

CURRICULUM VITAE

Haiqing Lin, Ph.D., Professor

Department of Chemical and Biological Engineering
University at Buffalo (UB), The State University of New York (SUNY)
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EDUCATION:

- 2005 Ph.D. Chemical Engineering The University of Texas at Austin
- 2001 M.S. Chemical Engineering North Carolina State University
- 1999 M.S. Chemical Engineering Xiamen University, P.R. China
- 1996 B.S. Chemical Engineering Xiamen University, P.R. China

PROFESSIONAL EXPERIENCE:

- Aug. 2021 – present Professor, University at Buffalo, SUNY
- Aug. 2018 – Jul. 2021 Associate Professor, University at Buffalo, SUNY
- Aug. 2013 – Jul. 2018 Assistant Professor, University at Buffalo, SUNY
- Sep. 2005 – Jul. 2013 Senior Research Engineer and Team Leader, Membrane Technology and Research, Inc. (MTR), Newark, CA

MAJOR RESEARCH INTERESTS

- Advanced membranes for gas separations such as carbon capture
- Advanced membranes for water purification
- Small molecular transport in polymeric materials
- Structure/property relationship of polymer-based materials

ACADEMIC AWARDS / SCHOLARSHIPS

- 2024 Academic Leadership Development Program (ALDP) Leadership Fellow of Mid-American Conference (MAC)
- 2022 SUNY Chancellor's Award for Excellence in Scholarship and Creative Activities
- 2021 Exceptional Scholar: Sustained Achievement Award, University at Buffalo
- 2021 Buffalo Blue Sky Gold Coin, University at Buffalo
- 2020 AIChE Separation Division Innovation Award
- 2019 Buffalo Blue Sky Gold Coin, University at Buffalo
- 2016 CAREER Award, National Science Foundation
- 2015 SEAS Early Career Researcher of the Year Award, University at Buffalo
- 2011 Distinguished Alumni Award, Chemical Engineering of Xiamen University
- 2006 University of Texas CO-OP Research Excellence Award for Best Research Paper
- 2006 AIChE Separation Division Graduate Student Research Award
- 1999 DuPont Fellowship, Xiamen University

HONORS

- Specialty Chief Editor of *Frontiers in Environmental Chemistry*

- Editorial board member of *Carbon Capture Science and Technology*, *Journal of Membrane Science*, *Journal of Membrane Science Letters*, *Journal of Polymer Science*, *Membranes*, and *Scientific Reports*
- 2020 I&EC Research Excellence in Review Awards
- 2020 Contributor to *Future Series* of AIChE Journal
- 2017 I&EC Research Excellence in Review Awards

AWARDS OF GRADUATE STUDENTS AND POSTDOCTORAL RESEARCHERS

2023:

- Talieh Alebrahim: Graduate Research Award of Membranes of AIChE Separation Division
- Leiqing Hu: IChemE & CCST Young Investigator (YI) Award
- Narjes Esmacili: Elias Klein traveling award from NAMS

2022:

- Ameya Tandel: Elias Klein traveling award from NAMS

2021:

- Vinh Bui: Elias Klein traveling award from NAMS
- Xiaoyi Chen: ACS I&EC Division Graduate Student Award Symposium

2020:

- Xiaoyi Chen: Women in Chemical Engineering (WIC) Travel Award of AIChE
- Talieh Alebrahim: Elias Klein traveling award from NAMS;
- Talieh Alebrahim: Women in Chemical Engineering (WIC) Travel Award of AIChE
- Thien Tran: Graduate Research Award of Membranes of AIChE Separation Division

2019:

- Liang Huang: Young Investigator Fellowship from NAMS
- Junyi Liu: Graduate Research Award of Membranes of AIChE Separation Division
- Thien Tran: Student Speaker Award by the CBE Department
- Hien Nguyen: First Prize Poster Award of Separation Division at AIChE
- Hien Nguyen: First Prize Poster Award at Graduate Research Symposium of CBE
- Xiaoyi Chen: Elias Klein traveling award from NAMS

2018:

