

Costas D. Maranas

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EDUCATION

1990-1995 **Princeton University**, Princeton, New Jersey
Ph.D. in Chemical Engineering, May 1995
M.A. in Chemical Engineering, June 1992

1985-1990 **Aristotle University**, Thessaloniki, Greece
Diploma in Chemical Engineering, June 1990

PROFESSIONAL HISTORY

Jun. 2004-present **The Pennsylvania State University,
Department of Chemical Engineering**
Professor

June 2005-present Donald B. Broughton Professor in Chemical Engineering

May 2005-2015 Director of Graduate Student Recruiting for the Bioinformatics & Genomics
Option

Jan. 2012-present Member of the Bioengineering Intercollege Graduate Program

Jan. 2004-present Faculty Affiliate of the Center for Supply Chain Research

Sep. 2001-present Member of Faculty of the Intercollege Graduate Degree in Integrative
Biosciences (Bioinformatics and Genomics & Cell and Developmental Biology
Options)

Jun. 2001-June 2004 **The Pennsylvania State University,
Department of Chemical Engineering**
Associate Professor

Sep. 1997-present Member of Faculty of the Operations Research Program

Sep. 1995-Jun. 2001 **The Pennsylvania State University,
Department of Chemical Engineering**
Assistant Professor

Sep. 1994-Aug. 1995 **Princeton University, Dept. of Chemical Engineering**
Pre-doctoral Research Assistant

Feb.-Jun. 1992 **Princeton University, Dept. of Chemical Engineering**

Assistant in Instruction

Feb.-Jul. 1990 **Chemical Process Research Institute (CPERI), Greece**
Research Assistant

Jul.-Sep. 1989 **Koninklijke Shell/Laboratorium in Amsterdam, NL,**
Mathematics and Systems Engineering Department
Research Assistant

Jul.-Oct. 1988 **Greek Fuels and Lubricants (EKO), Thessaloniki, Greece**
Process Engineer Assistant in Refinery Operations

ADJUNCT APPOINTMENTS

Oct. 2017-presnet **Adjunct Professor** of Beijing University of Chemical Technology

RESEARCH INTERESTS

Reconstruction and analysis of metabolic networks, computational strain design, metabolism of cyanobacteria and plants, metabolism of obligatory anaerobes, systems and synthetic biology, computational design of proteins, enzymes and antibodies, optimization theory and applications.

PROFESSIONAL SOCIETY MEMBERSHIPS

Fellow of the American Institute for Medical and Biological Engineering (Nov. 2007-present)

Member, American Chemical Society (ACS) (2004-2008)

Member, Biological Systems Engineering (2004-2008)

Member, Society for Biological Engineering (SBE) (2003-present)

Member, International Metabolic Engineering Society (IMES) (2015-present)

Member, Biophysical Society (2000-present)

Member, Computer-Aided Systems Technology (CAST) (1992- present)

Member, American Institute of Chemical Engineers (1992-present)

PROFESSIONAL SOCIETY ACTIVITIES

Conference Organizing Committee, International Conference on Microbiome Engineering, Nov. 4-6, 2018.

Conference co-Chair, Biochemical and Molecular Engineering, June 26-30, 2011 (over 200 participants)

Conference Advisory Board member for Metabolic Engineering Meeting (2008-present)

Conference Advisory Board member for Biochemical Engineering Meeting (2009-present)

Conference Committee member for FOCAPO (2008)

Advisory Board Member, Society for Biological Engineering SBE (2008-present)

Steering Committee member for EcoCyc database (2006-present)

PNNL Advisory Committee member for “Microbiomes in Transition” (2015-2020)

PNNL/EMSL Advisory Committee member for “Earth & Biological Sciences Directorate (EBSD)” (2015-present)

JOURNAL EDITORIAL ACTIVITIES

Editorial Board, Journal of Industrial Microbiology & Biotechnology (May 2017-present)

Editorial Board, IEEE Life Sciences Letters (July 2014-June 2017)

Associate Editor, BMC Systems Biology (Apr. 2011-present)

Associate Editor, PLoS Computational Biology (Feb. 2010-present)

Advisory Board of Biotechnology Journal (Nov. 2009-present)

Associate Editor, Bioprocess and Biosystems Engineering (Aug. 2007-Dec. 2007)

Editorial Board, Biophysical Journal (2005-2011)

Editorial Board, Journal of Global Optimization (2005-2007)

Editorial Board, Computers & Chemical Engineering (2004-2009)

Editorial Board, Metabolic Engineering (2001-present)

Editorial Board, Metabolic Engineering Communications (2018-present)

PROPOSAL REVIEWING ACTIVITIES

Proposal Reviewer for NSF, DOE, NIH, EPA, Novo Nordisk Foundation, Qatar National Research Fund, European Commission, Swiss National Science Foundation, ARISTEIA Research Program Greece, Technical University of Denmark, Research Foundation Flanders (FWO), and FNR Luxembourg.

INTERNAL ADMINISTRATIVE SERVICES

Member of Advising Committee of Center of Excellence for Industrial Biotechnology (2017-present)

Chair of Dept. of Chemical Engineering Awards Committee (2017-present)

Associate Member, Institute for CyberScience at Penn State (2017-present)

Member, Dept. of Chemical Engineering P&T Committee (2016-present)

Member, Dept. of Chemical Engineering Faculty Search Committee (2016-present)

Member, Dept. of Chemical Engineering Seminars Committee (2015-present)

Chair of Associate Dean of Research and Innovation Search Committee (2016-present)

Chair of Chemical Engineering Faculty Search Committee (2016-present)

Member, COE P&T Committee (2013-2015)

Member, COE Dean Search Committee (2013)

Member, Bioengineering Intercollege Graduate Program (2011-present)

Chair of Committee on Faculty Recruiting (2010)

Chair of Departmental P&T Committee (2010-2011)

Member of AD-14 CSE Chair Review Committee (2010-2011)

Member, COE P&T Committee (2008-2010)

Chair, Committee on Bio-Chair Faculty Recruiting (2009)

Member, Network Science Committee (2008-present)

Director of Graduate Student Recruiting for Bioinformatics & Genomics Option (2005-Present)

Member, Homeland Security Initiative (2005)

Faculty Affiliate, Center for Supply Chain Research (2004-Present)

Chair, Sabbatical Review Committee (2004)

Member, Department Head Search Committee (2003)

Chair, Space Committee (2002)

Member, Departmental Awards Committee (2002-2003)

Member, Faculty of the Intercollege Graduate Degree in Integrative Biosciences: CDB and B&G Options. (2001-Present)

Member, Junior Faculty Search Committee (2000)

Member, Undergraduate Curriculum Committee (1999-2001)

Member, ABET Committee (1999)

Member, Department Head Search Committee (1999-2000)

Omega Chi Epsilon Academic Advisor (1998-2002)

Member, Faculty of the Operations Research Program (1997-present)

Member, Graduate Student Admissions Committee (1996-1998)

AWARDS AND HONORS

Internal Recognitions

Penn State Engineering Alumni Society (PSEAS) Premier Research Award, (2016)

Penn State Engineering Alumni Society (PSEAS) Outstanding Research Award, (2012)

External Recognitions

Special Award for your Outstanding Contribution to Tsinghua Forum on Chemical Engineering (No. 12), October 24, 2014.

The Korean Society for Biotechnology and Bioeng. Lectureship at the KSBB Fall Meeting, (2007)

Stratis V. Sotirchos Lectureship at 6th Panhellenic Chemical Engineering Conference (2007)

Outstanding Young Investigator Award, AIChE Computing and Systems Technology Division Award (2006)

Allan P. Colburn Award for Excellence in Publications by a Young Member of the Institute, AIChE Institute Award (2002)

NSF CAREER Award (1997)

Du Pont Educational Aid Grant (1996-98)

Wallace Memorial Fellowship in Engineering, Princeton University (1993-94)

Technical Chamber of Greece Award (1988-1990)

National Scholarship Foundation of Greece Award (1987-1990)

INVITED LECTURES AND SEMINARS (2000-present)

Universities & Institutes

Department of Chemical Engineering, Monash University, December 3, (2018)

Department of Chemical Engineering, Colorado State University, May 18, (2018)

Department of Chemical Engineering, Monash University, Apr. 10, (2018)

Department of Chemical and Biomolecular Engineering, Princeton University, Feb. 12, (2018)

Applied Mathematics Group, Argonne National Lab (ANL), Sept. 1, (2017)

Department of Biochemical Engineering, Centre for Process Systems Engineering Seminar Series, University College London, June 7, (2017)

Department of Chemical, Biochemical and Environmental Engineering, University of Maryland Bucks County (UMBC), May 1, (2017)

Department of Chemical and Biomolecular Engineering, Tulane University, March 24, (2017)

MoES seminar at the University of Washington, Jan. 15, (2017)

Distinguished Lecture Series at the Monk Family Dept. of Chemical Engineering & Materials Science, University of Southern California, Dec. 1, (2016)

Department of Chemical Engineering, Massachusetts Institute of Technology (MIT), Oct. 21, (2016)

The Children's Hospital of Philadelphia (CHOP), Microbiome Program, University of Pennsylvania, May 25, (2016)

Department of Chemical Engineering, University of California Santa Barbara (UCSB), Jan. 14, (2016)

Department of Chemical and Biomolecular Engineering, Rutgers University, Nov. 19, (2015)

Department of Chemical and Biomolecular Engineering, University of Delaware, Oct. 2, (2015)

Institute of Systems Biology, Seattle WA, Sept. 25, (2015)

Bioengineering Department, UC San Diego, May 11, (2015)

School of Chemical and Biomolecular Engineering, Georgia Tech., Feb. 18, (2015)

Department of Chemical and Biomolecular Engineering, University of Colorado Boulder, Dec. 9, (2014)

Biological Engineering Department, Utah State University, Dec. 6, (2014)

Department of Chemical Engineering, Tsinghua University, Beijing, China, Oct. 24, (2014)

J. D. Lindsay Lecture Series, Department of Chemical Engineering, Texas A&M University, Sept. 3, (2014)

Department of Chemistry and Chemical Engineering, CalTech, Apr. 17, (2014)

Department of Chemical and Biomolecular Engineering, John Hopkins University, Apr. 10, (2014)

CEIT Centro de Estudios e Investigaciones Técnicas, Guipuzkoa, Spain, Dec. 18, (2013)

Department of Industrial Engineering, Penn State, Oct. 10, (2013)

School for Engineering of Matter, Transport and Energy, Arizona State University, Jan. 28, (2013)

Department of Chemical and Biomolecular Engineering, Univ. of Illinois at Urbana-Champaign, Oct. 2, (2012)

Ecole polytechnique fédérale de Lausanne, Institut des sciences et ingénierie chimiques, Lausanne, Switzerland, Apr. 25, (2012)

A. L. Bortree/Molecular Toxicology Seminar Series, Dept. of Veterinary and Biomedical Sciences, Penn State, Jan. 25, (2012)

Dept. of Chemical and Biological Engineering, University of Wisconsin, Nov. 8, (2011)

Dept. of Microbiology and Biochemistry, Michigan State University, Apr. 26, (2011)

NSF Engineering Research Center for Biorenewable Chemicals (CBiRC), Feb. 3, (2011)

Dept. of Chemical and Biological Engineering, Rice University, Oct. 28, (2010)

Dept. of Microbiology and Cell Science, Florida Univ., Feb. 22, (2010)

Joint BioEnergy Institute (JBEI), Jan. 29, (2010)

Operations Research Colloquium Seminar, Penn State, Dec. 8, (2009)

Dept. of Chemical, Biological and Environmental Engineering, Washington Univ., Dec. 4, (2009)

Dept. of Chemical Engineering Lindsey Lecture, Texas A&M, Oct. 28, (2009)

Dept. of Chemical and Biomolecular Engineering, Tufts Univ., Mar. 30, (2009)

Ecole polytechnique fédérale de Lausanne, Institut des sciences et ingénierie chimiques, Lausanne, Switzerland, Mar. 8, (2009)

Dept. of Chemical and Biological Engineering, Buffalo University, Feb. 25, (2009)

Dept. of Veterinary & Biomedical Sciences (Center for Molecular Immunology & Infectious Disease), Penn State Univ., Oct. 16, (2008)

Dept. of Industrial Engineering, Penn State Univ., Oct. 9, (2008)

Dept. of Chemical Engineering, Univ. of Maryland, Sept. 30, (2008)

Dept. of Chemical and Biomolecular Engineering, U. Penn, Sept. 24, (2008)

TIGEM Telephon Institute of Genetics and Medicine, Italy, May 23, (2008)

Dept. of Biological Sciences, Korea Advanced Institute of Science and Technology (KAIST), Korea, October 18, (2007).

