

CAREER VISION

I want to be one of the leaders pledge to work toward sustainable energy and environment (SEE). I plan to achieve this goal by investigating the involved fundamental science as a researcher (such as electrochemical ion insertion and electro-chemo-mechanics coupling), developing innovative technologies as an engineer (such as solid-state battery system and capacitive-deionization desalination system), and promoting matured solutions for SEE as an entrepreneur.

EDUCATION

<u>Postdoc Scholar</u>	<u>Lawrence Berkeley National Lab</u>	Aug,2017
Supervisor: Gerbrand Ceder	Material Science Division	~Aug, 2021
Research: <i>Electro-chemo-mechanics in solid-state energy storage system</i>		
<u>Ph.D.</u>	<u>University of California Berkeley</u>	Sep,2012
Advisor: Shaofan Li	Civil & Environmental Engineering	~Jun,2017
Dissertation: <i>Ion/water transport in 2D material for water desalination system</i>		
M.S./B.S.	Beijing Institute of Technology, China	Sep,2005
	Mechanical Engineering	~Dec,2011

PROFESSIONAL EXPERIENCE

<u>Assistant Professor</u>	Rochester Institute of Technology	Aug,2021
	Mechanical Engineering Department	~Present
Research: Sustainability and renewable energy systems		
<u>Graduate Research Assistant</u>	University of California Berkeley	Jan,2014
Advisor: Baoxia Mi	Environmental Engineering	~May, 2017
<u>Co-Founder & CEO</u>	CALSTERMER LLC	Sep,2014
Business scope: Design research-course curriculum for UCB extension		~Dec,2018

TEACHING EXPERIENCE

Graduate	Taught Time	Evaluation
Introduction to Computational Nano-mechanics	Spring,2017	4.6/5
Computational Micro-mechanics and Homogenization	Fall,2015	4.58/5
Undergraduate	Taught Time	Evaluation
Strength of Material	Since Fall,2021	4.2/5
Solid/Structural Mechanics and Finite Element	Spring,2016	4.51/5
Engineering Programming with MATLAB and Python	Spring,2015	4.45/5
Introductory Physics	Spring,2014	4.22/5

MENTORSHIP/VOLUNTEER EXPERIENCE

- ◆ Mentoring a group of 10 people (2 postdocs + 3 PhD students + 5 undergraduate assistants) in my CEE (clean energy and environment) lab.
- ◆ Supervised a team of high-school students on atomic simulation on water desalination, published two papers as corresponding author (peer-viewed paper #10-11).

- ◆ Volunteer as science facilitator for SAGE (Science Accelerating Girl's Engagement in STEM) 2020 for high school female students. (<https://conf.slac.stanford.edu/sage-2020/>)
- ◆ Served as a science communicator for BLDAP (Berkeley Lab Director's Apprenticeship Program) 2019 & 2020 for K-12 students. (<https://k12education.lbl.gov/>)
- ◆ Organizer of the workshop on Computational Nano-mechanics & Water desalination, Computational Nano & Soft Material Lab, summer, 2014~2015.

PUBLICATIONS & PRESENTATIONS & PATENTS

PATENTS

1. **Qingsong Tu**, Elijah Velazquez, Nathan CiviC. "An Open-Electrode Battery System for Harvesting Lithium from Brine Water." Provisional patent filed on September, 2022
2. S Chakravarthy, JJ Cho, **Qingsong Tu**, T Shi, G Ceder "All Solid-state Lithium-ion Cathode" US Patent App. 17/116,583, 2022.
3. **Tu Qingsong**, et al. "SOLID-STATE POSITIVE ELECTRODE, METHOD OF MANUFACTURE THEREOF, AND BATTERY INCLUDING THE ELECTRODE." U.S. Patent Application No. 16/459,896.
4. Shuxuan Liu, Weimin Zhang, Liang Yin, **Qingsong Tu**, Zhang Fan, Qianpeng Gao. 2012. Testing method and device for gear destruction. CN101923070A, filed Dec 22, 2010, and issued Apr 18, 2012.

