

HYUN-SEOB SONG

Biological Sciences Division
Fundamental & Computational Sciences Directorate
Pacific Northwest National Laboratory
Phone: 509-375-4485; Fax: 509-371-6946
E-mail: hyunseob.song@pnnl.gov

EDUCATION AND TRAINING

2011 Postdoctoral Res. Assoc., School of Chemical Engineering, Purdue University, Indiana
2001 Postdoctoral Res Assoc., School of Chemical Engineering, Purdue University, Indiana
1999 Ph.D., Department of Chemical Engineering, Korea University, Seoul, Korea
1995 M.S., Department of Chemical Engineering, Korea University, Seoul, Korea
1993 B.S., Department of Chemical Engineering, Korea University, Seoul, Korea

RESEARCH AND PROFESSIONAL EXPERIENCE

2013-present, **Staff Scientist**, Biological Sciences Division, Pacific Northwest National Laboratory, Richland, Washington, *Metabolic modeling of microorganisms and microbial communities; simulation of microbial community dynamics; model integration; reconstruction of genome-scale metabolic networks.*

2012-2013, **Staff Scientist**, DoD Biotechnology HPC Software Applications Institute, Henry M. Jackson Foundation, Frederick, Maryland, *Computational approach for the discovery of novel biomarkers of toxicant exposure through the integration of genome-scale metabolic networks with multi-omics data.*

2006-2012, **Postdoctoral Research Associate / Research Scientist**, School of Chemical Engineering, Purdue University, Indiana, *Development of dynamic metabolic modeling frameworks based on the cybernetic approaches; development of efficient numerical algorithms for the pathway analysis of genome-scale metabolic networks; optimization of bioreactor operation and configuration; nonlinear analysis of complex metabolic systems.*

2002-2006, **Senior Research Scientist**, Modeling and Simulation Group, LG Chem, Ltd. / Research Park, Daejeon, Korea, *Application of computational fluid dynamics for mixing analysis and process design/scale-up.*

2001-2002, **Research Assistant Professor**, Applied Rheology Center, Department of Chemical Engineering, Korea University, Seoul, Korea, *Research on nonlinear dynamics and stability of film blowing processes.*

2000-2001, **Postdoctoral Research Associate**, School of Chemical Engineering, Purdue University, Indiana, *Nonlinear analysis of industrial Fischer-Tropsch reactors.*

SELECTED PUBLICATIONS (*h-index of 10 from 37 publications*)

Song HS, Reifman J, Wallqvist A (2014) Prediction of Metabolic Flux Distribution from Gene Expression Data Based on the Flux Minimization Principle. PLoS ONE 9(11): e112524

Song HS, Cannon WR, Beliaev AS, Konopka A (2014) Mathematical Modeling of Microbial Community Dynamics: A Methodological Review. Processes 2(4): 711-752

Song HS, DeVilbiss F, Ramkrishna D (2013) Modeling Metabolic Systems. The Need for Dynamics. Current Opinion in Chemical Engineering. 2(4): 373-382

Song HS, Ramkrishna D, Pinchuk GE, Beliaev AS, Konopka AE, Fredrickson JK (2013) Dynamic Modeling of Aerobic Growth of *Shewanella oneidensis*. Predicting Triaxial Growth, Flux Distributions, and Energy Requirement for Growth. Metabolic Engineering 15: 25-33.

Song HS, Ramkrishna D (2012) Prediction of Dynamic Behavior of Mutant Strains from Limited Wild-Type Data. Metabolic Engineering 14: 69-80.

Song HS, Kim SJ, Ramkrishna D (2012) Synergistic Optimal Integration of Continuous and Fed-Batch Reactors for Enhanced Productivity of Lignocellulosic Bioethanol. I&EC Res 52(4): 1690-1696.

- Song HS, Ramkrishna D (2011) Cybernetic Models based on Lumped Elementary Modes Accurately Predict Strain-Specific Metabolic Function. *Biotechnol Bioeng* 108(1): 127-140.
- Song HS, Ramkrishna D (2010) Prediction of Metabolic Function from Limited Data: Lumped Hybrid Cybernetic Modeling (L-HCM). *Biotechnol Bioeng* 106(2): 271-284.
- Song HS, Morgan JA, Ramkrishna D (2009) Systematic Development of Hybrid Cybernetic Models: Application to Recombinant Yeast Co-consuming Glucose and Xylose,” *Biotechnol Bioeng*, 103(5): 984-1000.
- Song HS, Ramkrishna D (2009) Reduction of a Set of Elementary Modes Using Yield Analysis. *Biotechnol Bioeng* 102(2): 554-568.

SYNERGISTIC ACTIVITIES

- Organization of a workshop on metabolic modeling, DBT-ICT-Centre for Energy Biosciences, Institute of Chemical Technology, Mumbai, India (2010)
- Organization of a workshop on scale-up and mixing, LG Chem, Ltd. / Research Park, Daejeon, Korea (2005)
- Reviewer for *Biotechnology and Bioengineering* (since December 2014)
- Reviewer for *Processes* (since October 2014)
- Reviewer for *BioSystems* (since August 2014)
- Reviewer for *AIChE Journal* (since March 2014)
- Reviewer for *Bioresource Technology* (since February 2014)
- Reviewer for *International Journal of Chemical Engineering* (since Feb 2012)
- Reviewer for *Bioprocess and Biosystems Engineering* (since April 2009)
- Reviewer for *Optimal Control, Applications and Methods* (since April 2009)
- Reviewer for *Computers and Chemical Engineering* (since April 2008)
- Reviewer for *Resources, Conservation & Recycling* (since May 2008)