

SHUYI MA

ACADEMICS

University of Illinois at Urbana-Champaign

- Department: Chemical and Biomolecular Engineering
- PhD student
- GPA: 3.82

California Institute of Technology

- Bachelor of Science: June 2009
- Major: Chemical Engineering—Biomolecular Track
- GPA: 3.6

GRE Scores:

- Quantitative: 790
- Verbal: 670
- Analytical Writing: 4.5

RESEARCH & WORK EXPERIENCE

August 2009-present, Nathan D. Price research group: Dept. Chemical Engineering, University of Illinois at Urbana-Champaign

- Developing computational algorithms to diagnose lung diseases with high accuracy based on gene expression data.

November 2006-June 2009 Frances Arnold research group-Dept. Chemical Engineering, Caltech

- June-August 2007: Caltech Summer Undergraduate Research Fellowship (SURF) recipient. Engineered cytochrome P450_{BM3} to improve the hydroxylation of ethane to ethanol by applying combinatorial active site saturation testing in concert with directed evolution
- June-August 2008: Amgen Scholar. Engineered cytochrome P450_{BM3} to catalyze regioselective demethylation of the drug compound thebaine.
 - Research published in the *Caltech Undergraduate Research Journal*

June-September 2005-2007 Los Angeles Biomedical Research Institute Torrance, CA

- Developed a mathematical model for sinusoidal exercise training
- Developed a method for assessing airway constriction in patients with chronic lung disease by analyzing their breathing flow patterns during exercise. Applied this method to analyze the breathing patterns obtained during exercise of patients with chronic obstructive pulmonary disease (COPD) to better understand the physiology airflow limitation.
 - Research published in *Respiratory Medicine*
- Analyzed data gathered from activity monitors and oxygen delivering devices in a study that examines the activity levels and oxygen usage patterns of patients with chronic lung disease on long term oxygen therapy.
 - Research published in *COPD: Journal of Chronic Obstructive Pulmonary Disease*
- Supervised two summer research fellows

- Tracked customer complaints concerning three Nissan models

SUMMARY OF TECHNICAL SKILLS

- Familiar with molecular biology cloning techniques: PCR (SOE, assembly, error-prone), gel electrophoresis, DNA extraction and purification (miniprep, pellet paint), ligation and transformation of DNA into electrocompetent and chemocompetent *Escherichia coli* strains, culturing *E. coli*,
- Familiar with protein bioconversion setup and analysis techniques: cytochrome P450_{BM3} protein purification with anion exchange chromatography and Akta Purifier, high throughput screening with colorimetric assay (purpald, 4AAP, CO binding), chemical analysis with thin layer chromatography (TLC), high performance liquid chromatography (HPLC), and NMR spectroscopy
- Familiar with Microsoft Office Word, Excel, PowerPoint, SigmaPlot and SigmaStat statistical software, C, C++, MATLAB, Mathematica, and IGOR Pro data analysis software (wrote programs to assist in the data processing).

GRANTS

- Assisted in the preparation and writing of the Roy J. Carver Charitable Trust Application
 - Title: Integrated metabolic and regulatory network analysis of glioblastoma
 - PI: Nathan D. Price

PUBLICATIONS

- Ma S, Rossiter HB, Barstow TJ, Casaburi R, Porszasz J. "Clarifying the equation for the modeling of VO₂ kinetics above the lactate threshold." *Journal of Applied Physiology* (submitted 2010).
- Ma S, Hecht A, Varga J, Rambod M, Morford S, Goto S, Casaburi R, Porszasz J. "Breath-by-breath quantification of progressive airflow limitation during exercise in COPD: A new method." *Respiratory Medicine* (2010), 104, 398-396.
- Hecht A, Ma S, Porszasz J, Casaburi R for the COPD Clinical Research Network 2009. "Methodology for Using Long-Term Accelerometry Monitoring to Describe Daily Activity Patterns in COPD." *COPD: Journal Of Chronic Obstructive Pulmonary Disease* (2009), 6:2, 121-129
- Ma S. "Selective Hydroxylation of Thebaine with Engineered Cytochrome P450BM₃" *Caltech Undergraduate Research Journal*, (2009) 9:1, 18-23.
- Porszasz J, Hecht A, Ma S, Tjep B, Casaburi R. "Methodology for continuous long-term assessment of ambulatory and stationary oxygen use in hypoxemic COPD patients," *ATS International Conference 2007 Abstract* [Publication Page: A555]
- Hecht A, Porszasz J, Ma S, Casaburi R, and the NHLBI COPD Clinical Research Network. "Daily Activity Patterns Of Long-Term Oxygen Patients As Compared To a Sedentary Population As Revealed By Triaxial Accelerometry." *Poster Presentation. ATS International Conference 2007 Abstract*.
- Ma S, Hecht AH, Casaburi R, Whipp BJ, Porszasz J. "Detection Dynamic Airway Compression by Breath-by-Breath Geometric Analysis of Spontaneous Flow-Volume Loops of COPD Patients during Exercise." *ATS International Conference 2006 Abstract* [Publication Page: A875]
- Varga J, Ma S, Hecht AH, Hsia David, Casaburi R, Porszasz J. "Detection of Dynamic Airway Compression during Exercise in COPD by Breath by Breath Analysis of Spontaneous Flow-Volume Loops." *European Respiratory Society 16th Annual Congress 2006 Abstract* [Publication Page: P1224]

PRESENTATIONS

- Ma S. "Selective Hydroxylation of Thebaine with Engineered Cytochrome P450BM₃." *Oral*

Presentation. Caltech SURF Summer Seminar Day. August 21 2008.

- Ma S. "Improvement of Ethane to Ethanol Hydroxylation with Engineered Cytochrome P450." Oral Presentation. Caltech SURF Summer Seminar Day. August 14 2007.
- Ma S, Hecht AH, Casaburi R, Whipp BJ, Porszasz J. "Detecting Dynamic Airways Compression by Breath-by-Breath Geometric Analysis of Spontaneous Flow-Volume Loops of COPD Patients During Exercise." Poster Presentation. Southern California Pulmonary Research Conference, May 6 2007.
- Hecht A, Porszasz J, Ma S, Casaburi R, and the NHLBI COPD Clinical Research Network. "Daily Activity Patterns Of Long-Term Oxygen Patients As Compared To a Sedentary Population As Revealed By Triaxial Accelerometry." Poster Presentation. Southern California Pulmonary Research Conference, May 6 2007.
- Ma S, Hecht AH, Casaburi R, Whipp BJ, Porszasz J. "Characterization of spontaneous flow-volume loops during exercise." Oral Presentation. Harbor-UCLA Medical Center Cardiopulmonary Research Seminar. July 28 2005.

AWARDS

- NSF Graduate Research Fellowship Awardee (2010)
- NSF Graduate Research Fellowship Honorable Mention (2009)
- Amgen Scholar (2008)
- Arrola DuBridgde Scholarship (2007-2008)
- Rose Hills Summer Undergraduate Research Fellow (2007)
- Mrs. Norman Chandler Undergraduate Scholarship (2006-2007)
- Dick & Barbara Dickinson Scholarship (2005-2006)
- Los Angeles Biomedical Research Institute Summer Research Fellow (2005)
- Network of Educators in Science and Technology Student Award (2005)