- Lingxiang Zhu: Chinese Government Award for Outstanding Self-financed Students Abroad
- Lingxiang Zhu: Graduate Research Award of Membranes of AIChE Separation Division
- Lingxiang Zhu: Student Fellowship from NAMS
- Lingxiang Zhu: Dean's Graduate Achievement Award from UB
- Nima Shahkaramipour: First Prize Poster Award at NAMS
- Nima Shahkaramipour: First Prize Poster Award at Graduate Research Symposium of CBE
- Nima Shahkaramipour: A&WMA Student Award
- Junyi Liu: Student Speaker Award by the CBE Department
- Thien (James) Tran: Finalist of ACS Graduate Research Award of PMSE
- Hien Nguyen: Third Prize Poster Award from NAMS
- Hien Nguyen: Elias Klein traveling award from NAMS

2017:

- Lingxiang Zhu: Finalist of AIChE Graduate Research Award of Polymers

- Lingxiang Zhu: Student Speaker Award by the CBE Department
- Milad Yavari: Air & Waste Management Association (A&WMA) Scholarship
- Junyi Liu: Student Speaker Award by the CBE Department
- Thien (James) Tran: Elias Klein traveling award from NAMS

2016:

- Nima Shahkaramipour: 2nd place NY P2I Student Competition by Pollution Prevention Program
- Nima Shahkaramipour: Elias Klein traveling award from NAMS

2015:

- Lingxiang Zhu: Elias Klein traveling award from NAMS

PROFESSIONAL MEMBERSHIPS AND ACTIVITIES

- Board member of North American Membrane Society (NAMS) (2020-2023)
- Director of Separation Division of AIChE (2019 – 2024)
- Vice-chair and chair of Membranes Area of Separation Division of AIChE (2015 – 2019)
- American Association for the Advancement of Science (AAAS), Member
- American Chemical Society (ACS), Member
- American Institute of Chemical Engineers (AIChE), Senior Member
- North American Membrane Society (NAMS), Member

UNIVERSITY SERVICES

- Member, Faculty Search Committee for Chemistry, September 2018, 2023
- Member, Faculty Search Committee for RENEW, September 2016 – April 2017
- Focus area leader, RENEW, 2022 - present

SCHOOL COMMITTEES

- Member, Tenure and Promotion Committee, September 2018 – 2021
- Member, Academic grievance, September 2015 - present

DEPARTMENT COMMITTEES

- Director of Graduate Studies, January 1, 2022 - present
- Member, Graduate Study Committee, September 2018 – present
- Member, Faculty Search Committee, September 2015 – April 2017
- Member, Faculty Search Committee, September 2015 – April 2017
- Member, Undergraduate Study Committee, September 2014 – August 2018
- Member, Annual Graduate Research Symposium, September 2013 – July 2018

PROFESSIONAL SERVICES

Editor and Symposium Organizer

- Editor of Scientific Reports (2016-present)
- Editorial board member of Journal of Membrane Science Letter (2021-present)
- Editorial board member of Journal of Polymer Science (2021-present)
- Editorial board member of Membranes (2020-present)
- Editorial board member of Advances in Polymer Technology (2018-present)
- Editorial board member of Heliyon (2018-2020)
- Editor of Frontiers in Environmental Chemistry (2020- present)

- Guest editor of a special issue entitled “Polymeric Membranes: Chemistry, Physics, and Applications” for *Journal of Polymer Science* (2020)
- Guest editor of a special issue entitled “Polymeric Membranes for Gas Separation” for *Membranes* (2018)
- Symposium organizer of ACS Pacificchem “Polymeric, inorganic, and hybrid materials for breakthrough membrane applications: advancing the science, engineering and process design” (December 2021)
- Symposium co-organizer of MRS Advanced Membranes for Energy-efficient Molecular Separation and Ion Conduction (November 2019)
- Symposium co-organizer of MRS Functional Nanostructured Polymers for Emerging Energy Technologies (November 2016)
- Symposium co-organizer of ACS Polymeric Materials Science and Engineering (PMSE) “Nanostructured Porous Polymers: Synthesis, Property, and Function” (March 2015)

Journal Reviewer (>50 manuscripts per year)

Accounts of Chemical Research; ACS Applied Materials and Interfaces; ACS Applied Polymers; ACS Macro Letters; ACS Nano; Advanced Functional Materials; Advanced Materials; AIChE Journal; Chemistry of Materials; Energy & Environmental Science, Industrial & Engineering Chemistry Research; Journal of Materials Chemistry A; Journal of Membrane Science; Journal of Polymer Science; Macromolecules; Membranes; Nano Letter; Nature Communications; Polymer; Progress in Polymer Science; Science; Science Advances

