

Shen Ren

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EDUCATION

- University of Washington** **Seattle, WA**
PhD, Mechanical Engineering, 2016 — 2020
- Dissertation Title: Development of an Automated Resonance Electromagnetic Rewarming System for the Cryopreservation of Large-scale Biomaterials
 - Supervisor: Professor Dayong Gao
- University of Washington** **Seattle, WA**
Master of Science, Mechanical Engineering, 2014 — 2016
- Nanjing University of Science and Technology** **Nanjing, China**
B.S. Mechanical Engineering 2009 — 2013

TEACHING EXPERIENCE

- Seattle University** **Seattle, WA**
Instructor 2021 - Present
- MEGR 1050 Engineering Graphics and Design, 3 Credits
 - MEGR 3240 Heat Transfer, 4 Credits
 - CEEGR 3310 Fluid Mechanics, 4 Credits
 - MEGR 4870/4880/4890 Engineering Design, 3/4/3 Credits
 - MEGR 5200, Energy Systems, 3 Credits
 - MEGR 5030 Applied Fluid Dynamics, 3 Credits
- University of Washington** **Seattle, WA**
- **Engineering Thermodynamics, ME323**
 - Instructor, Winter 2019, Winter 2021.
 - Teaching Assistant, six quarters (Fall 2016, Winter 2017, Fall 2017, Winter 2018, Fall 2018, and Winter 2020).
 - **Introduction to Heat Transfer, ME331**
 - Instructor, Spring 2019, Spring 2021.
 - Teaching Assistant, four quarters (Spring 2016, Spring 2017, Spring 2018, and Fall 2019).
 - **Applied Statistics and Probability for Engineers, ME498**
 - Instructor, Spring 2020

RESEARCH EXPERIENCE

- Center for Cryo-Biomedical Engineering and Artificial Organs** **Seattle, WA**
Postdoctoral Scholar, Lab Manager 2020 — 2021
- Including 3 research laboratories
 - Cryo-Biomedical Engineering and Cryobiology Lab
 - Artificial Organs Lab
 - Bio-instrument Lab

- Research Assistant 2014 — 2020
- Developed an automatic single mode electromagnetic resonance rewarming system.
 - Developed a real-time resonant frequency monitoring and controlling system. Combined multiple electrical and temperature sensors to conduct the feedback control loop.
 - Adopted superparamagnetic nanoparticles to enhance the energy conversion efficiency.
 - Improved the cryopreservation of large-scale Jurkat cell suspensions, and achieved vitreous preservation of rabbit jugular veins while maintain the biological functionalities.

- Center for Dialysis Innovation** **Seattle, WA**
 Research Project Lead 2017—present
- Developing and prototyping a portable medical device used for Kidney Failure’s patient.
 - Developing the sub-systems and technologies to the portable device, including a real-time monitoring and controlling system, compatibility&mobility system, and disposable tubing.
 - Designed and established a full-scale benchtop system to serve as a testing platform for sub-systems and prototype development.

ENGINEERING WORK EXPERIENCE

- Solarc Energy Consulting Group LLC** **Seattle, WA**
 Energy Analyst 2017-2019
- Investigated energy consumption status of dwelling units and office spaces in Seattle area.
 - Developed energy usage model to simulate and analysis annual HVAC system and identified strategies to improve energy efficiency and reduce energy cost.

AWARDS AND HONORS

- Exceptional Ph.D. Dissertation Award** June 2021
 University of Washington
- Peter L. Steponkus Crystal Award** June 2021
 Society for Cryobiology
- Outstanding Ph.D. Student Paper Competition Finalist** June 2021
 ASME-BED/SB3C
- Best Undergraduate Thesis Award** July 2013
 Nanjing University of Science and Technology
- Outstanding Graduate Scholarship** July 2013
 Nanjing University of Science and Technology
- ISS Excellence in Service and Outreach Award** March 2013
 University of California – Riverside
- National Scholarship** November 2011
 Nanjing University of Science and Technology

Outstanding Freshman Scholarship

Nanjing University of Science and Technology

July 2010

MENTORING AND ADVISING

Washington State University – Everett

Seattle, WA

Capstone Project Mentor

2019-2020

Project Title: A Portable Flow Rate Control System for Artificial Organ

Advisors or Mentors: Shen Ren, Prof. Zhiquan Shu, Prof. Xiaopeng Bi, Prof. Dayong Gao

Team members: Claire Jackson, Jacob Knibbe, Michael Korody, Miranda Stewart

University of Washington

Seattle, WA

Research Project Mentor

2017-present

Master students: Nanye Du, Shaohang Hao, Steve Jin, Miles Ma, Yanyi Wang, Ziyuan Wang

Undergraduate students: Leo Tao (2017-2019), Shawn Ma (2017-present)

Interlake High School

Seattle, WA

Gifted High School Program Mentor

2018-present

Students: Jacob Zhang (2018-2019), Amy Jiang (2019 Summer), Jason Qian (2019-2020)

PUBLICATIONS

- Book Chapter

1. **Shen Ren**, Zhiquan Shu, Jiaji Pan, Ji Peng, Junlan Wang, Chunhua Zhao and Dayong Gao (November 10th 2020). Development of a Novel Electromagnetic Rewarming Technology for the Cryopreservation of Stem Cells with Large Volume [Online First], IntechOpen, DOI: 10.5772/intechopen.94556.
2. Development of a numerical model for electromagnetic resonance rewarming technology, Ji Peng, **Shen Ren**, and Dayong Gao, *To appear in IntechOpen, 2021.*