Recent Articles under Review

1. Cao, Daxian, **Qingsong Tu*** (*Corresponding*), et al. "Revealing Li dynamics in mixed ionic-electronic conducting interlayer of all-solid-state batteries." *Nature Comm*, 2022, accepted.
2. Diaz, Megan, **Qingsong Tu*** (*Corresponding*), and Akihiro Kushima. "Nano-scale mechanism of crack nucleation/propagation and lithium penetration in solid electrolyte." *Nature Comm* 2022, under review.
3. XinXing Peng, **Qingsong Tu*** (*Corresponding*), et al. "Unraveling Li Growth Kinetics in Solid Electrolytes due to Electron Beam Charging". *Science Advance*, accepted
4. Mouhamad Diallo, **Qingsong Tu*** (*Corresponding*), et al. "Effect of Solid-Electrolyte Pellet Density on Failure of Solid-State Batteries". *Nature Energy* 2022, under review

First-author/corresponding-author Articles

1. Animesh Nanaware, **Qingsong Tu*** (*Corresponding*), et al. "Pneumatic Controlled Nano-Sieve for Efficient Capture and Release of Nanoparticles" *JVSTB* 2022, In Press
2. **Tu, Qingsong**, et al. "Understanding metal propagation in solid electrolytes due to mixed ionic-electronic conduction." *Matter* 4.10 (2021): 3248-3268.
3. **Tu Qingsong**, et al. "Electrodeposition and Mechanical Stability at Lithium-Solid Electrolyte Interface during Plating in Solid-State Batteries." *Cell Reports Physical Science* (2020): 100106.
4. Tan Shi*, **Qingsong Tu*** (Co-first), et al. "High Active Material Loading in All-Solid-State Battery Electrode via Particle Size Optimization." *Advanced Energy Materials* 10.1 (2020): 1902881.
5. Zheng, Sunxiang, **Qingsong Tu *** (Co-first), et al. "Correlating Interlayer Spacing and Separation Capability of Graphene Oxide Membranes in Organic Solvents." *ACS nano* (2020).
6. Wang Z.*, **Qingsong Tu*** (Co-first), Zheng, S., & Mi, B. (2020). Selective Lead Adsorptive Removal by Two-Dimensional MoS₂ Nanosheets and Membranes. *Environmental Science & Technology* (2020).
7. **Tu Qingsong**, et al. "A Molecular Dynamics Study on Rotational Nanofluid and Its Application to Desalination." *Membranes* 10.6 (2020): 117.
8. Chua Janel, and **Qingsong Tu*** (*Corresponding*), et al. "High-Temperature Nanoindentation Size Effect in Fluorite Material" *International Journal of Mechanical Sciences* (2019).
9. Janel C., and **Qingsong Tu*** (*Corresponding*). "Molecular Dynamics Study of Crosslinked Phthalonitrile Polymers: Effect of Crosslink Density on Thermomechanical Dielectric Properties. *Polymers* 10 (2018): 64
10. **Qingsong Tu*** (*Corresponding*), et al. "A scale-up nanoporous membrane centrifuge for reverse osmosis desalination without fouling." *Technology* 6.01 (2018): 36-48.