Dept. of Chemical Engineering, RPI, Sept. 12, (2007).

Department of Biochemistry & Molecular Biology, College of Medicine, Hershey, PA, March 21, (2006).

Depts. of BME/ChemE and ICES, University of Texas, Austin, TX, October 13, (2005).

Sandia National Laboratories, Biological and Energy Science Center, Albuquerque, NM, May 12, (2005).

Dept. of Electrical Engineering, ETH, Switzerland, November 22, (2004).

Center for Process Biotechnology, Department of Biotechnology, Dept. of Biological Engineering, DTU, Denmark, November 19, (2004).

Dept. of Chemical Engineering, University of Connecticut, October 5, (2004).

Dept. of Chemical Engineering, University of Houston, September 3, (2004).

Division of Engineering and Applied Sciences, Harvard University, March 3, (2004).

Dept. of Bioengineering, University of California at San Diego, October 22, (2003).

Dept. of Chemical Engineering, Massachusetts Institute of Technology, October 17, (2003).

Dept. of Chemical Engineering, University of Massachusetts at Amherst, October 16, (2003).

Chemical Process Engineering Research Institute, Thessaloniki Greece, June 13, (2003).

Dept. of Chemical Engineering, Brooklyn Polytechnic University, April 11, (2003).

School of Chemical Engineering, Georgia Institute of Technology, March 19, (2003).

Dept. of Chemical and Biochemical Engineering, Rutgers University, February 27, (2003).

Dept. of Chemical Engineering, Princeton University, February 26, (2003).

Dept. of Chemical Engineering, University of California at Santa Barbara, November 21, (2002).

Dept. of Chemical Engineering, Northwestern University, September 26, (2002).

Dept. of Chemistry, Penn State University, September 19, (2002).

Dept. of Chemical Engineering, Delaware University, February 13, (2002).

Dept. of Chemical Engineering, Carnegie-Mellon University, December 17, (2001).

Dept. of Chemical Engineering, Wisconsin University, November 27, (2001).

Dept. of Chemical Engineering, John Hopkins University, October 25, (2001).

Dept. of Chemical Engineering, University of Virginia, October 18, (2001).

Dept. of Chemical Engineering, University of Pennsylvania, October 15, (2001).

Dept. of Chemical Engineering, Cornell University, September 10, (2001).

Dept. of Chemical Engineering, Imperial College, UK, September 3, (2001).

Dept. of Chemical Engineering, Rice University, February 22, (2001).

Centre for Process Systems Engineering, Imperial College, UK, June 30, (2000).

Corporations

GreenLight Technologies, Medford, MA, Aug. 31, (2016)

DuPont CR&D, Wilmington, DE, March 13, (2015).

Genomatica, Inc., San Diego CA, Apr. 18, (2014).

MedImmune, Gaithersburg MD, October 25, (2013).

BASF Corporation, Tarrytown NY, March 13, (2013).

Synthetic Genomics, April 30, (2007).

CACHE Corporation, WebCast, May 12, (2006).

Sigma-Aldrich, December 3, (2004).

Bristol Myers Squibb, April 27, (2004).

Xencor, Inc., Sept. 17, (2003).

Cargill, Inc., Industrial Bioproducts Business, Wayzata, MN, August 22, (2003).

Diversa Corporation, San Diego, CA, August 14, (2003).

DuPont Experimental Station, Wilmington DE, July 25, (2003).

Genencor International, Inc., Palo Alto, CA, July 11, (2002).

Xencor, Inc., April 10, (2002).

IBM Watson Center, Computational Biology Group, February 6, (2002).

Diversa Corporation, San Diego, CA, July 18, (2001).

Genomatica, Inc., March 15, (2001).

Enchira Biotechnology Corporation, January 5, (2001).

Maxygen Corporation, December 20, (2000).

Rutgers Organics, July 12, (2000).

Air Products & Chemicals, March 14, (2000).

Conferences, Workshops & Symposia

5th Conference on Constraint-Based Reconstruction Methods and Analysis (COBRA 2018). Oct. 14-16, 2018, Seattle, WA, “From 13C labeling data to parameterized kinetic models with a genome-wide coverage”

2018 Bioinformatics & Genomics Retreat. Oct. 5 & 6, 2018, Penn State, “Metabolic pathway design through uncharted biochemical spaces”

ISGSB 2018 (International Study Group for Systems Biology). Sept. 24-28, 2018, Tromsø, Norway, “From 13C labeling data to parameterized kinetic models with a genome-wide coverage”

YSGSB 2018 (Young Study Group for Systems Biology). Sept. 23, 2018, Tromsø, Norway, “Shaping production hosts by design”

Metabolic Engineering XII conference. Systems metabolic engineering for superior bio-production. June 24-28, 2018, Munich, Germany, “Shaping metabolism and production hosts by design”

MilliporeSigma Synthetic Biology and Metabolic Engineering Symposium, April 27, 2018, St. Louis, MO, “Shaping metabolism and production hosts by design”

Biocon China 2018, 4th International Symposium on Biopharmaceutical Innovation and Development, Computational antibody design session, Shanghai, China, April 20-21, 2018, “OptMAVE: Computational antibody design”

Topical A conference on "Microbiomes and Microbial Communities" as part of the Annual Meeting of Chemical Engineers 2017, Minneapolis, MN, Nov. 1, 2017, “Metabolic modeling of microbial communities”

Metabolic Engineering Summit, Oct. 22-24, 2017, Beijing, China, “Atom mapping information in novel pathway design and metabolic flux elucidation”

CBiRC 9th Annual Site Visit, Oct. 9-10, 2017 Ames, IA, “Pathway synthesis using de novo steps through uncharted biochemical spaces”

Metabolic Pathway Analysis 2017. In silico & in vitro metabolism conference: From pathways to cells to communities and tissues, Bozeman, MT, July 24-28, 2017, “Exploring the combinatorial space of complete pathways to chemicals”

Biochemical and Molecular Engineering XX. The Next Generation of Biochemical Engineering: From Nanoscale to Industrial Scale, Newport Beach, CA July 16-20, 2017, “Computational redesign of acyl-ACP thioesterase with improved selectivity towards medium-chain fatty acids at high production levels”

Christodoulos A. Floudas Memorial Symposium, Princeton University, May 6, 2017, “Computational biology and bioinformatics”

EcoFAB summit. Developing a community strategy to advance standardized model ecosystems, Washington DC, April 27-28, 2017, “Challenges and Opportunities in Modeling Metabolism in Communities”

Fifth Annual Winter Q-Bio Meeting, Kauai, HI, Feb. 21-24, 2017, “Constructing predictive kinetic models of metabolism for guiding strain design”

DOE/BER Annual Grantees Meeting. Computing in Biology session, Crystal City, VA, Feb. 5-8, 2017, “Computational bottlenecks in metabolic networks and protein design”

Microbial Communities: Modelling Meets Experiments, EMBL, Germany, Dec. 8-11, 2016, “Modeling of metabolism in microbial communities”

Hellenic Bioinformatics (HBIO), Thessaloniki, Greece, Nov. 18-21, 2016, “Reconstruction, analysis and redesign of metabolic networks”

Gas Fermentation Workshop, Heron island, Australia, July 2-6, 2016, “Assessing methanotrophic capabilities of Methanosarcina acetivorans for bioproduction”

Metabolic Engineering XI: Metabolic Engineering Meeting, Kobe, Japan, June 26-30, 2016, “Computational Tools and Methods for Metabolic Engineering”

CBiRC 8th Annual Site Visit, May 9-12, 2016 Ames, IA, “Medium and short-chain fatty acid overproduction in E. coli through integrated fluxomics and computational strain design approach”

Indo-US Workshop on Cell Factories, Mar. 18-20, 2016, Mumbai, India, “Reconstruction, analysis and redesign of metabolism”

Genomics Science Contractors-Grantees Annual Meeting XIV, Mar. 6-9, 2016 Vienna VA, “Constructing predictive kinetic models of metabolism for guiding strain design”

Arpa-E REMOTE Annual Review Meeting, Jan. 20-21, 2016, LaJolla, CA, “Engineering A Methane-to-acetate Pathway For Producing Liquid Biofuels”

NSF Workshop on Designing Principles for Engineering Biology, Tysons Corner, VA, Nov. 10-11, 2015, “Engineering of biomolecular Networks”

CBiRC 7th Annual Meeting, Oct. 11-13, 2015 Ames, IA, “Progress in the integrated flux platform design”

4th Conference on Constraint-Based Reconstruction & Analysis (COBRA), Heidelberg, Germany, Sept. 18, 2015, “OptStoic: Designing overall stoichiometric conversions and intervening reactions”

IDEAS Lab Midterm Workshop, London, UK, Sept. 16, 2015, “Designing Nitrogen Fixation in Oxygenic Photosynthetic Cells”

Biochemical and Biomolecular Engineering XIX, Puerto Vallarta, Mexico, July 12-16, 2015, “Computational Tools for Enzyme and Antibody Design”

BioEnergy Science Center (BESC) Annual Retreat, Keynote Speaker, June 16, 2015, “Reconstruction, Analysis and Redesign of Metabolism”

COBRA Workshop on Modelling Microbial Communities, 5th International Human Microbiome Congress, Luxembourg, March 30, 2015, “Modeling microbial communities using bilevel programming”

EPFL/Nestle workshop: From single genome to metagenomic metabolic modelling, Lausanne, Switzerland, Jan. 26, 2015, “Reconstruction, Analysis, & Redesign of Metabolic Pathways”

Indo-US NSF Workshop on Synthetic and Systems Biology, JNU New Delhi, India, November 9-12, 2014, “Using computations to reconstruct, analyze and redesign metabolism”

Bioengineering Workshop: Cell factory design from enzyme to metabolic network, Tsinghua University, Beijing, China, October 27, 2014, “Using Computations for Enzyme and Antibody Design”

Metabolic Engineering X, Vancouver BC, June 15-19, 2014, “Integrating Kinetic Models of Metabolism with k-OptForce for Strain Design”

COBRA Conference, Wintergreen VA, May 20-23, 2014, “Using MetRxn for metabolic model reconstruction, flux elucidation and redesign”

DOE BER Contractor-Grantee Annual Meeting, Washington DC, Feb. 9-12, 2014, “Using MetRxn to reconstruct and redesign metabolism”

CBiRC NSF Engineering Research Center for Biorenewable Chemicals Fifth Annual Meeting, Oct. 6-8, Ames, IA, “Progress in the integrated flux platform design”

Biochemical and Molecular Engineering XVIII: Frontiers in Biological Design, Synthetic Biology and Processing East Meets West, Beijing China, June 16-20, 2013, “Computational methods for the rational de novo design of human antibodies”

American Society of Microbiology Annual Meeting, Denver, CO, May 18-22, 2013, “Kinetic modeling of metabolism and computational strain design”

3rd Conference on Cell Factories and Biosustainability, Copenhagen Bioscience Conferences, Novo Nordisk Foundation, Denmark, May 5-8, 2013, “Using Computations to Simulate and Assemble Cell Factories”

