia-Pacific Regional Conference*, 12-15 September 2001, Fukuoka, Japan.
30. Hu, JY, SL Ong, WJ Ng, NE Jette, LY Lee and L Song, "Cycle Behavior of AnSBR Treating Methanol Wastewater", In the *Proceedings of Asian Waterqual 2001 Asia-Pacific Regional Conference*, 12-15 September 2001, Fukuoka, Japan
31. Hu, JY, SL Ong, L Song, W J Ng and E T Phua, "Membrane biofouling-a biofilm grow at the wrong place?", In the *Proceedings of Special Seminar in RCEQC*, Kyoto University, 19 December 2001, 1-7.
32. Elimelech, M, D Liu, and L Song, "Role of Retained Particles in Particle Deposition: Measurements and Modeling", *Proceedings of the National Meeting of the American Filtration Society*, W.W.-F. Leung, Editor, Volume 7, May 1993, 39-40.
33. Elimelech, M., and L Song, "A Model for the Dynamics of Particle Deposition in Packed Bed Filters", *Proceedings of the National Meeting of the American Filtration Society*, W.W.-F. Leung, Editor, Volume 7, May 1993, 208-211.

Seminar, Conference, and Symposium Presentations

1. Song L, "Dynamics of Colloidal Fouling in Crossflow Membrane Filtration", September 17, 2010, Department of Civil and Environmental Engineering, University of Houston, Houston, Texas.
2. Song L, "Analysis of energy consumption and cost minimization of RO desalination processes", June 17, 2010, Department of Chemical and Biomolecular Engineering, National University of Singapore, Singapore.
3. Song L, "Mass Transfer and Concentration Polarization in RO Membrane Channel", June 16, 2010, Department of Chemical and Biomolecular Engineering, National University of Singapore, Singapore.
4. Song L, "Reverse Osmosis Processes and Sustainable Water Supply", June 15, 2010, Department of Chemical and Biomolecular Engineering, National University of Singapore, Singapore.
5. Song L, "Experimental Investigation of Organic Fouling on Reverse Osmosis Membranes", *Engineering Faculty Public Lecture*, 18 April 2007, EA auditorium, Faculty of Engineering, National University of Singapore
6. Song L, "Performance Prediction a Long Narrow Reverse Osmosis Filtration Channel", *Workshop on Moving Interface Problems and Application in Biological Flows*, 5-8 February, 2007, Institute for Mathematical Sciences, National University of Singapore, Singapore
7. Song L, Kwee Guan Tay, and Gurdev Singh, "An Integrated Concept for Fouling Characterization and Modeling in Full-scale Membrane Filtration Processes", *NAMS 16th Annual Meeting*, 11-15 June 2005, Providence, Rhode Island.

8. Liang S and Song L, "Simulations of Fouling Development in a Submerged Membrane Bioreactor for Domestic Wastewater Treatment", *NAMS 16th Annual Meeting*, 11-15 June 2005, Providence, Rhode Island.
9. Song L, "Development of Electric Charge and Potential on Initially Neutral Membranes", *NAMS 16th Annual Meeting*, NAMS 2005, 11-15 June 2005, Providence, Rhode Island.
10. Song, L, "Optimal design of MF filters and distribution of the permeate flux along a hollow fiber", presented at *NAMS 15th Annual Meeting*, June 26-30, 2004, Sheraton Waikiki, Honolulu, Hawaii.
11. Song, L, WJ Ng, SL Ong, "New Features and Design Considerations of Full-scale RO Processes with Highly Permeable Membranes", presented at *NAMS 15th Annual Meeting*, June 26-30, 2004, Sheraton Waikiki, Honolulu, Hawaii.
12. Liang, S, L Song, SL Ong, and WJ Ng, "Characteristics and Fouling Property of Dissolved Organic Matter in Membrane Bioreactors", presented at *NAMS 15th Annual Meeting*, June 26-30, 2004, Sheraton Waikiki, Honolulu, Hawaii.
