

# Mengyao Yuan, Ph.D.

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## **ENERGY AND ENVIRONMENTAL ECONOMICS, INC.** *Senior Consultant*

San Francisco, CA

Dr. Yuan joined E3 in 2019 after conducting postdoctoral research through the Carnegie Institution for Science that modeled and analyzed near-zero-emission energy systems. She completed her Ph.D. in Energy Resources Engineering from Stanford University in 2018. Her doctoral research, published in the *International Journal of Greenhouse Gas Control*, investigated membrane-based carbon capture from a natural gas power plant with flexible electricity output. Dr. Yuan brings with her both an extensive research background in energy systems modeling and analysis, and a fluency with technical tools including Python, MATLAB, and R. She primarily works in E3's planning group, where she helps utilities, system operators, and state agencies prepare for a high renewables future. Dr. Yuan, a native speaker of Mandarin Chinese, also earned a BEng from the Hong Kong University of Science and Technology and an M.S. in Environmental Engineering and Science from Stanford University.

## **CARNEGIE INSTITUTION FOR SCIENCE** *Postdoctoral Research Scientist*

Stanford, CA  
January 2018 – May 2019

- Modeled and analyzed near-zero-emission energy systems to inform investment and policymaking (Adviser: Dr Ken Caldeira)
- Attended and provided logistical support for the international workshop, "Energy for Development in a Carbon-constrained World (EDC2018)"

## **STANFORD UNIVERSITY** *Graduate Researcher*

Stanford, CA  
April 2013 – January 2018

- Investigated techno-economic modeling and optimization of membrane separation processes for CO<sub>2</sub> capture from coal and natural gas power systems
- Performed ex-situ and operando characterization (XPS, SEM, XRD) of metallic membrane materials for carbon capture and hydrogen purification

## **NATURAL RESOURCES DEFENSE COUNCIL** *Schneider Fellow*

Beijing, CHINA  
Summer 2015

- Co-authored, edited, and translated (English/Chinese) policy reports on demand-side management, electric vehicles, and renewable energy integration for stakeholders
- Assisted in organizing conferences and workshops for policymakers, industry leaders, and researchers

## **CARBON RECYCLING INTERNATIONAL**

*Research & Development Intern*

Reykjavik, ICELAND

Summer 2013

- Developed Excel models to evaluate lifecycle emissions of various renewable methanol production pathways
- Conducted country-level case studies and made recommendations for potential plant locations

## **STANFORD ENVIRONMENTAL CONSULTING**

*Consultant*

Stanford, CA

April 2012 – April 2013

- Conducted lifecycle assessment of several recyclable products using SimaPro and Excel

## **INDUSTRIAL TECHNOLOGY RESEARCH INSTITUTE (ITRI)**

*Research Intern*

Hsinchu, TAIWAN

Summer 2012

- Conducted a literature review on metal-organic frameworks (MOFs) and received laboratory training in MOF synthesis and characterization
- Performed process modeling and identified membrane materials suitable for oxygen enrichment

## Education

Stanford University

*Ph.D., Energy Resources Engineering*

*M.S., Environmental Engineering and Science*

Stanford, CA

2018

2013

The Hong Kong University of Science and Technology

*BEng, Chemical Engineering (with First Class Honors)*

Hong Kong

2011

## Citizenship

China

## Peer-Reviewed Publications

1. **Yuan, M.**, H. Teichgraber, J. Wilcox, and A.R. Brandt. 2019. "Design and operations optimization of membrane-based flexible carbon capture." *International Journal of Greenhouse Gas Control* 84: 154–163.
2. **Yuan, M.**, K. Lee, D.G. Van Campen, S. Liguori, M.F. Toney, and J. Wilcox. 2018. "Hydrogen purification in palladium-based membranes: An operando x-ray diffraction study." *Industrial & Engineering Chemistry Research* 58(2): 926–34.
3. **Yuan, M.**, S. Liguori, K. Lee, D.G. Van Campen, M.F. Toney, and J. Wilcox. 2017. "Vanadium as a potential membrane material for carbon capture: Effects of minor flue gas species." *Environmental Science & Technology* 51(19): 11459–67.

4. Tsai, C., K. Lee, J.S. Yoo, [et al., including **M. Yuan**], J. Wilcox, and J.K. Nørskov. 2016. Direct water decomposition on transition metal surfaces: Structural dependence and catalytic screening." *Catalysis Letters* 146(4): 718–24.
5. Lee, K., **M. Yuan**, and J. Wilcox. 2015. "Understanding deviations in hydrogen solubility predictions in transition metals through first-principles calculations." *Journal of Physical Chemistry C* 119(34): 19642–53.
6. **Yuan, M.**, K. Narakornpijit, R. Haghpanah, and J. Wilcox. 2014. "Consideration of a nitrogen-selective membrane for postcombustion carbon capture through process modeling and optimization." *Journal of Membrane Science* 465: 177–84.