Cobra 2012 - 2nd International conference on constraint-based reconstruction and analysis, Elsinore, Denmark, Oct. 7-9, 2012, "OptCom: A Multi-Level Optimization Framework for the Metabolic Modeling and Analysis of Microbial Communities"

MARM 2102, Session: Bioenergy/Biofuels for Clean Energy, Baltimore, MD, June 1, 2012, "Integrating Computations with Experiments to Drive Biofuel Overproduction"

ICiS Genomics Driving Modeling in Biology Workshop, Park City, UT, July 24-29, 2011, "Challenges and Opportunities in Reconstructing and Analyzing Genome Scale Models"

1st Conference on Constraint-Based Reconstruction and Analysis, Reykjavik, Iceland, June 24-26, 2011, "Reconstruction of Genome-Scale Metabolic and Isotope Mapping Models"

2011 GTL Contractor-Grantee Workshop: Modeling in a Systems Biology Environment, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop, Bethesda, MD, Apr. 10-13, 2011, "Using Computations to Facilitate Metabolic Reconstructions and Guide Strain Optimization"

International Conference on Biomolecular Engineering, San Francisco, CA, January 16-19, 2011, "MetRxn: Reaction/Metabolite Standardization and Congruency across Databases and Genome-Scale Metabolic Models"

Bioinformatics & Genomics Retreat, Penn State University, Sept. 11, 2010, "Using Computations to Reconstruct, Quantify and Redirect Metabolism"

Society of Industrial Microbiology (SIM) Annual Meeting, San Francisco, CA, August 1-5, 2010, "Using computations to reconstruct and redirect metabolism"

Society of Industrial Microbiology (SIM) Annual Meeting, San Francisco, CA, August 1-5, 2010, "Using computations to drive novel enzyme and antibody design"

Metabolic Engineering VIII: Metabolic Engineering for Green Growth, Jeju Island, South Korea, June 13-18, 2010, "Using Computations to Reconstruct, Analyze and Redesign Metabolism"

Mini-Workshop on challenges in experimental data integration within genome-scale metabolic models, Institut Henri Poincare, Paris, France, October 10-11, 2009, "Genome-scale metabolic model reconstruction, curation and redesign"

3rd Annual Advances in Biomolecular Engineering: Protein Design Symposium, The New York Academy of Sciences, New York, NY, June 12, 2009, "Using Computations to Redesign Enzymes, Binding Sites and Antibodies"

GTL Contractor-Grantee Workshop VII: Modeling in a Systems Biology Environment, USDA-DOE Plant Feedstock Genomics for Bioenergy Awardee Workshop, Bethesda, MD, Feb. 8-11, 2009, "Using Computations to Reconstruct, Analyze and Redesign Metabolism"

Metabolic Engineering VII: Health and Sustainability, Puerto Vallarta, Mexico, Sept. 14-19, 2008, "Using Computations to Make Sense out of 'Omics Data'"

EMCC5, 5th Chemical Engineering Conference for Collaborative Research in Eastern Mediterranean Countries, Cetraro, Italy, May 25-29, 2008, "Systems Engineering Challenges and Opportunities in Biological Networks"

The Korean Society for Biotechnology and Bioengineering Fall Meeting, Daegu, Korea, October 19, 2007, “Computational Protein Engineering”

15th Annual International Conference on Microbial Genomics, University of Maryland College Park Campus, September 16-20, 2007, “Optimization-based Refinement of Metabolic Models”

Biochemical Engineering XV: Engineering Biology from Biomolecules to Complex Systems, Quebec City, July 15-16, 2007, “Metabolic Model Generation and Automated Curation: *Mycoplasma genitalium*”

Stratis V. Sotirchos Lectureship 2007, 6th Panhellenic Chemical Engineering Conference, Athens Greece, May 31- June 3, “Systems Engineering Challenges and Opportunities in Biological Networks”

Microbial Genomes 2007, Hinxton Hall, Cambridge, UK, April 11-14, 2007, “Analysis and Redesign of Microbial Metabolic Pathways”

Institute of Biological Engineering (IBE) 2007 annual meeting, St. Louis, Missouri, March 30-April 1, 2007, Session: Biology Inspired Modeling, “Computational Design of Biological Circuits”

IECA 2006: The International E. Coli Alliance Conference on Systems Biology, Jeju Island, Republic of Korea, October 31-November 4, 2006, “Computational Analysis and Redesign of Biological Pathways”

Metabolic Engineering VI: From recDNA towards Engineering Biological Systems, Noordwijkerhout, The Netherlands, October 1-5, 2006, “Optimal design of recombination and degenerate oligo based protein combinatorial libraries using pairwise residue scoring matrices”

ICCSB – First International Conference on Computational Systems Biology, Shanghai, China, July 20-23, 2006, “Analysis and Redesign of Biological Networks: Metabolic & Signaling Pathways”

ASM2006 - 106th General Meeting of the American Society for Microbiology, Orlando, FL, May 21-25, 2006, “Analysis and Redesign of Metabolic Networks”

DIMACS Workshop on Clustering Problems in Biological Networks, Rutgers University, Piscataway, NJ, May 9-11, 2006, “Analysis and Redesign of Biological Networks”

GTL2006 Contractor-Grantee Workshop IV and Metabolic Engineering Working Group Interagency Conference on Metabolic Engineering, Bethesda, MD, Feb. 12-15, 2006, “Development of Experimental and Computational Tools to Evaluate Metabolic Flux”

ICSB 2005 – Sixth International Conference on Systems Biology, Workshop on gene network models and their application: from gene function to drug discovery, Cambridge, MA, October 23, 2005, “Signaling network analysis and redesign”

13th Annual International Conference on Microbial Genomes, Madison, WI, September 11-15, 2005, “Computational Tools for the Analysis and Redesign of the E. coli Metabolic Network”

Phage Display for Engineering Protein Therapeutics Conference, Cambridge, MA, May 16-17 2005, “Computational Protein Library Design”

National Science Foundation workshop on Control and Systems Integration of Micro-and Nano-Scale Systems, March 29-30 2004, “Challenges and Opportunities in the Design and Analysis of Biological Systems”

Pacific Symposium on Biocomputing (PSB2004), Big Island HI, January 2004, “A Mixed Integer Linear Programming Framework (MILP) for Inferring Time Delay in Gene Regulatory Networks”

Ninth Annual Symposium on Frontiers of Engineering, National Academy of Engineering (NAE), September 18-20, 2003.

Biochemical Engineering XIII, Boulder CO, July 19-23, 2003, “In Silico Prescreening of Protein Hybrids in Directed Evolution Experiments”

Foundations of Computer-Aided Process Operations (FOCAPO2003), Coral Springs FL, January 2003, “Challenges and Opportunities for Systems Engineering in Computational Biology”

Metabolic Engineering IV, Barga Italy, October 2002, “Inference of Gene Regulatory Networks from DNA microarray experiments”

Metabolic Engineering IV, Barga Italy, October 2002, “In Silico Design of Metabolic Pathways”

Biochemical Engineering XII, Sonoma CA, July 2001, “Probing the Performance Limits of Metabolic Networks and Identifying Regulatory Barriers through Boolean Constraints”

European Symposium of Computer-Aided Process Engineering (ESCAPE11), Denmark, June 2001, “Optimization in Molecular Design and Bioinformatics”

Metabolic Engineering III, Colorado Springs CO, October 2000, “Modeling and Optimization of Directed Evolution Protocols”

PUBLICATIONS

Textbooks

Costas D. Maranas and Ali R. Zomorodi (2016), “Optimization Methods in Metabolic Networks,” John Wiley & Sons.

Journal Publications

1. Ungerer, J. K.E. Wendt, J.I. Hendry, C.D. Maranas and H.B. Pakrasi (2019), “Reply to Zhou and Li: Plasticity of the genomic haplotype of *Synechococcus elongatus* leads to rapid strain adaptation under laboratory conditions,” *Proceedings of the National Academy of Sciences*, Vol. 116, Issue 10, 3946-3947.
2. Heirendt, L., S. Arreckx, T. Pfau, S.N. Mendoza, A. Richelle, A. Heinken, H.S. Haraldsdóttir, J. Wachowiak, S.M. Keating, V. Vlasov, S. Magnusdóttir, C.Y. Ng, G. Preciat, A. Žagare, S.H.J. Chan, M.K. Aurich, C.M. Clancy, J. Modamio, J.T. Sauls, A. Noronha, A. Bordbar, B. Cousins, D.C. El Assal, L.V. Valcarcel, I. Apaolaza, S. Ghaderi, M. Ahookhosh, M.B. Guebila, A. Kostromins, N. Sompairac, H.M. Le, D. Ma, Y. Sun, L. Wang, J.T. Yurkovich, M.A.P. Oliveira, P.T. Vuong, L.P. El Assal, I. Kuperstein, A. Zinovyev, H.S. Hinton, W.A. Bryant, F.J.A. Artacho, F.J. Planes, E. Stalidzans, A. Maass, S.

- Vempala, M. Hucka, M.A. Saunders, C.D. Maranas, N.E. Lewis, T. Sauter, B.Ø. Palsson, I. Thiele and R.M.T. Fleming (2019), "Creation and analysis of biochemical constraint-based models using the COBRA Toolbox v.3.0," *Nature Protocols*, Vol. 14, 639–702.
3. Ng, C.Y., L. Wang, A. Chowdhury and C.D. Maranas (2019), "Pareto Optimality Explanation of the Glycolytic Alternatives in Nature," *NPG Scientific Reports*, Vol. 9, Issue 1, 2633.
 4. Sarkar, D., T.J. Mueller, D. Liu, H.B. Pakrasi and C.D. Maranas (2019), "A diurnal flux balance model of *Synechocystis* sp. PCC 6803 metabolism," *PLoS Computational Biology*, Vol. 15, Issue 1, e1006692.
 5. Hendry, J.I., S. Gopalakrishnan, J. Ungerer, H.B. Pakrasi, Y. Tang and C.D. Maranas (2019), "Genome-scale fluxome of *Synechococcus elongatus* UTEX 2973 using transient ¹³C-labeling data," *Plant Physiology*, Vol. 79, Issue 2, 761-769.
 6. Ungerer, J. K.E. Wendt, J.I. Hendry, C.D. Maranas and H.B. Pakrasi (2018), "Comparative genomics reveals the molecular determinants of rapid growth of the cyanobacterium *Synechococcus elongatus* UTEX 2973," *Proceedings of the National Academy of Sciences*, Vol. 115, Issue 50, E11761-E11770.
 7. Chowdhury, R., T. Ren, M. Shankla, K. Decker, M. Grisewood, J. Prabhakar, C. Baker, J.H. Golbeck, A. Aksimentiev, M. Kumar and C.D. Maranas (2018), "PoreDesigner for tuning solute selectivity in a robust and highly permeable outer membrane pore," *Nature communications*, Vol. 9, Issue 1, 3661.
 8. Hernandez-Lozada, N.J., R.-Y. Lai, T. Simmons, K.A. Thomas, R. Chowdhury, C.D. Maranas and B.F. Pfleger (2018), "Highly active C8-acyl-ACP thioesterase variant isolated by a synthetic selection strategy," *ACS Synthetic Biology*, DOI: 10.1021/acssynbio.8b00215.
 9. Nazem-Bokaei, H. and C.D. Maranas (2018), "A prospective study on the fermentation landscape of gaseous substrates to biorenewables," *Frontiers in Microbiology*, Vol. 9, doi: 10.3389/fmicb.2018.01855.
 10. Grisewood, M.J., J. Ferry and C.D. Maranas (2018), "Computationally Exploring and Alleviating the Kinetic Bottlenecks of Anaerobic Methane Oxidation," *Frontiers in Environmental Science*, Vol. 6, <https://doi.org/10.3389/fenvs.2018.00084>.
 11. Chowdhury, R., M.F. Allan and C.D. Maranas (2018), "OptMAVEN-2.0: De novo Design of Variable Antibody Regions Against Targeted Antigen Epitopes," *Antibodies*, Vol. 7, Issue 23, 1-24.
 12. Tan, Z., J.M. Yoon, A. Chowdhury, K. Burdick, L.R. Jarboe, C.D. Maranas and J.V. Shanks (2018), "Engineering of *E. coli* inherent fatty acid biosynthesis capacity to increase octanoic acid production," *Biotechnology for Biofuels*, Vol. 11, Issue 1, 87.
 13. Wang, L., C.Y. Ng, S. Dash, C.D. Maranas (2018), "Exploring the combinatorial space of complete pathways to chemicals," *Biochemical Society Transactions*, doi:10.1042/BST20170272.