13. Ma, SW, L Song, SL Ong and WJ Ng, "Numerical Modeling the Effects of Spacers on Concentration Polarization in Spiral-wound Reverse Osmosis Modules", presented at *NAMS 14th Annual Meeting*, 17-21 May 2003, Snow King Resort, Jackson Hole, WY.
14. Song, L, WW Zhou, SL Ong and WJ Ng, "Study on Membrane Potential and Ion Transport through Reverse Osmosis Membranes", presented at *NAMS 14th Annual Meeting*, 17-21 May 2003, Snow King Resort, Jackson Hole, WY.
15. Song, L, LY Yuan, SL Ong and WJ Ng, "Retarded Transport of Soluble Microbial Products through the membrane in an MBR", presented at *NAMS 14th Annual Meeting*, 17-21 May 2003, Snow King Resort, Jackson Hole, WY.
16. Chen, KL, L Song, JY Hu, SL Ong and WJ Ng, "A New Normalization Method For Fouling Characterization Of Feed Waters In Membrane Processes, presented at *NAMS 14th Annual Meeting*, 17-21 May 2003, Snow King Resort, Jackson Hole, WY.
17. Song, L, "Membrane Technology in Water Reclamation and Pollution Control", presented at *NUS Workshop on Sustainable Urban Infrastructure*, 26-26 February 2002, NUS, Singapore.
18. Hu, JY, SL Ong, TW Tan, YY Feng, LY Lee, WJ Ng, L Song and W Liu, "Removal of MS2 bacteriophage using membrane technologies", presented at *IWA 3rd world water congress*, 7-12 April 2002, Melbourne, Australia. Australia.
19. Hu, JY, SL Ong, YY Feng, L Song, WJ Ng and LY Lee, "Improvement of recovery efficiency for organics compounds in water by granular activated carbon", presented at *IWA 3rd Water Congress*, 7-12 April 2002, Melbourne, Australia.
20. Hu, JY, SL Ong, K Yin, YY Feng, L Song, WT Liu, LY Lee and WJ Ng, "Effects of UV disinfection on organic matters in reclaimed water", presented at *IWA 3rd Water Congress*, 7-12 April 2002, Melbourne, Australia.
21. Hu, JY, SL Ong, L Song, WJ Ng, ET Phua and LY Lee, "Biocide free control strategy of biofouling in a lab-scale reverse osmosis membrane system", May 2002, presented at *NAMS 13th Annual Meeting*, 11-15 May 2002, Long Beach, CA.
22. Song, L, JY Hu, WT Liu, SL Ong and WJ Ng, "Thermodynamic restriction on RO system and its implication to process design", May 2002, presented at *NAMS 13th annual meeting*, 11-15 May 2002, Long Beach, CA.
23. Hu, JY, SL Ong, L Song, ET Phua and WJ Ng, "Biofilter-A suitable pretreatment for RO membrane system", presented at *Seminar at Tsinghua University*, 27 September 2002, Tsinghua University, Beijing, China.
24. Song, L, "Fouling Characterization & Modeling in RO Process for Water Reclamation", presented at *Innovative Technology: New Life to Water*, 6-6 November 2002, NUS, Singapore
25. Hu, JY, LY Lee, SL Ong, WJ Ng, L Song, SL Yuan and MJ Gomez, "Nitrification process in a high MLSS SBR", presented at *International Water Association Conference on Water & Wastewater Management for Developing Countries*, 29-31 October 2001, Kuala Lumpur, Malaysia.
26. Song, L, "A new model for membrane transport with coefficients completely independent of pressure and concentration", presented at *ICOM '99*, 12-18 June 1999, Toronto, Canada.
27. Song, L, "Fouling dynamics of colloids in crossflow ultra- and microfiltration", presented at *North American Membrane Society -10th Annual Meeting*, 16-20 May 1998, Cleveland, OH.
