

Tingwei Ren

Email: txr942@psu.edu

Phone: 814-777-5199

Greenberg Lab 125, Penn State University, University Park, PA, 16802

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EDUCATION

Ph.D. (Chemical Engineering): The Pennsylvania State University, 2013.08-present, Current GPA: 3.93/4.0

B.S. (Chemical Engineering): Tsinghua University, 2009.08-2013.07, Overall GPA: 86.5/100

AWARDS AND ACADEMIC ACHIEVEMENTS

College of Engineering Research Symposium (CERS) Best Poster Award, Pennsylvania State University, 2017

Air Products Fellowship, Air Products & Chemicals, Inc, 2017

North American Membrane Society Annual Meeting Poster Award, North American Membrane Society, 2016

North American Membrane Society Annual Meeting Travel Award, North American Membrane Society, 2016

Thomas and June Beaver Fund Fellowship, Pennsylvania State University, 2014-2015

Best Candidacy Esam Award Finalist, Department of Chemical Engineering, Pennsylvania State University, 2014

Scholarship for Outstanding Research Performance, Tsinghua University, 2012

Scholarship for Outstanding Academic Performance, Tsinghua University, 2011

ACADEMIC EXPERIENCE

Ph.D. Project The Pennsylvania State University, 2014.01-present

Topic: Membrane protein based biomimetic materials: design and functional studies.

Advisor: Prof. Manish Kumar, Department of Chemical Engineering

Project 1: Functional biomimetic membrane performance evaluation

- *Biomacromolecules and biomaterials characterization:* Using fluorescence spectroscopy based characterization technique to improve biomimetic membrane based protein insertion efficiency quantification. This new platform simplifies the quantification process while maintaining accuracy.

- *Biomimetic membrane property study:* Development of a quick assay for predicting biomimetic membrane hydrophobicity property. The new assay can facilitate optimization of biomimetic membrane property to maximize membrane protein functionality.

Project 2: Angstrom-scale monodisperse biomimetic membrane development

- *Angstrom-scale monodisperse membrane characterization:* Development of monodisperse porous membrane using biomimetic material-channel protein complex. The new biomimetic membrane achieves improvement in pore size control accuracy.

- *Biomimetic membrane scale-up:* 2D crystals biomimetic membranes fabrication and characterization using TEM.

Project 3: Transport model development of biomimetic membrane

- Development of transport models for calculating solute rejection and permeability in biomimetic membranes.

Bachelor Thesis

Tsinghua University, 2012.11-2013.06

Topic: Fundamental fluid mechanics study of co-axial electro-spinning technology

Advisor: Prof. Yangcheng Lu, Department of Chemical Engineering

- Novel electro-spinning device design with precise hollow fiber thickness control

- Development and validation of a two-phase flow model for hollow fiber thickness prediction through polyvinylpyrrolidone (PVP) hollow fiber characterization

Undergraduate Research

Tsinghua University, 2011.03-2012.01

Advisor: Prof. Yangcheng Lu, Department of Chemical Engineering

- Synthesis of pH-sensitive poly (acrylic acid and acrylamide) hydrogel beads by microfluidic device
- Discovery of formation mechanism of the poly (acrylic acid and acrylamide) hydrogel beads core-shell structure

PUBLICATIONS

1. **Tingwei Ren**, Yuexiao Shen, Mustafa Erbakan, Mariusz Grzelakowski, Peter Butler, Manish Kumar. "Membrane Protein Insertion and Compatibility with Biomimetic Membranes." *Submitted to Advanced Biosystems*
2. Yue-xiao Shen, **Tingwei Ren**, Hasin Feroz, Akhila Gollakota, Daniel Tsai, Ian T. Sines, Jun-li Hou and Manish Kumar. "Highly permeable artificial water channels in block copolymer membranes." *In submission*
3. Hasin Feroz, Bryan Ferlez, **Tingwei Ren**, Carol S. Baker, John P. Gajewski, Daniel J. Lugar, Sandeep B. Gaudana, Peter Butler, Jonas Hühn, Matthias Lamping, Wolfgang J. Parak, Mike Blatt, Julian M. Hibberd, Nigel J. Burroughs, Cheryl A. Kerfeld, Nicholas Smirnov, John H. Golbeck, Manish Kumar. "Direct measurement of light-driven chloride transport kinetics of halorhodopsin." *In submission*
4. Yang, Bodong, Yangcheng Lu, **Tingwei Ren**, and Guangsheng Luo. "One-step synthesis of pH-sensitive poly (Acrylamide-co-Sodium Acrylate) beads with core-shell structure." *Reactive and Functional Polymers*, 2013