14. Gopalakrishnan, S., H.B. Pakrasi, C.D. Maranas (2018), "Elucidation of Photoautotrophic Carbon Flux Topology in *Synechocystis* PCC 6803 using Genome-scale Carbon Mapping Models," *Metabolic Engineering*, Vol. 47, 190-199.
15. Kumar, A., L. Wang, C.Y. Ng and C.D. Maranas (2018), "Pathway design using de novo steps through uncharted biochemical spaces," *Nature Communications*, Vol. 9, Issue 1, 184.
16. Wang, L. and C.D. Maranas (2018), "MinGenome: An in silico top-down approach for the synthesis of minimized genomes," *ACS Synthetic Biology*, Vol. 2, Issue 2, 462-473.
17. Abernathy, M.H., J. Yu, F. Ma, M. Liberton, J. Ungerer, W.D. Hollinshead, S. Gopalakrishnan, L. He, C.D. Maranas, H.B. Pakrasi, D.K. Allen and Y.J. Tang (2017), "Deciphering cyanobacterial phenotypes for fast photoautotrophic growth via isotopically nonstationary metabolic flux analysis," *Biotechnology for biofuels*, Vol. 10, Issue 1, 273.
18. Wang, L., S. Dash, Chiam Y. Ng and C.D. Maranas (2017), "A review of computational tools for design and reconstruction of metabolic pathways," *Synthetic and Systems Biotechnology*, <https://doi.org/10.1016/j.synbio.2017.11.002>.
19. Entzminger, K.C., J.-min Hyun, R.J. Pantazes, A.C. Patterson-Orazem, A.N. Qerqez, Z.P. Frye, R.A. Hughes, A.D. Ellington, R.L. Lieberman, C.D. Maranas and J.A. Maynard (2017), "De novo design of antibody complementarity determining regions binding a FLAG tetra-peptide," *Scientific Reports NPG*, Vol. 7, 10,295.
20. Tiller, K., R. Chowdhury, T. Li, S. Ludwig, S. Sen, C.D. Maranas and P. Tessier (2017), "Facile affinity maturation of antibody variable domains using natural diversity mutagenesis," *Frontiers in Immunology*, Vol. 8, 986.
21. Chan, S.H.J., J. Cai, L. Wang, M.N. Simons-Senftle and C.D. Maranas (2017), "Standardizing biomass reactions and ensuring complete mass balance in genome-scale metabolic models," *Bioinformatics*, doi: 10.1093/bioinformatics/btx453.
22. Suástegui, S., C.Y. Ng, A. Chowdhury, W. Sun, M. Cao, E. House, C.D. Maranas and Z. Shao (2017), "Multilevel Engineering of the Upstream Module of Aromatic Amino Acid Biosynthesis in *Saccharomyces cerevisiae* for High Production of Polymer and Drug Precursors," *Metabolic Engineering*, Vol. 6, Issue 15.
23. Serrano-Bermúdez, L.M, A.F. González Barrios, C.D Maranas and D. Montoya (2017), "Clostridium butyricum maximizes growth while minimizing enzyme usage and ATP production: metabolic flux distribution of a strain cultured in glycerol," *BMC systems biology*, Vol. 11, Issue 1, 58.
24. Chan, S.H.J., M.N. Simons and C.D. Maranas (2017), "SteadyCom: Predicting microbial abundances while ensuring community stability," *PLoS computational biology*, Vol. 3 Issue 5, e1005539.
25. Dash, S., A. Khodayari, J. Zhou, E.K. Holwerda, D.G. Olson, L.R. Lynd and C.D. Maranas (2017), "Development of a core *Clostridium thermocellum* kinetic metabolic model consistent with multiple genetic perturbations," *Biotechnology for Biofuels*, Vol. 10, Issue 1, 108.

26. Grisewood, M.J., N.J. Hernández-Lozada, J.B. Thoden, N.P. Gifford, D. Mendez-Perez, H. A. Schoenberger, M.F. Allan, M.E. Floy, R.-Y. Lai, H.M. Holden, B.F. Pfleger, C.D. Maranas (2017), "Computational Redesign of Acyl-ACP Thioesterase with Improved Selectivity toward Medium-Chain-Length Fatty Acids," *ACS Catalysis*, Vol. 6, Issue 6, 3837-3849.
27. Cañas, R.A., Z. Yesbergenova-Cuny, M. Simons, F. Chardon, P. Armengaud, I. Quilleré, C. Cukier, Y. Gibon, A.M. Limami, S.D. Nicolas, L. Brulé, P.J. Lea, C.D. Maranas and Bertrand Hirel (2017), "Exploiting the Genetic Diversity of Maize using a Combined Metabolomic, Enzyme Activity Profiling, and Metabolic Modelling Approach to Link Leaf Physiology to Kernel Yield," *The Plant Cell*, tpc. 00613.2016.
28. Mueller, T.J., J.L. Ungerer, H.B. Pakrasi, C.D. Maranas (2017), "Identifying the Metabolic Differences of a Fast-Growth Phenotype in *Synechococcus* UTEX 2973," *Scientific Reports NPG*, Vol. 7, 41,569.
29. Poosarla, G.V., T. Li, B.C. Goh, K. Schulten, T.K. Wood, C.D. Maranas (2017), "Computational de novo design of antibodies binding to a peptide with high affinity," *Biotechnology and Bioengineering*, DOI: 10.1002/bit.26244.
30. Khodayari, A. and C.D. Maranas (2016), "A genome-scale *Escherichia coli* kinetic metabolic model k-ecoli457 satisfying flux data for multiple mutant strains," *Nature Communications*, Vol. 7, 1306.
31. Zhang, L., C. Xie, R.G. Nichols, S.H.J. Chan, C. Jiang, R. Hao, P.B. Smith, J. Cai, M.N. Simons, E. Hatzakis, C.D. Maranas, F.J. Gonzalez and A.D. Patterson (2016), "Farnesoid X Receptor Signaling Shapes the Gut Microbiota and Controls Hepatic Lipid Metabolism," *mSystems*, Vol. 1, Issue 5, e00070-16.
32. Saha, R., D. Liu, A. Hoynes-O'Connor, M. Liberton, J. Yu, M. Bhattacharyya-Pakrasi, A. Balassy, F. Zhang, T.S. Moon, C.D. Maranas and H.B. Pakrasi (2016), "Diurnal Regulation of Cellular Processes in the Cyanobacterium *Synechocystis* sp. Strain PCC 6803: Insights from Transcriptomic, Fluxomic, and Physiological Analyses," *mBio*, Vol. 7, Issue 3, e00464-16.
33. Ng, C.Y., A. Chowdhury and C.D. Maranas (2016), "A microbial factory for diverse chemicals," *Nature biotechnology*, Vol. 34, Issue 5, 513.
34. Lihan, M., B.C. Goh, T. Li, C.D. Maranas and K. Shulten (2016), "de novo Design and in silico Optimization of Antibody-Like Binders Targeting Ebola Viral Antigen," *Biophysical Journal*, 110(3), 537a.
35. Soo, V., M.J. McAnulty, A. Tripathi, F. Zhu, L. Zhang, E. Hatzakis, P.B. Smith, S. Agrawal, H. Nazem-Bokaei, S. Gopalakrishnan, H.M. Salis, J.G. Ferry, C.D. Maranas, A.D. Patterson and T.K. Wood (2016), "Reversing methanogenesis to capture methane for liquid biofuel precursors," *Microbial cell factories*, Vol. 15, Issue 1, DOI: 10.1186/s12934-015-0397-z
36. Nazem-Bokaei, H., S. Gopalakrishnan, J.G. Ferry, T.K. Wood and C.D. Maranas (2016), "Assessing methanotrophy and carbon fixation for biofuel production by *Methanosarcina acetivorans*," *Microbial cell factories*, Vol. 15, Issue 1, DOI: 10.1186/s12934-015-0404-4

37. Dash, S., Y.N. Chiam and C.D. Maranas (2016), "Metabolic modeling of clostridia: current developments and applications," *FEMS Microbiology Letters*, doi: 10.1093/femsle/fnw004
38. Mueller, T.J., E.A. Welsh, H.B. Pakrasi and C.D. Maranas (2016), "Identifying regulatory changes to facilitate nitrogen fixation in the non-diazotroph *Synechocystis* sp. PCC 6803," *ACS Synth. Biol.*, DOI: 10.1021/acssynbio.5b00202.
39. Chowdury, A. and C.D. Maranas (2015), "Designing overall stoichiometric conversions and intervening metabolic reactions," *Scientific Reports NPG*, doi: 10.1038/srep16009.
40. Chowdury, A. and C.D. Maranas (2015), "Personalized Kinetic Models for Predictive Healthcare," *Cell Systems*, Vol. 1, Issue 4, 250-251, doi:10.1016/j.cels.2015.10.008.
41. Berla, B.M., R. Saha, C.D. Maranas and H.B. Pakrasi (2015), "Cyanobacterial Alkanes Modulate Photosynthetic Cyclic Electron Flow to Assist Growth under Cold Stress," *Scientific Reports NPG*, doi: 10.1038/srep14894.
42. Gopalakrishnan, S. and C. D. Maranas (2015), "Achieving Metabolic Flux Analysis for *S. cerevisiae* at a Genome-Scale: Challenges, Requirements, and Considerations," *Metabolites*, Vol. 3, Issue 5, 521-535.
43. Chowdury, R., A. Chowdury and C.D. Maranas (2015), "Using gene essentiality and synthetic lethality information to correct yeast and cho cell genome-scale models," *Metabolites*, Vol. 5, Issue 4, 536-570.
44. Chowdhury, A., A. Khodayari and C.D. Maranas (2015), "Improving prediction fidelity of cellular metabolism with kinetic descriptions," *Current opinion in biotechnology*, Vol. 36, 57-64.
45. Gopalakrishnan, S. and C.D. Maranas (2015), "13C Metabolic Flux Analysis at a Genome-Scale," *Metabolic Engineering*, doi:10.1016/j.ymben.2015.08.006.
46. Ebrahim, A., E. Almaas, E. Bauer, A. Bordbar, A.P. Burgard, R.L. Chang, A. Dräger, I. Famili, A.M. Feist, R. MT Fleming, S.S. Fong, V. Hatzimanikatis, M.J. Herrgård, A. Holder, M. Hucka, D. Hyduke, N. Jamshidi, S.Y. Lee, N. Le Novère, J.A. Lerman, N.E. Lewis, D. Ma, R. Mahadevan, C.D. Maranas, H. Nagarajan, A. Navid, J. Nielsen, L.K. Nielsen, J. Nogales, A. Noronha, C. Pal, B.O. Palsson, J.A. Papin, K.R. Patil, N.D. Price, J.L. Reed, M. Saunders, R.S. Senger, N. Sonnenschein, Y. Suna and I. Thiele (2015), "Do Genome-scale Models Need Exact Solvers or Clearer Standards?," *Molecular Systems Biology*, Nature Publishing Group, <http://hdl.handle.net/10993/21873>.
47. Ng, C.Y., A. Khodayari, A. Chowdhury, C.D. Maranas (2015), "Advances in de novo strain design using integrated systems and synthetic biology tools," *Current opinion in chemical biology*, Vol. 28, 105-114.
48. Fendt, S.-M. and C.D. Maranas (2015), "Editorial overview: Systems biology: Advances in disease understanding and in metabolic engineering," *Current Opinion in Biotechnology*,
49. Ng, C.Y., I. Farasat, C.D. Maranas and H.M. Salis (2015), "Rational design of a synthetic Entner–Doudoroff pathway for improved and controllable NADPH regeneration," *Metabolic Engineering*, Vol. 29, 86-96.