Proposal Reviewer

- NSF Review Panel (2014 - 2024)
- ACS Petroleum Research Fund Program (2014-2024)
- DOE ARPA-E (2020); SBIR (2019, 2021-2023)
- University of Wisconsin-Milwaukee Research Foundation (2018, 2020, 2021)
- UK EPSRC Program (2014-2017)
- Israel Science Foundation and Agricultural Research and Development Fund (2013, 2017 - 2020)
- Czech Science Foundation (2018 – 2021)
- Singapore A*STAR (2021)

COURSES TAUGHT

- CE540 Materials Principles (Fall), 30-50 graduate: 2017 - present
- CE318 Heat and Mass Transfer (Spring), 60 – 90 undergraduates: 2014 - 2020
- CE500 Materials Characterization (Fall), 20-40 graduate: 2014 - 2016

RESEARCH SUPERVISION

Prior Advisees

- Postdocs (3): *Wenji Guo* (Huazhong University of Science and Technology), Liang Huang (Huazhong University of Science and Technology), James Tran (DOE NETL)
- Ph.D. students (10): Gengyi Zhang, *Taliehsadat Alebrahim*, *Xiaoyi Chen* (August 2021, GAF Energy); Hien Nguyen (May 2020, Repligen Corporation); Thien Tran (May 2020, DOE NETL); Nima Shahkaramipour (December 2019, Pentair); *Maryam Omidvar* (May 2019, Technical University of Denmark); Junyi Liu (December 2018,

Air Liquide); Milad Yavari (December 2017, SRI International); Lingxiang Zhu (December 2017, DOE National Energy Technology Laboratory)

- M.S. students (31): Kai Chen, *Mengqi Yuan*, Varun Reddy Satti (Genista Biosciences), Manas Agarwal, *Shweta Singh* (PhD at UB), Nicholas Rawda (VanDeMark Chemical), Skye Schaefer (Air Liquide), Sankhajit Pal (Intel), *Krista Clark* (Pall), *Alisa Chakraborty* (PhD at Penn State), Himangshu Mondal (PhD at Alabama), *Xiao-Ci Lin*, Darius Rub (Thermal Fisher Scientific), Erda Deng (PhD at UB), *Riliwan Sanni (African American)* (Energy Materials Corporation), *Janavi Gohil* (Pall), Sarthak Doshi (Cytiva), Gengyi Zhang (PhD at UB), Weiguang Jia (BiopepTek), *Shabdiki Chaurasia* (UMass, Lowell), *Xiaoyi Chen* (GAF Energy), *Haley Valentine* (Thermo Fisher Scientific), Praphulla Mandadapu (India), *Yichen Tu* (Intel), Sankara Ramanan (Dynatemp Refrigerants Company), Nachiket Paranjape (Yahoo), Xianda Hou (Daqing Pure Hemp Technology Corp.), Junyi Liu (Air Liquide), Shawreen Shah (Akorn), Benjamin Lam (Helios-NRG), and Shizhong Zhao (BiopepTek)
- Undergraduate Researchers (49): Chintan Shah, *Elizabeth Haddad* (2022); *Elizabeth Jacobia* (2021); Vinh Bu, Nicholas Rawda, and Skye Schaefer (2020); Vinh Bu, *Wilhemina Duah*, Zhihao Feng, *Sarah Howard*, Mohamed Kawy, Robert Kirsits, Omran Omar, Darius Rub, and Skye Schaefer (2019); *Tanahiry Escamilla*, Suting Huang, Zhihao Feng, Chen Lin, Mohamed Kawy, and Omran Omar (2018); *Stephanie Hall*, Suting Huang, Mingi Ji, *Fleurie Kelley*, Chen Lin, and Yash Savla (2017); *Jennifer Park*; Hunter Steven; *Sumbal Zaman*; *Tanahiry Escamilla*; *Beatrices Bacolod*; and Chris Chan (2016); Ananthan Balachandran; Kaipin Huang; James Kim; Tho Le; John Schneible; Brandon Chin; Ryan Fair; Ken He; *Azza Hosny*; Tony Huynh; *Vivian Huyhn*; and Norman Ng (2015); and Po-Han Chen; *Dana Havas*; Weiguang Jia; and Min Wei (2014)

Current Advisees

- Postdocs (2): Leiqing Hu, Gengyi Zhang
- Ph.D. students (9): Fathy Attia, Vinh Bui, Kai Chen, Sagnik Das, Erda Deng, *Narjes Esmaeili*, Farhang Pazanialenjareghi, *Shweta Singh*, and Ameya Tandel
- M.S. students (4): Sai Srikar Chundury, Ruveen Dias, Shiwen Dong, and Bhanuprakash Valluri

GRANTS AND CONTRACTS AT UB

To date (April 2024), Prof. Lin has secured more than **\$16 M** for his laboratory from federal, state, industrial, and international funding agencies. His laboratory has been involved with various projects with total awards of **≈\$26 M**.

