

JENNIFER L. REED

9500 Gilman Drive, Department of Bioengineering
University of California, San Diego
La Jolla, CA 92093-0412

jlreed@ucsd.edu
Office: 858-534-4783; Home: 858-775-6405
<http://systemsbiology.ucsd.edu/personnel/reed.htm>

EDUCATION

- University of California, San Diego** September 2005
Ph.D., Bioengineering
Principal Advisor: Bernhard Palsson, Ph.D.
Thesis: Model Driven Analysis of *Escherichia coli* Metabolism
- University of California, San Diego** June 2002
Master of Science, Bioengineering
Principal Advisor: Bernhard Palsson, Ph.D.
- University of California, San Diego** June 2000
Bachelor of Science, Bioengineering
Summa Cum Laude

HONORS & ACTIVITIES

- University of California, Faculty Fellow (2005-2007)
- Irwin and Joan Jacobs Fellow (2000 – 2001)
- Reuben H. Fleet Scholarship and William W. Stout Scholarship (1999-2000)
- Participant in Whitaker Bioengineering Summer Internship Program at the NIH (1999)
- Award for Excellence as a Teaching Assistant, Department of Bioengineering (June 2001 and June 2003)
- Award for Highest Academic Achievement, Department of Bioengineering (June 2000)
- Award for Best Oral Presentation, 3rd Annual Southern California Biomedical Engineering Student Symposium (January 2004)
- Award for Outstanding Service, Department of Bioengineering (June 2000)
- Member of Phi Beta Kappa honor society (June 2000)
- Undergraduate Provost's Honor Roll, Every Quarter at University of California, San Diego (1996-2000)
- Member of Tau Beta Pi engineering honor society, UC San Diego (June 1997)
 - Student Outreach Coordinator (September 1999- June 2000)

PUBLICATIONS

* *Indicates authors contributed equally towards the work*

Reed JL, Patel TR, Chen KH, Joyce AR, Applebee MK, Herring CD, Bui OT, Knight EM, Fong SS, and Palsson BO. Systems Approach to Refining Genome Annotation: Prediction and Validation of Gene Functions. *Proc Natl Acad Sci U S A*. Accepted (2006).

Joyce AR*, Reed JL*, White A, Edwards R, Osterman A, Baba T, Mori H, Lesley SA, Palsson BO, and Agarwalla S*. Experimental and computational assessment of conditionally essential genes in *E. coli*. *J Bacteriology*. In Press (2006).

Reed JL, Hua Q., and Palsson BO. Sensitivity of ^{13}C Isotopomer Based Flux Calculations to Network Detail. In Preparation (2006).

Reed JL, Famili I, Thiele I, and Palsson BO. Towards Multidimensional Genome Annotation. *Nature Reviews Genetics*. 7(2):130-141(2006).

Papin JA, Reed JL, and Palsson BO. Hierarchical thinking in network biology: the unbiased modularization of biochemical networks. *Trends in Biochemical Sciences*. 29:641-647(2004).

Price ND, Reed JL, and Palsson BO. Genome-scale Models of Microbial Cells: Evaluating the consequences of constraints. *Nature Reviews Microbiology*. 2:886-897(2004).

Reed JL and Palsson BO. Genome-scale in silico models of *E. coli* have multiple equivalent phenotypic states: assessment of correlated reaction subsets that comprise network states. *Genome Research*, 14(9): 1797-1805 (2004).

Covert MW, Knight EM, Reed JL, Herrgard MJ, and Palsson BO. Integrating high-throughput data and computational models leads to *E. coli* network elucidation. *Nature* 429: 92-96 (2004).

Reed JL, Vo TD, Schilling CH, and Palsson BO. An expanded genome-scale model of *Escherichia coli* K-12 (iJR904 GSM/GPR). *Genome Biology*, 4(9): p. R54.1-R54.12 (2003).

Price ND*, Reed JL*, Papin JA*, Wiback SJ, and Palsson BO. Network-based Analysis of Regulation in the Human Red Blood Cell. *Journal of Theoretical Biology*, 225(2):185-194 (2003).

Reed JL and Palsson BO. Thirteen years of building constraint-based in silico models of *Escherichia coli*. *Journal of Bacteriology*, 185(9):2692-9 (2003).

Price ND*, Reed JL*, Papin JA*, Famili I, and Palsson BO. Analysis of metabolic capabilities using singular value decomposition of extreme pathway matrices. *Biophysical Journal*, 84(2):794-804 (2003).

Antzutkin ON, Balbach JJ, Leapman RD, Rizzo NW, Reed J, and Tycko R. Multiple quantum solid-state NMR indicates a parallel, not antiparallel, organization of beta-sheets in Alzheimer's beta-amyloid fibrils. *Proc Natl Acad Sci U S A*, 97(24):13045-50 (2000).

Balbach JJ, Ishii Y, Antzutkin ON, Leapman RD, Rizzo NW, Dyda F, Reed J, and Tycko R. Amyloid fibril formation by A beta 16-22, a seven-residue fragment of the Alzheimer's beta-amyloid peptide, and structural characterization by solid state NMR. *Biochemistry*, 39(45):13748-13759 (2000).

BOOK CHAPTERS

Reed JL, Fong SS, and Palsson BO. Phenomics, book chapter in *Microbial Diversity and Bioprospecting*, edited by A.T. Bull, 2003. p. 280-287.