50. Pantazes, R.J., M.J. Grisewood, T. Li, N.P Gifford and C.D. Maranas (2015), "The Iterative Protein Redesign and Optimization (IPRO) suite of programs," *Journal of computational chemistry*, Vol. 36, Issue 4, 251-263. DOI: 10.1002/jcc.23796
51. Chowdhury, A., A.R. Zomorodi and C.D. Maranas (2015), "Bilevel optimization techniques in computational strain design," *Computers and Chemical Engineering*, Vol. 72, 363–372.
52. Mueller, T.J., M.J. Grisewood, H. Nazem-Bokaee, S. Gopalakrishnan, J.G Ferry, T.K Wood and C.D. Maranas (2015), "Methane oxidation by anaerobic archaea for conversion to liquid fuels," *J Ind Microbiol Biotechnol*, Vol. 42, Issue 3, 391-401. DOI 10.1007/s10295-0141548-7.
53. Khodayari, A., A. Chowdhury and C.D. Maranas (2014), "Succinate overproduction: A case study of computational strain design using a comprehensive Escherichia coli kinetic model," *Front. Bioeng. Biotechnol.* 2:76. doi:10.3389/fbioe.2014.00076.
54. Kumar, A. and C.D. Maranas (2014), "CLCA: Maximum Common Molecular Substructure Queries within the MetRxn Database," *J. Chem. Inf. Model.*, DOI: 10.1021/ci5003922.
55. Simons, M.N., R. Saha, N. Amiour, A. Kumar, L. Guillard, G. Clément, M. Miquel, Z. Li, G. Mouille, B. Hirel and C.D. Maranas (2014), "Assessing the Metabolic Impact of Nitrogen Availability using a Compartmentalized Maize Leaf Genome-Scale Model," *Plant Physiology*, doi: <http://dx.doi.org/10.1104/pp.114.245787>.
56. Saha, R., A. Chowdhury and C.D. Maranas (2014), "Recent advances in the reconstruction of metabolic models and integration of omics data," *Current Opinion in Biotechnology*, doi:10.1016/j.copbio.2014.02.011.
57. Dash, S., T.J. Mueller, K.P. Venkataramanan, E.T. Papoutsakis and C.D. Maranas (2014), "Capturing the response of Clostridium acetobutylicum to chemical stressors using a regulated genome-scale metabolic model," *Biotechnology for Biofuels*, Vol. 7, Issue 144 doi:10.1186/s13068-014-0144-4.
58. Li, T., R.J. Pantazes and C.D. Maranas (2014), "OptMAVEN: a New Framework for the *de novo* Design of Antibody Variable Regions Targeting Specific Antigen Epitopes," *PLOS ONE*, Vol. 9, Issue 8, e105954.
59. Khodayari, A. A.R. Zomorodi, J.C. Liao and C.D. Maranas (2014), "A kinetic model of *Escherichia coli* core metabolism satisfying multiple sets of mutant flux data," *Metabolic Engineering*, DOI: 10.1016/j.ymben.2014.05.014.
60. Simons, M., R. Saha, L. Guillard, G. Clément, P. Armengaud, R. Cañas, C.D. Maranas, P.J. Lea and B. Hirel (2014), "Nitrogen-use efficiency in maize (*Zea mays* L.): from 'omics' studies to metabolic modelling," *Journal of Experimental Botany*, Vol. 5, Issue 26.
61. Zomorodi, A.R., M.M. Islam and C.D. Maranas (2014), "d-OptCom: Dynamic Multi-level and Multi-objective Metabolic Modeling of Microbial Communities," *ACS Synthetic Biology*, DOI: 10.1021/sb4001307.

62. Chowdhury, A., A.R. Zomorodi and C.D. Maranas (2014), "k-OptForce: Integrating kinetics with flux balance analysis for strain design," *PLoS Comput. Biol.*, Vol. 10, Issue 2, e1003487.
63. Aumiller, W.M., B.W. Davis, N. Hashemian, C.D. Maranas, A. Armaou and C.D. Keating (2014), "Coupled Enzyme Reactions Performed in Heterogeneous Reaction Media: Experiments and Modeling for Glucose Oxidase and Horseradish Peroxidase in a PEG/Citrate Aqueous Two-Phase System," *J. Phys. Chem. B*, DOI: 10.1021/jp501126v.
64. Zomorodi, A. and C.D. Maranas (2014), "Coarse-grained optimization-driven design and piecewise linear modeling of synthetic genetic circuits," *European Journal of Operational Research*, <http://dx.doi.org/10.1016/j.ejor.2014.01.054>.
65. Tee, T.W., A. Chowdhury, C.D. Maranas and J.V. Shanks (2014), "Systems metabolic engineering design: Fatty acid production as an emerging case study," *Biotechnology & Bioengineering*, DOI 10.1002/bit.25205.
66. Mueller, T.J., B.M. Berla, H.B. Pakrasi and C.D. Maranas (2013), "Rapid construction of metabolic models for a family of Cyanobacteria using a multiple source annotation workflow," *BMC Systems Biology*, 7:142.
67. Grisewood, M.J., N.P. Gifford, R.J. Pantazes, Y. Li, P.C. Cirino, M.J. Janik and C.D. Maranas (2013), "OptZyme: Computational Enzyme Redesign Using Transition State Analogues," *PloS ONE* 8 (10), e75358.
68. Berla, B.M., R. Saha, C.M. Immethun, C.D. Maranas, T.S. Moon and H.B. Pakrasi (2013), "Synthetic biology of cyanobacteria: unique challenges and opportunities," *Frontiers in Microbiology* 4.
69. Pantazes, R.J. and C.D. Maranas (2013), "MAPs: a database of modular antibody parts for predicting tertiary structures and designing affinity matured antibodies," *BMC Bioinformatics* Vol. 14, Issue 168, doi:10.1186/1471-2105-14-168.
70. Zomorodi A.R., J.G. Lafontaine Rivera, J.C. Liao and C.D. Maranas (2013), "Optimization-driven identification of genetic perturbations accelerates the convergence of model parameters in ensemble modeling of metabolic networks," *Biotechnol. J.*, doi: 10.1002/biot.201200270.
71. Saha R., A.T. Verseput, B.M. Berla, T.J. Mueller, H.B. Pakrasi and C.D. Maranas (2012), "Reconstruction and Comparison of the Metabolic Potential of Cyanobacteria *Cyanothece* sp. ATCC 51142 and *Synechocystis* sp. PCC 6803," *PLoS ONE*, Vol. 7, Issue 10, e48285.
72. Suthers, P.F. and C.D. Maranas (2012), "Ochestrating hi-fi annotations," *Nature Chemical Biology*, Vol. 8, 810-811.
73. Brochado, A.R., S. Andrejev, C.D. Maranas and K.R. Patil (2012), "Impact of Stoichiometry Representation on Simulation of Genotype-Phenotype Relationships in Metabolic Networks," *PLoS Comput. Biol.*, Vol. 8, Issue 11, e1002758.
74. Zomorodi A.R., P.F. Suthers, S. Ranganathan and C.D. Maranas (2012), "Mathematical optimization applications in metabolic networks," *Metabolic Engineering*, Vol. 14, 672-686.

75. Ranganathan, S., T.W. Tee, A. Chowdhury, A.R. Zomorodi, J.M. Yoon, Y. Fu, J.S. Shanks, C.D. Maranas (2012), "An integrated computational and experimental study for overproducing fatty acids in *Escherichia coli*," *Metabolic Engineering*, Vol. 14, 687-704.
76. Wang, N., K.A. Eckert, A.R. Zomorodi, P. Xin, W. Pan, D.A. Shearer, J. Weisz, C.D. Maranas and G.A. Clawson (2012), "Down-Regulation of HtrA1 Activates the Epithelial-Mesenchymal Transition and ATM DNA Damage Response Pathways," *PLoS ONE*, Vol. 7, Issue 6, e39446.
77. Copeland, W.B., B.A. Bartley, D. Chandran, M. Galdzicki, K.H. Kim, S.C. Sleight, C.D. Maranas and H.M. Sauro (2012), "Computational tools for metabolic engineering," *Metabolic Engineering*, Vol. 14, 270-280.
78. Zomorodi, A.R. and C.D. Maranas (2012), "OptCom: A Multi-Level Optimization Framework for the Metabolic Modeling and Analysis of Microbial Communities," *PLoS Comput. Biol.*, Vol. 8, Issue 2, e1002363.
79. Kumar, A., P. Suthers and C.D. Maranas (2012), "MetRxn: A Knowledgebase of Metabolites and Reactions Spanning Metabolic Models and Databases," *BMC Bioinformatics*, Vol. 13, Issue 6, doi:10.1186/1471-2105-13-6.
80. Khanna, P., E. Weidert, F. Vital-Lopez, A. Armaou, C.D. Maranas and C. Dong (2011), "Model Simulations Reveal VCAM-1 Augment PAK Activation Rates to Amplify p38 MAPK and VE-cadherin Phosphorylation," *Cellular and Molecular Bioengineering*, Vol. 4, Issue 4, 656-669, DOI 10.1007/s12195-011-0201-z.
81. Xu, P., S. Ranganathan, Z.L. Fowler, C.D. Maranas and M.A.G. Koffas (2011), "Genome-scale metabolic network modeling results in minimal interventions that cooperatively force carbon flux towards malonyl-CoA," *Metabolic Engineering*, Vol. 13, Issue 5, 578-587, DOI:10.1016/j.ymben.2011.06.008.
82. Saha, R., P.F. Suthers and C.D. Maranas (2011), "*Zea mays* iRS1563: A Comprehensive Genome-Scale Metabolic Reconstruction of Maize Metabolism," *PLoS ONE*, Vol. 6, Issue 7, DOI: 10.1371/journal.pone.0021784.
83. Pantazes, R.J., M.J. Grisewood and C.D. Maranas (2011), "Recent Advances in Computational Protein Design," *Current Opinion in Structural Biology*, Vol. 21, 1-6, COSTI-892.
84. Ravikirthi, P., P.F. Suthers and C.D. Maranas (2011), "Construction of an *E. coli* Genome-scale Atom Mapping Model for MFA Calculations," *Biotechnology & Bioengineering*, Vol. 108, Issue 6, 1372-1382, DOI: 10.1002/bit.23070.
85. Kumar, V.S., J.G. Ferry and C.D. Maranas (2011), "Metabolic reconstruction of the archaeon methanogen *Methanosarcina Acetivorans*," *BMC Systems Biology*, Vol. 5, No. 28, doi:10.1186/1752-0509-5-28.
86. Vital-Lopez, F.-G., A. Armaou, C.D. Maranas and M. Hutnik (2011), "Modeling the Effect of Chemotaxis In Glioblastoma Tumor Progression," *AIChE J.*, Vol. 57, Issue 3, 778-792, doi: 10.1002/aic.12296.
87. Zomorodi, A. and C.D. Maranas (2010), "Improving the iMM904 *S. cerevisiae* metabolic model using essentiality and synthetic lethality data," *BMC Systems Biology*, Vol. 4, No. 178.