CONFERENCE PRESENTATIONS AND POSTERS

1. **Ren, T.**, Shen, Y., Erbakan, M., Grzelakowski, M., Butler, P. & Kumar, M. How to Quantify and Improve the Performance of Biomimetic Membranes? AIChE Annual Meeting, San Francisco, CA, Nov 2016. (poster)
2. **Ren, T.**, Shen, Y., Erbakan, M., Grzelakowski, M., Butler, P. & Kumar, M. Membrane Protein Insertion and Compatibility with Biomimetic Membranes. Membranes: Materials & Processes, Gordon Research Conference and Seminar, New London, NH, July 2016. (poster)
3. **Ren, T.**, Shen, Y., Erbakan, M., Grzelakowski, M., Butler, P. & Kumar, M. Measurement of Aquaporin Z Compatibility with Biomimetic Membranes Using a Developed Membrane Protein Compatibility Evaluation Method. 26th Annual North American Membrane Society Meeting, Bellevue, WA, May 2016. (talk and poster)
4. **Ren, T.**, Butler, P. & Kumar, M. Developing A Platform for Quantitative Measurement of Membrane Protein Compatibility with Biomimetic Membranes. College of Engineering Research Symposium, Pennsylvania State University, State College, PA, Apr, 2016. (talk)
5. **Ren, T.**, Erbakan, M., Grzelakowski, M., Butler, P. & Kumar, M. A New Fluorescence-Based Method for Membrane Protein Single Molecule Property Determination. 59th Biophysical Society Annual Meeting, Baltimore, MD, Feb 2015. (poster)

INTERSHIP AND WORK EXPERIENCE

Sinopec Beijing Yanshan Company 2011.07-2011.08

- *Concept learning on cracking process in petrochemical industry*

Zhejiang Cenway New Synthetic Materials Company 2012.07-2012.08

- *Technical consultation on industrial butyl rubber production*
- *Micro-fluid device design for lab-scale butyl rubber synthesis*

COLLABORATION AND LEADERSHIP EXPERIENCE

Research collaborations: Prof. Guillermo C. Bazan (University of California); Prof. Menachem Elielech (Yale University); Prof. Costas D. Maranas (Pennsylvania State University); Prof. Peter J. Butler (Pennsylvania State University)

Undergraduate student mentoring: Luma Teles, Eduardo Barbieri (Science Without Borders Program, Brazil); Jeevan Prabhakar (3M Summer research Fellowship, Penn State); Joseph Francis Hall (Erickson Discovery Grant Program, Penn State); Sneha Srinivasan, Yasin Fahham

Leadership:

- *Directing Prof. Manish Kumar Research Lab packing, relocation and re setup during department move to swing space*
- *Organizing AICHE 2016 Tsinghua-Alumni Reception*

SKILLS

- **Expertise** in Fluorescence Correlation Spectroscopy (FCS), Transmission Electron Microscopy (TEM), Fast Protein Liquid Chromatography (FPLC), Light scattering based characterization of liposome solute transport, Protein purification process design;
- **Experienced** in High Performance Liquid Chromatography (HPLC), Cryo-Electron Microscopy (Cryo-EM), Ultrafiltration (UF), pilot plant scale bio-separation unit operations
- **Experienced** in data analysis, including R, Matlab, OriginPro