As PI of Federal Grants and Contracts

1. Catalytic Membrane Reactors Based on Carbon Molecular Sieve Hollow Fiber Membranes for Sustainable and Modular H₂ Production, PI: Haiqing Lin, 10/1/2022 – 9/30/2024, Department of Energy National Energy Technology Laboratory and Empire State Development Division of Science, Technology & Innovation (NYSTAR), \$2,100,000 (35% share)
2. Tunable Two-Dimensional (2D) Porous Material/Polymer Composite Hollow Fiber Membranes for Advanced Water Resource Recovery, PI: Haiqing Lin, 9/1/2021 –

- 7/31/2025, Department of Energy, Office of Energy Efficient & Renewable Energy, \$2,000,000 (20% share)
3. PFI-TT: Development of Polymeric Organosilica Membranes for Hydrogen Purification at 100 – 300 °C, PI: Haiqing Lin, 1/1/2021 – 12/31/2023, National Science Foundation, \$249,998 (95% share)
 4. Membrane Adsorbents Comprising Self-Assembled Inorganic Nanocages (SINCs) for Super-fast Direct Air Capture Enabled by Passive Cooling, PI: Haiqing Lin, 10/1/2020 – 12/31/2022, Department of Energy National Energy Technology Laboratory, \$800,000 (35% share)
 5. Rational Development of Novel Metal-Organic Polyhedra-based Membranes for CO₂ Capture, PI: Haiqing Lin, Co-PIs: Tim Cook, Tim Merkel, Andrew Sexton, Chulsung Bae, and Zhen-Gang Wang, 7/1/2019 – 6/30/2024; Department of Energy National Energy Technology Laboratory, \$2,857,557 (25% share)
 6. Rational Development of Novel Metal-Organic Polyhedra-based Membranes for CO₂ Capture, PI: Haiqing Lin, Co-PI: Tim Cook, 7/1/2019 – 6/30/2024; Empire State Development Division of Science, Technology & Innovation (NYSTAR) \$599,999 (50% share)
 7. Development of ultrahigh-flux hollow fiber membranes based on carbon molecular sieve with superior H₂/CO₂ separation properties, PI: Haiqing Lin, Co-PIs: Andrew Sexton and Raj Singh, 10/1/2018 – 12/31/2021; Department of Energy National Energy Technology Laboratory, \$800,000 (67% share)
 8. CAREER: SusChEM: Design and Discovery of Polymers with Pendant Rings for Membrane Gas Separations, PI: Haiqing Lin, 3/1/16-2/28/22, National Science Foundation (1554236), \$500,000 (100% share)
 9. Collaborative Research: SusChEM: Molecular Design of Durable Lewis Basic Elastomeric Membranes for Clean Energy Conversion and CO₂ Separation, PI: Haiqing Lin, 7/1/15 - 6/30/19, National Science Foundation (1506211), \$180,102 (100% share)
 10. AOI [1L2] Sorption Enhanced Mixed Matrix Membranes for CO₂ Capture from Precombustion Processes, PI: Haiqing Lin, Co-PI: Mark Swihart and Tim Merkel, 10/1/15 - 12/31/19, DOE NETL, \$1,470,099 (50% share)

As PI at UB for Federal Grants and Contracts

1. CO₂-philic Block Copolymers with Intrinsic Microporosity for Postcombustion CO₂ Capture (DE-SC0020730), co-PI: Haiqing Lin, 7/2023 – 7/2025, Department of Energy SBIR Phase 2A through Helios-NRG, LLC, \$1,000,000 (34% share)
2. Engineering-Scale Testing and Validation of Algae-Based Technology and Bi-Products, PI: Haiqing Lin, 10/1/2021 – 9/30/2024, Department of Energy and Helios-NRG, \$2,000,000 (\$200,000 share)
2. CO₂-philic Block Copolymers with Intrinsic Microporosity (BCPIMs) for Postcombustion CO₂ Capture, PI: Ravi Prasad, Co-PI: Haiqing Lin, 9/1/2021 – 8/31/2023, Department of Energy STTR Phase II Program through Helios-NRG, \$1,500,000 (\$500,000 share)
3. Novel Algae Technology to Utilize CO₂ for Value Added Products, PI: Ravi Prasad, Co-PI: Haiqing Lin, 7/1/2019 – 6/30/2022, Department of Energy National Energy Technology Laboratory through Helios-NRG (DE-FE-0031710), \$1,499,558 (\$200,000 share)
4. Development of Self-Assembly Isoporous Supports Enabling Transformational Membrane Performance for Cost-Effective Carbon Capture, PI: Hans Wijmans, Co-