- Peer-Reviewed Scientific Journal Papers

1. Jiaji Pan, **Shen Ren**, Praveen K. Sekar, Ji Peng, Zhiquan Shu, Ming Chen, Dayong Gao, Investigation of Electromagnetic Resonance Rewarming Enhanced by Magnetic Nanoparticles for Cryopreservation, *Langmuir* 2019, 35, 23, 7560-7570.
2. Ji Peng, Cifeng Fang, **Shen Ren**, Jiaji Pan, Zhiquan Shu, and Dayong Gao, Development of a microfluidic device with on-chip active cooling and heating components by heat transfer analysis, *International Journal of Heat and Mass Transfer*, 2019, 130, 660-667.
3. Jiaji Pan, Zhiquan Shu, Gang Zhao, Weiping Ding, **Shen Ren**, Praveen K Sekar, Ji Peng, John Kramlich, Ming Chen, Dayong Gao, Towards uniform and fast rewarming for cryopreservation with electromagnetic resonance cavity: numerical simulation and experimental investigation, *Applied Thermal Engineering*, 2018, 140, 25 July 2018, Pages 787-798. <https://doi.org/10.1016/j.applthermaleng.2018.05.015>
4. Jiaji Pan, Zhiquan Shu, **Shen Ren**, and Dayong Gao, Determination of Dielectric Properties of Cryoprotective Agent Solutions with a Resonant Cavity for the Electromagnetic Rewarming in Cryopreservation, Biopreservation and Biobanking, Oct2017.404-409. <http://doi.org/10.1089/bio.2016.0096>

SELECTED CONFERENCE PRESENTATIONS

1. **Shen Ren**, Zhiquan Shu, Ziyuan Wang, Ye Jin, Ruidong Ma, Shaohang Hao, and Dayong Gao, Successful Viterous Cryopreservation of Rabbit Jugular Vein Using Magnetic Nanoparticles Enhanced Single-mode Electromagnetic Resonance (SMER) Rewarming System, the 58th Annual Meeting of the Society for Cryobiology, July 20-23, 2021.
2. **Shen Ren**, Zhiquan Shu, Ziyuan Wang, Ye Jin, Ruidong Ma, Shaohang Hao, and Dayong Gao, Successful Cryopreservation of Rabbit Jugular Vein Using Magnetic Nanoparticles Enhanced Single-mode Electromagnetic Resonance Rewarming System, Summer Biomechanics, Bioengineering, and Biotransport Conference, June 14-18, 2021.
3. **Shen Ren**, Zhiquan Shu, Ji Peng, and Dayong Gao, Development of electromagnetic resonance technology for rapid-uniform rewarming of large volume of cryopreserved biomaterials, the 57th Annual Meeting of the Society for Cryobiology, July 21-23, 2020, Virtual Meeting.
4. **Shen Ren**, Zhiquan Shu, Tianhang Yang, Ji Peng, and Dayong Gao, Optimization of the hybrid electromagnetic-conduction rewarming system for bio-specimen with large volume, the 56th Annual Meeting of the Society for Cryobiology, July 22-25, 2019, San Diego, USA.
5. **Shen Ren**, Jiaji Pan, Zhiquan Shu, Tianhang Yang, Ji Peng, Dayong Gao, A hybrid rewarming system consisting of electromagnetic heating and conventional thermal conduction for large volume biospecimen, the 55th Annual Meeting of the Society for Cryobiology, July 10-13, 2018, Madrid, Spain.
6. **Shen Ren**, Zhiquan Shu, Jiaji Pan, and Dayong Gao, Towards non-freezing cryopreservation at -85C with a cryoprotectant cocktail, the 54th Annual Meeting of the Society for Cryobiology, July 20-24, 2017, Hefei, Anhui, China.
7. **Shen Ren**, Jiaji Pan, Zhiquan Shu, and Dayong Gao, Determination of the Temperature-Dependent Specific Heat Capacity of Various Vitrification Solutions by Differential Scanning Calorimetry (DSC), the 53rd Annual Meeting of the Society for Cryobiology, July 24-27, 2016, Ottawa, Canada.

ACADEMIC SERVICES AND MEMBERSHIPS

Invited Reviewer

Biopreservation and Biobanking	2017-present
Journal of Pharmaceutical Research International	2021-present

Student Chair and Volunteer

Society for Cryobiology	2019-present
SB3C Summer Biomechanics, Bioengineering, and Biotransport Conference	2021-present

Member

Society for Cryobiology	2014-present
American Society of Mechanical Engineers (ASME)	2018-present
International Society for Biological and Environmental Repositories (ISBER)	2020-present

PATENTS APPLIED

1. Dayong Gao, Shaohang Hao, Ye Jin, Ruidong Ma, **Shen Ren**, Zhiquan Shu, Ziyuan Wang, "Automatic Single-mode Electromagnetic Resonance System for Cryopresrvation of Large-scale Biomaterials,"
US Application Number 63/194,401, May 28, 2021
2. **Shen Ren**, Ye Jin, Dayong Gao, "Portable Hemofiltration Components, Systems, and Methods,"
US Application Number 63/183,482, May 3, 2021