Reed JL and Palsson BO. Systems Biology: A Four Step Process, book chapter in *Introduction to Bioengineering*, edited by P.C. Chen, S. Chien, and Y.C. Fung. Under Review (2006).

PRESENTATIONS

Reed JL. "Model-Driven Analysis of *Escherichia coli* Metabolism," Bioengineering Seminar, Department of Bioengineering, University of California, San Diego, June 2006, San Diego, CA.

Reed JL and Palsson BO. "Constraint-Based Modelling of Large-Scale Metabolic Systems," Consortium for Post-Genome Sciences: Genomes to Systems, September 2004, Manchester, England.

Reed JL and Palsson BO. "Constraint-Based Metabolic and Regulatory Models of *Escherichia coli*," SIGSIM, satellite meeting at the 12th International Conference on Intelligent Systems for Molecular Biology July 2004, Glasgow, Scotland.

Reed JL and Palsson BO. "E. coli i2K: A Genome-Scale Model of Metabolism, Regulation, and Transcription and Translation in *Escherichia coli*," 2nd International *E. coli* Alliance Conference on Systems Biology, June 2004, Banff, Canada.

Reed JL and Palsson BO. "Genome-scale Metabolic Models of *Escherichia coli*," 3rd Annual Southern California Biomedical Engineering Student Symposium, January 2004, Los Angeles, California, USA.

GRANT WRITING EXPERIENCE

Metabolic Engineering Grant submitted to NSF, not funded (2002).

E.coli Network Reconstruction Grant submitted to NIH, funded (2003).

E.coli Network Reconstruction Grant submitted to NIH, pending (2006).

TEACHING EXPERIENCE

Co-Instructor (Faculty Fellow Program)

Systems Biology and Bioengineering I: Biological Components

University of California, San Diego, Fall 2005 and Fall 2006

Biochemical Engineering

University of California, San Diego, Winter 2006

Bioreactor Engineering

University of California, San Diego, Fall 2006

Modeling and Computation in Bioengineering

University of California, San Diego, Spring 2006

Bioengineering Design

University of California, San Diego, Spring 2006 and Fall 2006.

Systems Biology Short Course (Network reconstruction and systems analysis)

UCSD Extension, July 2005 & January 2006

Winter School in Genomics (Network reconstruction and systems analysis)

Lecturer, Cuernavaca, Mexico, February 2006

Systems Biology & Bioengineering Short Course (Network reconstruction and systems analysis)

University of California, San Diego, May 2004

Teaching Assistant

Metabolic Engineering (Computational methods and high-throughput biotechnology)

Graduate Student Instructor, University of California, San Diego, Spring 2003

Introduction to Bioengineering Design (Statistical analysis and signal processing)

Graduate Student Instructor, University of California, San Diego, Spring 2001

Experimental Techniques Lab (Data acquisition and analysis)

Undergraduate Student Instructor, University of California, San Diego, Fall 1999 and Spring 2000

Physics Laboratory-Electricity and Magnetism, Waves, and Optics (Circuits, lasers, optics, and magnetic fields)

Undergraduate Student Instructor, University of California, San Diego, Winter 2000

RESEARCH EXPERIENCE

Systems Biology Research Group (January 2001 – Present)

- *Thesis: Model Driven Analysis of Escherichia coli Metabolism*
- *Research Institute: University of California, San Diego*
- *Advisor: Bernhard Palsson, Ph.D.*
- Reconstructed metabolic and regulatory networks of *Escherichia coli*.
- Developed a genome-scale isotopomer model of *E.coli* metabolism for intracellular flux calculations.
- Compared *E. coli* model predictions with experimental data to hypothesize new gene functions which were subsequently verified experimentally.

Laboratory of Chemical Physics (June 1999 – August 1999)

- *Research Project: Synthesis and NMR Analysis of β -Amyloid Fibrils*
- *Research Institute: National Institute of Diabetes & Digestive & Kidney Diseases, NIH*
- *Advisor: Robert Tycko, Ph.D.*
- Synthesized ^{13}C labeled amyloid peptides for NMR studies.
- Generated β -amyloid fibrils and measured their resulting NMR spectra.

TECHNICAL SKILLS AND COURSE WORK

- Graduate Coursework includes:
Biochemistry, Cell and Molecular Biology, Respiratory and Renal Physiology, Biomechanics, Biomedical and Transport Phenomena, Fluid Mechanics, Solid Mechanics, Tissue Engineering Sciences, Neurocomputing, Numerical Methods, Operations Research, Bioinformatics Sequence and Structure Analysis
- Undergraduate Coursework includes:
Human Physiology, Genetics, Structural and Metabolic Biochemistry, Molecular Biology, Biochemical Techniques, General Chemistry, Organic Chemistry, Physical Chemistry, Mass Transfer, Fluid Mechanics, Linear Circuits, Chemical Engineering Process Modeling, Bioreactor Design, Biochemical Engineering, Metabolic Engineering, Tissue Engineering, Biotechnology laboratory, Biomaterials, Biosystems and Control, Statistics
- Experience with standard lab equipment and techniques: HPLC, bacterial cell culture, PCR, gel electrophoresis, bacterial transformation, bacterial DNA isolation, protein analysis methods (Lowry and ELISA assays), SDS page, enzyme assays, signal generators, circuit testing, pressure transducers, strain gauges.
- Extensive familiarity with MATLAB, GAMS, AutoCAD, and Unix.
- Perl and FORTRAN programming experience.