88. Pantazes, R.J. and C.D. Maranas (2010), "OptCDR: a general computational method for the design of antibody complementarity determining regions for targeted epitope binding," *Protein Engineering, Design & Selection*, Vol. 23, No. 11, 849-858.
89. Ranganathan, S. and C.D. Maranas (2010), "Microbial 1-butanol production: Identification of non-native production routes and *in silico* engineering interventions," *Biotechnology Journal*, Vol. 5, 716-725.
90. Ranganathan, S., P.F. Suthers and C.D. Maranas (2010), "OptForce: An Optimization Procedure for Identifying All Genetic Manipulations Leading to Targeted Overproductions," *PLoS Comput. Biol.*, Vol. 6, No. 4, e1000744.
91. Suthers, P.F., Y.J. Chang and C.D. Maranas (2010), "Improved computational performance of MFA using elementary metabolite units and flux coupling," *Metabolic Engineering*, Vol. 12, 123-128.
92. Khoury, G.A., H. Fazelinia, J.W. Chin, P.C. Cirino and C.D. Maranas (2009), "Computational Design of *Candida boidinii* Xylose Reductase for Altered Cofactor Specificity," *Protein Science*, Vol. 10, No. 10, 2125-2138.
93. AbuOun, M., P.F. Suthers, G.I. Jones, B.R. Carter, M.P. Saunders, C.D. Maranas, M.J. Woodward and M.F. Anjum (2009), "Genome Scale Reconstruction of a *Salmonella* Metabolic Model," *The Journal of Biological Chemistry*, Vol. 284, No. 43, 29480-29488.
94. Zomorodi, A., P.F. Suthers and C.D. Maranas (2009), "Genome-scale Gene/Reaction Essentiality and Synthetic Lethality Analysis," *Molecular Systems Biology*, Vol. 5, No. 301, Aug. 18.
95. Kumar, V.S. and C.D. Maranas (2009), "GrowMatch: An automated method for reconciling *in vivo/in silico* growth predictions," *PLoS Comput. Biol.*, Vol. 5, No. 3, e1000308.
96. Suthers, P.F., M.S. Dasika, V.S. Kumar, G. Denisov, J.I. Glass, and C.D. Maranas (2009), "A genome-scale metabolic reconstruction of *Mycoplasma genitalium* iPS189," *PLoS Comput. Biol.*, Vol. 5, No. 2, e1000285.
97. Lee, S.-C., Y.J. Chang, D.-M. Shin, J. Han, M.-H. Seo, H. Fazelinia, C.D. Maranas, and H.-S. Kim (2009), "Designing the substrate specificity of d-hydantoinase using a rational approach," *Enzyme and Microbial Technology*, Vol. 44, No. 3, 170-175.
98. Fazelinia, H, P.C. Cirino and C.D. Maranas (2009), "OptGraft: A computational procedure for transferring a binding site onto an existing protein scaffold," *Protein Science*, Vol. 18, 180-195.
99. Chin, J., R. Khankal, C. Monroe, C.D. Maranas and P. Cirino (2009), "Analysis of NADPH supply during xylitol production by engineered *Escherichia coli*," *Biotechnology & Bioengineering*, Vol. 102, No. 1, 209-220.
100. Chang, Y.J., P.F. Suthers, and C.D. Maranas (2008), "Identification of Optimal Measurement Sets for Complete Flux Elucidation in MFA Experiments," *Biotechnology & Bioengineering*, Vol. 100, No. 6, 1039-1049.

101. Vital-Lopez, F. G., A. Varshney, C. D. Maranas and A. Armaou (2008), "Implication of dynamics in signal transduction and targeted disruption analyses of signaling networks", *Comp. & Chem. Eng.*, Vol. 32, 2065-2071.
102. Dasika, M.S. and C.D. Maranas (2008), "OptCircuit: An Optimization Based Method For Computational Design of Genetic Circuits," *BMC Systems Biology*, Vol. 2, No. 24.
103. Gianchandani, E.P., M.A. Oberhardt, A.P. Burgard, C.D. Maranas, and J.A. Papin (2008), "Predicting biological system objectives de novo from internal measurements," *BMC Bioinformatics*, Vol. 9, No. 43.
104. Pantazes, R.J., M.C. Saraf, and C.D. Maranas (2007), "Optimal Protein Library Design Using Recombination or Point Mutations Based on Sequence Based Scoring Functions," *Protein Engineering, Design and Selection*, Vol. 20, No. 8, 361-373.
105. Satish Kumar V., M.S. Dasika, and C.D. Maranas (2007), "Optimization based automated curation of metabolic reconstructions," *BMC Bioinformatics*, Vol. 8, 212.
106. Suthers, P.F., A.P. Burgard, M.S. Dasika, F. Nowroozi, S. Van Dien, J.D. Keasling, and C.D. Maranas (2007), "Metabolic Flux Elucidation for Genome-Scale Models Using ¹³C Labeled Isotopes," *Metabolic Engineering*, Vol. 9, 387-405.
107. Fazelinia, H., P.C. Cirino and C.D. Maranas (2007), "Extending Iterative Protein Redesign and Optimization (IPRO) in protein library design for ligand specificity," *Biophysical Journal* Vol. 92, No. 6, 2120-2130
108. Christensen, C., A. Gupta, C.D. Maranas and R. Albert (2007), "Large-scale inference and graph theoretical analysis of gene-regulatory networks in *B. subtilis*," *Physica A*, Vol. 373, 796-810.
109. Vital-Lopez, F.G., C.D. Maranas and A. Armaou (2006), "A computational procedure for optimal engineering interventions using kinetic models of metabolism," *Biotech. Progress*, Vol. 22, No. 6, 1507-1517.
110. Dasika, M.S., A. Burgard and C.D. Maranas (2006), "A computational framework for the topological analysis and targeted disruption of signal transduction networks," *Biophysical Journal*, Vol. 91, No. 1, 382-398.
111. Gupta, A., C.D. Maranas and R. Albert (2006), "Elucidation of Directionality for Co-Expressed Genes: Predicting Intra-Operon Termination Sites," *Bioinformatics*, Vol. 22, No. 2 209-214.
112. Saraf, M.C., G.L. Moore, N.M. Goodey, V.Y. Cao, S.J. Benkovic and Costas D. Maranas (2006), "IPRO: An Iterative Computational Protein Library Redesign and Optimization Procedure," *Biophysical Journal*, Vol. 90, No. 11, 4167-4180.
113. Pharkya, P. and C.D. Maranas (2006), "An Optimization Framework for Identifying Reaction Activation/Inhibition or Elimination Candidates for Overproduction in Microbial Systems," *Metabolic Engineering*, Vol. 8 No. 1, 1-13.
114. Saraf, M.C., A. Gupta and C.D. Maranas (2005), "Design of Combinatorial Protein Libraries of Optimal Size," *Proteins: Structure Function and Bioinformatics*, Vol. 60 No. 4, 769-777.

115. Fong, S.S., A.P. Burgard, C.D. Herring, E.M. Knight, F.R. Blattner, C.D. Maranas and B.O. Palsson (2005), "In Silico Design and Adaptive Evolution of Escherichia Coli for Production of Lactic Acid," *Biotechnology & Bioengineering*, Vol.91, No. 5,643-648.
116. Nikolaev, E.V., A.P. Burgard, and C.D. Maranas (2005), "Elucidation and Structural Analysis of Conserved Pools for Genome-Scale Metabolic Reconstructions," *Biophysical Journal*, Vol. 88, No. 1, 1-13.
117. Rogers, M.J., M. Ding and C. D. Maranas (2005), "Valuation of Pharmaceutical R&D Licensing Deals Using a Real Options Based Approach," *AIChE Journal*, Vol. 51, No. 1, 198-209.
118. Gupta, A.D., J.D. Varner and C.D. Maranas (2005), "Large-Scale Inference of the Transcriptional Regulation of Bacillus Subtilis," *Computers & Chemical Engineering*, Vol 29, 565-576.
119. Dasika, M.S., Gupta, A. and C.D. Maranas (2005), "DEMSIM: A Discrete Event based Mechanistic Simulation Platform for Gene Expression and Regulation Dynamics," *Journal of Theoretical Biology*, Vol. 232, 55-69.
120. Pharkya, P., Burgard, A.P and C.D. Maranas (2004), "OptStrain: A Computational Framework for Redesign of Microbial Production Systems," *Genome Research*, Vol.14, 2367-2376.
121. Lehmann, A. and C.D. Maranas (2004), "Molecular Design using Quantum Chemical Calculations for Property Estimation," *Industrial & Engineering Chemistry Research*, 43, 3419-3432.
122. Saraf, M.C., A.R. Horswill, S.J. Benkovic and C.D. Maranas (2004), "FamClash: A Method for Ranking the Activity of Engineered Enzymes," *Proc. Natl. Acad. Sci. USA*, Vol. 101(12), 4142-4147.
123. Burgard, A.P., E.V. Nikolaev, C. Schilling and C.D. Maranas (2004), "Flux Coupling Analysis of Genome-scale Metabolic Network Reconstructions," *Genome Research*, Vol. 14, No. 2, 301-312.
124. Moore, G.L. and C.D. Maranas (2004), "Perspectives: Computational Challenges in Combinatorial Library Design for Protein Engineering," *AIChE Journal (invited)*, Vol. 50, 52-262.
125. Saraf, M.C. and C.D. Maranas (2003), "Using a Residue Clash Map to Functionally Characterize Protein Recombination Hybrids," *Protein Engineering*, Vol. 16, No. 6, 397-406.
126. Pharkya, P., A.P. Burgard and C.D. Maranas (2003), "Exploring the overproduction of amino acids using the bilevel optimization framework OptKnock," *Biotechnology & Bioengineering*, Vol. 84, 887-899.
127. Burgard, A., P. Pharkya and C.D. Maranas (2003), "OptKnock: A Bilevel Programming Framework for Identifying Gene Knock-Out Strategies for Microbial Strain Optimization," *Biotechnology & Bioengineering*, Vol.84, No. 6, 647-657.
128. Gupta, A. and C.D. Maranas (2003), "Managing Uncertainties in Chemical Process Industry (CPI) Supply Chain Planning," *Computers & Chemical Engineering*, Vol. 27, 1219-1227.

129. Pharkya, P., E. Nikolaev and C.D. Maranas (2003), "Review of the BRENDA database," *Metabolic Engineering, Vol. 5*, 71-73.
130. Saraf, M.C., G.L. Moore and C.D. Maranas (2003), "Using Multiple Sequence Correlation Analysis to Characterize Functionally Important Protein Regions," *Protein Engineering, Vol. 16, No. 6*, 1-10.
131. Moore, G.L. and C.D. Maranas (2003), "Identifying Residue-Residue Clashes in Protein Hybrids Using a Second-Order Mean-Field Approach," *Proc. Natl. Acad. Sci. USA, Vol. 100*, 5091-5096.
132. Burgard, A.P. and C.D. Maranas (2003), "An Optimization Based Framework for Inferring and Testing Hypothesized Metabolic Objective Functions," *Biotechnology & Bioengineering, Vol. 82*, 670-677.
133. Gupta, A. and C.D. Maranas (2003), "Market-Based Pollution Abatement Strategies: Risk Management Using Emission Option Contracts," *Industrial & Engineering Chemistry Research, Vol. 42*, 802-810.
134. Rogers, M.J., A. Gupta and C.D. Maranas (2002), "Real Options Based Analysis of Optimal Pharmaceutical R&D Portfolios," *Industrial & Engineering Chemistry Research, Vol. 41*, 6607-6620.
135. Moore, G.L. and C.D. Maranas (2002), "Predicting Out-of-Sequence Reassembly in DNA Shuffling," *Journal of Theoretical Biology, Vol. 219*, 9-17.
136. Vaidyaraman, S. and C.D. Maranas (2002), "Synthesis of Mixed Refrigerant Cascade Cycles," *Chemical Engineering Communications, Vol. 189, No. 8*, 1057-1078.
137. Moore, G.L. and C.D. Maranas (2002), "eCodonOpt: A Systematic Computational Framework for Optimizing Codon Usage in Directed Evolution Experiments," *Nucleic Acids Research, Vol. 30*, 2407-2416.
138. Burgard, A.P. and C.D. Maranas (2002), "Review of the Biocatalysis/Biodegradation Database (UM-BBD)," *Metabolic Engineering, Vol. 4*, 111-113.
139. Burgard, A.P., G.L. Moore, and C.D. Maranas (2001), "Review of the TEIRESIAS-based Tools of the IBM Bioinformatics and Pattern Discovery Group," *Metabolic Engineering, Vol. 3*, 285-288.
140. A.P. Burgard, S. Vaidyaraman and C.D. Maranas (2001), "Minimal Reaction Sets for *Escherichia Coli* Metabolism under Different Growth Requirements and Uptake Conditions," *Biotechnology Progress, Vol. 17*, 791-797.
141. S. Lutz, M. Ostermeier, G.L. Moore, G.L., C.D. Maranas and S.J. Benkovic (2001), "Creating Multiple-Crossover DNA Libraries Independent of Sequence Identity," *Proc. Natl. Acad. Sci. USA, Vol. 98*, 11248-11253.
142. Burgard, A.P. and C.D. Maranas, (2001), "Review of Enzymes and Metabolic Pathways (EMP) database," *Metabolic Engineering, Vol. 3*, 193-194.