11. **Qingsong Tu*** (Corresponding), et al. "Study of the effect of osmotic pressure on the water permeability of carbon-based two-dimensional materials." *Computational Materials Science* 150 (2018): 9-14.
12. Wang Z.*, **Qingsong Tu*** (Co-first), Zheng, S., Urban, J. J., Li, S., & Mi, B. (2017). Understanding the Aqueous Stability and Filtration Capability of MoS₂ Membranes. *Nano letters*, 17(12), 7289-7298.
13. Zheng Sunxiang, **Qingsong Tu*** (Co-first), Jeffrey J. Urban, Shaofan Li, and Baoxia Mi. "Swelling of graphene oxide membranes in aqueous solution: characterization of interlayer spacing and insight into water transport mechanisms." *ACS nano* 11, no. 6 (2017): 6440-6450.
14. **Qingsong Tu**, and Shaofan Li. "An updated Lagrangian particle hydrodynamics (ULPH) for Newtonian fluids." *Journal of Computational Physics* 348 (2017): 493-513.
15. **Qingsong Tu**, Qiang Yang, Hualin Wang, and Shaofan Li. "Rotating carbon nanotube membrane filter for water desalination." *Scientific reports* 6 (2016).
16. **Qingsong Tu**, Michelle Lee, Samuel Zhang, and Shaofan Li. "Molecular dynamics simulations of ions diffusion in carbon nanotubes embedded in cell membrane." *Comput. Model Eng. Sci* 98 (2014): 247-259.
17. **Qingsong Tu**, et al. "Magnetic memory signals on surface defect of ferromagnetic specimen under plastic deformation condition." (ICDMA), 2010 International Conference on. Vol. 1. IEEE, 2010.
18. **Qing-song TU**, et al. "Study into Three-Dimensional Weak Magnetic Signal of Bolted Connection Under Static Tension Condition." *Transactions of Beijing Institute of Technology* 10 (2010): 006.
19. **Qing-Song Tu**, et al. "Magnetic Memory Testing on Detecting Stress Distribution of Mechanical Components with Weak Ferromagnetism." *Advanced Science Letters* 12.1 (2012): 73-77.

Conference Presentations

1. "ELECTRO-CHEMO-MECHANICS IN THE APPLICATION OF SOLID STATE BATTERIES". USACM MFEM 2022, Berkeley, CA, Sep 26, 2022
2. "Inter layer for anode-free architecture in SSBs." Material Research Society, Boston, MA, May 15, 2022.
3. "Electro-chemo-mechanical model for interfacial stability of Li metal anode and SE in the solid-state battery." LBNL Electrochem Seminar, LBNL, Berkeley, Jan 18, 2020.
4. "The mechanism for dendrite growth in SSBs." Material Research Society, Boston, MA, Dec 4, 2019.
5. "Solid Electrolytes Particle Size Effect in SSBs." Material Research Society, Boston, MA, Nov 24, 2018.
6. "First Principles Modeling and Design of Solid-State Interfaces for the Protection and use of Li Metal Anodes." Battery Material Research Modeling Meeting, UC Berkeley, CA, Sep 25, 2018
7. "Dendrite Modeling in All-Solid-State Battery." Vehicle Technologies Office Annual Merit Review, Washington DC, US, June 18, 2018.
8. "An Updated Lagrangian Particle Hydrodynamics (ULPH) for Newtonian Fluids." 14th U.S. National Congress on Computational Mechanics, Montreal, Canada, July 22, 2017.
9. "A non-local updated Lagrangian method for fluid dynamics". Berkeley/Stanford Compfest 2017, UC Berkeley, April 9, 2017.
10. "A new Peridynamic formulation for bubbly flows studies in three dimensions." World Congress on Computational Mechanics, South Korea, July 19, 2016.

AWARDS AND HONORS

WCCM (World Congress on Computational Mechanics) paper award	Jul,2016
UCB Department Award for Nano Research	Fall,2016
Berkeley Summer Research Grant	Summer,2015

PROFESSIONAL SERVICE

Reviewer/Editor for Journals

- ◆ Serve as reviewers for 40 journals: Science Advance, Small, Energy Storage Materials, Journal of Membrane Science, Journal of Fluids Engineering, Journal of Structural Engineering, Mechanics of Advanced Materials and Structures, J. of Micromechanics and Molecular Physics.

- ◆ Serve as editors for 3 journals: Frontiers in Energy Research, Membranes, MPDI-Batteries.

Academic Organization

- ◆ Session chair MRS: 2021-Fall, 2022-Spring; ECS-2022-Fall; MFEM-2022-Fall
- ◆ Co-organizer “Water Resources, Pollution, Remediation and Energy Policy”,
Chinese Environmental Scholars Forum, May 20-21, 2017
- ◆ Co-organizer “Entrepreneurship, Renewable Energy, Big Data, Robotics & AI”, Berkeley
Chinese Summit, Oct 19, 2016
- ◆ President Chinese Visiting and Scholar Association,
University of California Berkeley, 2014-2015
- ◆ Manager STEM and Innovative Programs for International High-School Students, UC
Berkeley Extension, Summer, 2016~2017.