28. Song, L, "Modeling of membrane fouling in crossflow ultra- and microfiltration", presented at *International Conference on Membrane Science and Technology*, 9-13 July 1998, Beijing, China.

29. Hong, S., Elimelech, M, and Song, L. "Crossflow Membrane Filtration of Colloidal Suspensions", *American Chemical Society 212th National Meeting*, August 25-29, 1996, Orlando, FL.
30. Hong, S., Song, L., and Elimelech, M. "Crossflow Membrane Filtration of Particle Suspensions: Theory and Experiments", *Annual Meeting of the North American Membrane Society*, May 19-23, 1996.
31. Song, L., and Elimelech, M. "Colloid Deposition onto Heterogeneously Charged Surfaces in Porous " presented at the *American Chemical Society Annual Meeting*, March 1994, San Diego, CA.
32. Song, L., Hong, S., and Elimelech, M., "Particle Transport and Deposition in Porous Membrane Channels", presented at the *ACS-68th Annual Colloid and Surface Science Symposium*, June 12-15, 1994, Stanford, CA.
33. Elimelech, M., and Song, L., "Transient Deposition of Colloidal Particles in Heterogeneous Porous Media", presented at the *ACS-68th Annual Colloid and Surface Science Symposium*, June 20-23, 1994, Stanford, CA.
34. Elimelech, M., Liu, D., and Song, L., "Role of Retained Particles in Particle Deposition: Measurements and Modeling", presented at the *1993 National Meeting of the American Filtration Society*, May 1993, Chicago, IL.
35. Elimelech, M., and Song, L., "A Model for the Dynamics of Particle Deposition in Packed Bed Filters", presented at the *1993 National Meeting of the American Filtration Society*, May 1993, Chicago, IL.
36. Elimelech, M., Liu, D., and Song, L., "Role of Retained Particles in the Dynamics of Particle Deposition in Porous Media: Modeling and Measurements", presented at the *ACS-67th Annual Colloid and Surface Science Symposium*, June, 1993, Toronto, Canada.
37. Elimelech, M., and Song, L., "Role of Particle Size in the Kinetics of Particle Deposition under Attractive Electric Double Layer Interactions", presented at the *ACS-67th Annual Colloid and Surface Science Symposium*, June, 1993, Toronto, Canada.
38. Song, L., and Elimelech, M., "Deposition of Colloidal Particles from Flowing Suspensions onto Heterogeneous Solid Surfaces", presented at the *ACS-67th Annual Colloid and Surface Science Symposium*, June, 1993, Toronto, Canada.
39. Song, L., and Elimelech, M., "Deposition of Brownian Particles in Porous Media: Modified Boundary Conditions for the Sphere-in-Cell Model", presented at: *ACS - 66th Annual Colloid and Surface Science Symposium*, June 17-21, 1992, Morgantown, WV.
40. Song, L., and Elimelech, M., "Dynamics of Particle Deposition in Porous Media: Role of Retained Particles", presented at: *ACS - 66th Annual Colloid and Surface Science Symposium*, June 17-21, 1992, Morgantown, WV.
41. Elimelech, M., and Song L., "Dynamics of Colloid deposition in Porous Media", presented at: *Colloids in the Aquatic Environment: An International symposium*, September 7-9, 1992, London, United Kingdom.
42. Elimelech, M., and Song L., "Capture of Colloids in Porous Media: Theory, Numerical Solution, and Implications to the Transport of Colloidal Contaminants in Groundwaters", presented at: *ACS - 65th Annual Colloid and Surface Science Symposium*; in the session of: Colloid and Interfacial Aspects of Groundwater and Soil Cleanup, June 17-19, 1991, Norman, OK.
43. Song, L., and Elimelech, M., "Modeling of Particle Deposition in Porous Media", presented at: *American Geophysical Union 1991 Fall Meeting*, December 9-13, 1991, San Francisco, CA.