143. Maranas, C.D. and A.P. Burgard (2001), "Review of EcoCyc and MetaCyc web databases," *Metabolic Engineering, Vol. 3*, 98-99.
144. Moore, G.L., C.D. Maranas, S. Lutz, and S.J. Benkovic (2001), "Predicting Crossover Generation in DNA Shuffling," *Proc. Natl. Acad. Sci. USA, Vol. 98, No. 6*, 3226-3231.
145. Burgard, A.P. and C.D. Maranas (2001), "Probing the Performance Limits of the *Escherichia coli* Metabolic Network Subject to Gene Additions or Deletions", *Biotechnology & Bioengineering, Vol. 74* 364-375.
146. Gupta, A., C.D. Maranas and C.M. McDonald (2000), "Midterm Supply Chain Planning Under Uncertainty: Customer Demand Satisfaction and Inventory Management," *Computers & Chemical Engineering, Vol. 24*, 2613-2621.
147. Gupta, A. and C.D. Maranas (2000), "A Two-Stage Modeling and Solution Framework for Multisite Midterm Planning under Demand Uncertainty," *Industrial & Engineering Chemistry Research, Vol. 39*, 3799-3813.
148. Moore, G.L. and C.D. Maranas (2000), "Modeling DNA Mutation and Recombination for Directed Evolution Experiments," *Journal of Theoretical Biology, Vol. 205*, 483-503.
149. Moore, G.L., C.D. Maranas, K.R. Gutshall and J.E. Brenshley (2000), "Modeling and Optimization of DNA Recombination," *Computers & Chemical Engineering, Vol. 24*, 693-699.
150. Camarda, K.V., B.W. Bonnell, C.D. Maranas, and R. Nagarajan (1999), "Design of Surfactant Solutions with Optimal Macroscopic Properties," *Computers & Chemical Engineering, Vol. 23, Suppl.*, 467-470.
151. Gupta, A. and C.D. Maranas (1999), "A Hierarchical Lagrangean Relaxation Procedure for Solving Midterm Planning Problems," *Industrial & Engineering Chemistry Research, Vol. 38*, 1937-1947.
152. Camarda, K.V. and C.D. Maranas (1999), "Optimization in Polymer Design using Connectivity Indices," *Industrial & Engineering Chemistry Research, Vol. 38*, 1884-1892.
153. Vaidyaraman, S. and C.D. Maranas (1999a), "Optimal Refrigeration Cycle Synthesis and Refrigerant Selection," *AIChE Journal, Vol. 45, No. 5*, 997-1017.
154. Raman, V.S. and C.D. Maranas (1998), "Optimization in product design with properties correlated with topological indices," *Computers & Chemical Engineering, Vol. 22, No. 6*, 747-763.
155. Petkov, S.B. and C.D. Maranas (1998b), "Design of Multiproduct Batch Plants Under Demand Uncertainty with Staged Capacity Expansions," *Computers & Chemical Engineering, Vol. 22, Suppl.*, 789-792.
156. Petkov, S.B. and C.D. Maranas (1998a), "Design of Single-Product Campaign Batch Plants under Demand Uncertainty," *AIChE Journal, Vol. 44, No. 4*, 896-911.

157. Petkov, S.B. and C.D. Maranas (1997b), "Multiperiod Planning and Scheduling of Multipurpose Batch Plants Under Demand Uncertainty," *Industrial & Engineering Chemistry Research*, Vol. 36, No. 11, 4864-4881.
158. Petkov, S.B. and C.D. Maranas (1997a), "Quantitative Assessment of Uncertainty in the Optimization of Metabolic Pathways," *Biotechnology and Bioengineering*, Vol. 56, No. 2, 145-161.
159. Androulakis, I.P., C.D. Maranas and C.A. Floudas (1997), "Prediction of Oligopeptide Conformations via Deterministic Global Optimization," *Journal of Global Optimization*, Vol. 11, 1-34.
160. Maranas, C.D. (1997b), "Optimization Accounting for Property Prediction Uncertainty in Polymer Design," *Computers & Chemical Engineering*, Vol. 21, Suppl., 1019-1024.
161. Maranas, C.D. (1997a), "Optimal Molecular Design Under Property Prediction Uncertainty," *AIChE Journal*, Vol. 43, No. 5, 1250-1264.
162. Maranas, C.D. and C.A. Floudas (1997), "Global Optimization in Generalized Geometric Programming," *Computers & Chemical Engineering*, Vol. 21, No. 4, 351-369.
163. Harding, S.T., C.D. Maranas, C.M. McDonald and C.A. Floudas (1997), "Locating All Homogeneous Azeotropes in Multicomponent Mixtures," *Industrial & Engineering Chemistry Research*, Vol. 36, No. 1, 160-178.
164. Maranas, C.D., I.P. Androulakis, C.A. Floudas, J.M. Mulvey and A.J. Berger (1997), "Solving Long-Term Financial Planning Problems via Global Optimization," *Journal of Economics Dynamics and Control*, Vol. 21, No. 8/9, 1405-1425.
165. Maranas, C.D. (1996), "Optimal Computer-Aided Molecular Design: Application to Polymer Design," *Industrial & Engineering Chemistry Research*, Vol. 35, No. 10, 3403-3414.
166. Adjiman, C.S., I.P. Androulakis, C.D. Maranas and C.A. Floudas (1996), "A Global Optimization Method, α BB, for Process Design," *Computers & Chemical Engineering*, Vol. 20, Suppl. A, S419-S424.
167. Maranas, C.D., C.M. McDonald, S.T. Harding and C.A. Floudas (1996), "Locating All Azeotropes in Homogeneous Azeotropic Systems," *Computers & Chemical Engineering*, Vol. 20, Suppl. A, 413-418.
168. Androulakis, I.P., C.D. Maranas and C.A. Floudas (1995), " α BB: A Global Optimization Method for General Constrained Nonconvex Problems," *Journal of Global Optimization*, Vol. 7, No. 4, 337-363.
169. Maranas, C.D. and C.A. Floudas (1995), "Finding All Solutions of Nonlinearly Constrained Systems of Equations," *Journal of Global Optimization*, Vol. 7, No. 2, 143-182.
170. Maranas, C.D., C.A. Floudas and P.N. Pardalos (1995), "New Results in the Packing of Equal Circles in a Square," *Discrete Mathematics*, Vol. 142, 287-293.

171. Maranas, C.D. and C.A. Floudas (1994b), "A Deterministic Global Optimization Approach for Molecular Structure Determination," *Journal of Chemical Physics*, Vol. 100, No. 2, 1247-1261.
172. Maranas, C.D. and C.A. Floudas (1994a), "Global Minimum Potential Energy Conformations of Small Molecules," *Journal of Global Optimization*, Vol. 4, 135-170.
173. Maranas, C.D. and C.A. Floudas (1993), "Global Optimization for Molecular Conformation Problems," *Annals of Operations Research*, Vol. 42, 85-117.
174. Maranas, C.D. and C.A. Floudas (1992), "A Global Optimization Approach for Lennard-Jones Microclusters," *Journal of Chemical Physics*, Vol. 97, No. 10, 7667-7678.

Refereed Conference Proceedings

1. Vital-Lopez, F.-G., A. Armaou and C. Maranas (2008), "Hybrid multi-scale modeling of brain tumor progression," *Proceedings of the 18th International symposium on Mathematical Theory of Networks & Systems*, RSBioSystems.2, Blacksburg, VA.
2. Vital-Lopez, F.G., C.D. Maranas and A. Armaou (2006), "Bifurcation analysis of the metabolism of *E. coli* at optimal enzyme levels," Proceedings of the 2006 American Control Conference, Minneapolis, MN.
3. Nikolaev, E.V., P. Pharkya, C. D. Maranas, and A. Armaou (2005), "Optimal selection of enzyme levels using large-scale kinetic models," Proceedings of 16th International Federation of Automatic Control World Congress, Prague, Czech Republic, 6 pages.
4. Pharkya, P. and C.D. Maranas (2005), "A hierarchical framework for metabolic pathway discovery and strain design," *FOSBE 2005 Proceedings*, 141-144.
5. Rogers, M. J., M. Ding, and C. D. Maranas (2004), "A Case Study on the Design of Pharmaceutical R&D Licensing Deals," *FOCAPD Conference Proceedings*, 475-479.
6. Dasika, M.S., Gupta, A., and C.D. Maranas (2004), "A Mixed Integer Linear Programming Framework (MILP) for Inferring Time Delay in Gene Regulatory Networks," *Pacific Symposium on Biocomputing*, Vol. 9, 474-485.
7. Maranas, C.D., G.L. Moore, A.P. Burgard and A. Gupta (2003), "Systems Engineering Challenges and Opportunities in Computational Biology," *Proceedings of Foundations of Computer-Aided Process Operations IV*, Coral Springs, FL, January 12-15, 2003, CACHE, 13-26.
8. Rogers, M.J., A. Gupta and C.D. Maranas (2003), "Risk Management in Real Options Based Pharmaceutical Portfolio Planning," *Proceedings of Foundations of Computer-Aided Process Operations IV*, Coral Springs, FL, January 12-15, 2003, CACHE, 241-244.
9. Gupta, A. and C.D. Maranas (2001), "Multiperiod Planning of Multisite Supply Chains Under Demand Uncertainty," *European Symposium on Computer-Aided Process Engineering*, Vol. 11, 871-882.
10. C.D. Maranas (2001), "Optimization in Molecular Design and Bioinformatics," *European Symposium on Computer-Aided Process Engineering*, Vol. 11, 1157-1164.

11. Vaidyaraman, S. and C.D. Maranas (1999b), "Simultaneous Refrigeration Cycle Synthesis and Refrigerant Selection," In proceedings of PRES'99, 2nd Conference on Process Integration, Modeling and Optimisation for Energy Saving and Pollution Reduction, May 31-June 2, Budapest, Hungary.
12. Maranas, C.D., I.P. Androulakis and C.A. Floudas (1995), "A Deterministic Global Optimization Approach for the Protein Folding Problem," *Proc. of DIMACS Series in Discrete Mathematics and Theoretical Computer Science, Vol. 23*, 133-150.
13. Maranas, C.D. and C.A. Floudas, (1993b), "A Global Optimization Method For Weber's Problem With Attraction And Repulsion," *Proc. of Large Scale Optimization: State of the Art Conference*, (February 15-17, 1993, Florida University), Kluwer Academic Publishers B.V., 259-293.
14. Pistikopoulos, E.N., T.A. Mazzuchi, C.D. Maranas and T.V Thomaidis (1991), "Simultaneous Assessment of Flexibility, Reliability and Availability for In-Line Blending Systems: A Unified Framework for Analysis and Retrofit Design," *Proc. of Fourth International Symposium on Process Systems Engineering (PSE 91)*, 1.4.1-1.4.16.

Book chapters

1. Simons-Senftle, M.N., D. Sarkar and C.D. Maranas (2018), "Modeling Plant Metabolism: Advancements and Future Capabilities. In: Shrawat A., Zayed A., Lightfoot D. (eds) Engineering Nitrogen Utilization in Crop Plants. Springer, Cham. DOI https://doi.org/10.1007/978-3-319-92958-3_4.
2. Nazem-Bokae H., Y.Z., Maranas C.D., Ferry J.G. (2018), "The Biochemistry and Physiology of Respiratory-Driven Reversed Methanogenesis," In: Kalyuzhnaya M., Xing XH. (eds) Methane Biocatalysis: Paving the Way to Sustainability. Springer, Cham. DOI https://doi.org/10.1007/978-3-319-74866-5_12.
3. Chan, S.H.J., M. Simons and C.D. Maranas (2017), "Computational Modeling of Microbial Communities," *Systems Biology*, chapter 6.
4. Moore, G.L. and C.D. Maranas (2003), "Modeling and Optimization of Directed Evolution Protocols." *Enzyme Functionality: Design, Engineering, and Screening*, edited by A. Svendsen (pp. 185-212). New York, NY: Marcel Dekker, Inc.

PATENTS

Pfleger B.F., N.J. Hernandez-lozada, C.D. Maranas and M. Grisewood, "Gene construct encoding mutant thioesterase, mutant thioesterase encoded thereby, transformed host cell containing the gene construct, and method of using them to produce medium-chain fatty acids, " US 20,170,369,858, filed June 22, 2017, and issued Dec. 28, 2017.

Ferry, J.G., C.D. Maranas and T.K. Wood, "Methane-to-acetate pathway for producing liquid biofuels and biorenewables," Publication number: 20150147791. Filed: Nov. 21, 2014. Publication date: May 28, 2015.

Maranas C.D., A.P. Burgard and P. Pharkya, "Method for determining gene knockouts," US 8,457,941, filed Aug. 16, 2011, and issued Apr. 16, 2013.

Maranas C.D., A.P. Burgard and P. Pharkya, "Method for redesign of microbial production systems," US 8,108,152, filed Oct. 21, 2010, and issued Jan. 1, 2012.

Maranas C.D. and A.P. Burgard, "Method and system for modeling cellular metabolism," US 8,086,414, filed Mar. 15, 2010, and issued Dec. 27, 2011.

Maranas C.D., A.P. Burgard and P. Pharkya, "Method for determining gene knockouts," US 8,027,821, filed Jul. 9, 2003, and issued Sept. 27, 2011.

Maranas C.D., A.P. Burgard and P. Pharkya, "Method for redesign of microbial production systems," US 7,826,975, filed Aug. 26, 2004, and issued Nov. 2, 2010.

Maranas C.D. and A.P. Burgard, "Method and system for modeling cellular metabolism," US 7,711,490, filed Jan. 10, 2002, and issued May 4, 2010.

Maranas C.D. and G. Moore "Modeling framework for predicting the number, type and distribution of crossovers in directed evolution experiments," US 2003/0073092, filed Nov. 9, 2001.

Post-Doctoral Research Associates

1. Dr. Shyam Srinivasan, 2019-present. PhD: U. of Toronto
2. Dr. Patrick Suthers, 2018-present. PhD: U. of Wisconsin
3. Dr. John Hendry Rajeswaran, 2018-present. PhD: IIT Bombay
4. Dr. Siu Hung (Joshua) Chan, 2015-2018. PhD: DTU. Current position: Assistant Professor, Colorado State University.
5. Dr. Hadi Nazem-Bokaei, 2014-2017. PhD: Virginia Tech. Current position: CSIRO Research scientist, Australia.
6. Dr. Tong Li, 2013-2016. PhD: University of Leuven, Belgium. Current position: BASF, San Diego, CA.
7. Dr. Ali Zomorodi, 2012-2013. PhD: Pennsylvania State University. Current position: Instructor in Pediatrics, faculty of Harvard Medical School (HMS) and Mass General Hospital (MGH).
8. Dr. Patrick Suthers, 2005-2013. PhD: University of Wisconsin-Madison.
9. Dr. Yang Chang, 2007-2008. PhD: University of Illinois at Urbana-Champaign. Current position: Research Associate, Merck Sharp & Dohme Corp.
10. Dr. Evgeni Nikolaev, 2002-2005. PhD: Lobachevsky Nizhegorod State University, Russia. Current position: Instructor of Mathematics, New Jersey State University (Rutgers).

11. Dr. Anshuman Gupta, 2002-2005. PhD: Pennsylvania State University. Current position: Vice President-Analytics, Indicus Analytics, India.
12. Kyle Camarda, 1998-2000. PhD: University of Illinois at Urbana-Champaign. Current position: Associate Professor, Department of Chemical and Petroleum Engineering, University of Kansas.

PH.D. THESES SUPERVISED

1. "Computational protein design," Soodabeh Gaffari, ongoing.
2. "Metabolic modeling of microbiome," Bipin Rimal, ongoing.
3. "Reconstruction of yeast metabolic models", Hoang Dinh, ongoing
4. "Metabolic models of cyanobacteria and plants," Debolina Sarkar, ongoing.
5. "Computational design of transport proteins," Ratul Chowdury, ongoing.
6. "ME metabolic models," Lin Wang, ongoing.
7. "Metabolic modeling of clostridia," Satyakam Dash, ongoing.
8. "Genome-scale metabolic flux analysis (MFA), Sarat Gopalakrishnan, ongoing.
9. "Computational Methods for Enzyme Redesign," Matthew Grisewood, January 2018. Current position: Schodinger, Inc.
10. "Development of synthetic biology tools for microbial metabolic engineering," Chiam Yu Ng, July 2017. Current position: Amyris.
11. "Application of multi-tissue and multi-organism genome-scale models for analyzing plant metabolism", Maggie Simons, June 2017. Current position: Instructor, dept. of Chemical Engineering, Rice University.
12. "Elucidation and Synthetic Design of Biochemical Pathways," Akhil Kumar, February 2017: Current position: Amazon, Inc.
13. "Construction of dynamic metabolic models for metabolic engineering applications," Ali Khodayari, January 2017. Current position: Genomatica, Inc.
14. "Development of genome-scale and dynamic models to analyze metabolism in Cyanobacteria," Thomas Mueller, September 2016. Current position: Axtria.
15. "Development of computational tools to redirect metabolism," Anupam Chowdhury, August 2016. Current position: Zymergen.
16. "Reconstruction and analysis of genome-scale metabolic models of photosynthetic organisms," Rajib Saha, June 2014. Current position: Assistant Prof., University of Nebraska.
17. "Computational methods for the de novo design of antibodies", Robert Pantazes, January

2014. Current position: Assistant Professor, Auburn University.
18. "Computational tools for genome-scale synthetic lethality analysis and metabolic modeling of microbial communities", Ali Zomorodi, August 2012. Current position: Instructor in Pediatrics, faculty of Harvard Medical School (HMS) and Mass General Hospital (MGH).
 19. "Using computations to analyze and redesign metabolism", Sridhar Ranganathan, December 2011. Current position: Staff Scientist, Synthetic Biology, Life Technologies.
 20. "Development of hybrid intracellular/extracellular models of brain tumor progression and medication strategies", Francisco Vital-Lopez, 2011. Current position: Research scientist, Biotechnology High Performance Computing Software Applications Institute (BHSAI).
 21. "Systems based optimization approaches to analyze and improve metabolic networks", Vinay-Satish Kumar, 2010. Current position: Data Scientist, Facebook.
 22. "Engineering and analysis of cofactor partitioning for NADPH-dependent xylitol production in Escherichia coli", Jonathan Chin, 2010. Current position: Scientist, Algenol Biofuels.
 23. "Computational design and experimental characterization of proteins with novel functions", Hossein Fazelinia, 2009. Current position: Postdoctoral research fellow, Fox Chase Cancer Center.
 24. "Systems engineering based approaches for biological network, inference, analysis and redesign", Madhukar Dasika, August 2007. Current position: Scientist, DuPont.
 25. "Development of computational tools for the design and optimization of combinatorial protein libraries", Manish Saraf, May 2006. Current position: Vice President, Citigroup.
 26. "Modeling and optimization in directed evolution protocols and protein engineering", Gregory Moore, May 2005. Current position: Senior Scientist, Protein Engineering, Xencor.
 27. "Optimization based redesign of microbial production systems", Priti Pharkya, December 2005. Current position: Senior Research Scientist II, Genomatica.
 28. "Molecular design in chemical and biological systems", Andreas Lehmann, December 2004. Current position: Postdoctoral Associate, Fox Chase Cancer Center.
 29. "Optimization-based frameworks for the analysis and redesign of metabolic networks", Anthony Burgard, 2004. Current position: Associate Director, Computational Technologies, Genomatica.
 30. "Supply chain management under uncertainty", Anshuman Gupta, August 2002. Current position: Vice President-Analytics, Indicus Analytics, India.
 31. "Optimization based methodology for refrigeration system synthesis and molecular design", Shankar Vaidyaraman, August 2001. Current position: Marketing Associate, Eli Lilly and Company.

M.S. STUDENT THESES/PROJECTS SUPERVISED

1. "Computational design of thioesterases", N. Gifford, Oct. 2014.
2. "OptZyme: A Computational Tool for Altering Enzymatic Specificity", M. Grisewood, May 2013. Current position: Doctoral Student, Department of Chemical Engineering, Pennsylvania State University.
3. "MetRxn: a knowledgebase of metabolites and reactions spanning metabolic models and databases", A. Kumar, 2013. Current position: Doctoral student, Department of Bioinformatics and Genomics, Pennsylvania State University.
4. "Optimization-driven design of synthetic genetic circuits using biobricks", A. R. Zomorodi, 2011. Current position: Postdoctoral Research Associate, Bioinformatics Program & Biomedical Engineering Department, Boston University.
5. "Reconstruction of a genome-scale metabolic model of maize metabolism", R. Saha, January 2011. Current position: Doctoral Student, Department of Chemical Engineering, Pennsylvania State University.
6. "Construction of a genome-scale atom mapping model of E.coli for metabolic flux analysis", P. Ravikirthi, 2010. Current position: Bioinformatician, Positive Bioscience, India.
7. "Computational design to switch protein cofactor specificity and create enzymatic activity", G. Khoury, 2010. Current position: Doctoral Student, Department of Chemical and Biological Engineering, Princeton University.
8. "Optimization methods to compare strain design strategies in metabolic networks using different cellular objectives", V. S. Kumar, December 2008. Current position: Data Scientist, Facebook.
9. "Metabolic Engineering and Strain Design procedures for valuable chemical synthesis", S. Ranganathan, 2008. Current position: Staff Scientist, Synthetic Biology, Life Technologies.
10. "Real options based planning of pharmaceutical product pipelines", M. Rogers, May 2004. Current position: Business Development Manager, DuPont.
11. "Development of process design case studies for the capstone design course", M. Kalp, 1999. Current position: Project Engineer, Croda.
12. "Analysis and optimization of chemical process systems under uncertainty", S. Petkov, August 1997. Current position: Director Business Development, Huvepharma, Bulgaria.

COURSES TAUGHT

Graduate level: Nonlinear Optimization: Theory and Applications, Optimization in Biological Networks

Undergraduate level: Design of Chemical Plants, Design Projects in Chemical Engineering, Process Dynamics, Process Heat Transfer, Mathematical Modeling in Chemical Engineering

SHORTCOURSE AND WORKSHOP LECTURE/INSTRUCTOR

Pan American Program on Process Systems Engineering, Iguazu Falls, Argentina, October 15-25, 2005,
“Biological Pathways Analysis and Engineering”