- PIs: Haiqing Lin, 4/1/18 – 10/31/22; Department of Energy National Energy Technology Laboratory, \$2,907,219 (\$377,938 share)
5. CO₂-philic Block Copolymers with Intrinsic Microporosity (BCPIMs) for Postcombustion CO₂ Capture, PI: Ravi Prasad, Co-PI: Haiqing Lin, 6/29/2020 – 7/28/2021, Department of Energy STTR Phase I Program through Helios-NRG (DE-SC0020730), \$256,420 (\$150,000 share)
 6. Novel Algae Technology for CO₂ Utilization, PI: Ravi Prasad, Co-PI: Haiqing Lin, 5/20/21–12/31/20, DOE SBIR Phase II, \$1,000,000 (\$200,000 share)
 7. Scalable Polymerized Metal-Organic Frameworks with CO₂-philic Rubbery Polymers for Membrane CO₂/N₂ Separation, PI: Ravi Prasad, Co-PI: Haiqing Lin, 7/2/18 – 4/1/19, DOE STTR Phase I, \$150,000 (\$75,000 share)
 8. Novel Algae Technology for CO₂ Utilization, PI: Ravi Prasad, Co-PI: Haiqing Lin, 2/21/17–11/20/17, DOE SBIR Phase I, \$150,000 (\$45,000 share)
 9. Novel Integrated Technology Incorporating Anti-fouling Membranes to Dewater Algal Harvests, PI: Ravi Prasad, Co-PI: Haiqing Lin, 6/8/15 - 3/7/16, DOE SBIR Phase I, \$150,000 (\$45,000)
 10. Advanced Membrane Technology for Helium Recovery, PI: Ravi Prasad, Co-PI: Haiqing Lin, 4/1/14 - 3/31/15, DOE SBIR Phase 2, \$1,000,000 (\$10,000 share)

As co-PI at UB for Federal Grants and Contracts

1. Technologies for One Water in Extremely Resilient-buildings (TOWER), PI: Diana Aga, Co-PI: Martha Bohm, Ning Dai, and Haiqing Lin, 11/1/2022 – 10/31/2025, National Science Foundation, \$1,500,000 (\$375,000 share)
2. Manufacturing USA: GOALI: Designing Catalytic Membrane Reactors (CMRs) for Low-Temperature CO₂ Utilization and Methane Dry Reforming, PI: Mark Swihart, Co-PI: Haiqing Lin, Carl Lund, and Shiguang Li, 9/1/18-8/31/21, National Science Foundation (1804996), \$360,000 (\$120,000 share)
3. Laser Chip Lithography-Patterned Nanomembranes for Wastewater Treatment, PI: Liang Feng, Co-PI: Haiqing Lin, 9/1/16-8/31/20, National Science Foundation (1635026), \$250,000 (\$87,000 share)
4. Innovative Seawater Desalination Systems Coupling Peroxide Oxidation and Reactive Graphene Oxide Modified Membranes, PI: Ning Dai, Co-PI: Haiqing Lin, 3/1/18 – 8/31/19, Department of Interior (R17AC00147), \$150,000 (\$75,000 share)
5. Nanoporous Membranes Based on Sub-Nanometer Pores, PI: Bing Gong, Co-PI: Haiqing Lin, 6/15/15-5/31/19, National Science Foundation (1512164), \$300,000 (\$45,000 share)

Industries and Internal Agencies

1. Evaluation of anti-fouling membranes, PI: Haiqing Lin, 9/1/2021 – 8/31/2022, Rochester Institute of Technology, \$9,484
2. Nanofiltration membranes for Li recovery, PI: Haiqing Lin, 12/5/14 – 6/5/15, FMC, \$3,600 (100% share)
3. Membrane Testing for Lubrizol, PI: Haiqing Lin, 12/5/14 – 6/5/15, Lubrizol, \$8,995 (100% share)
4. Study of Chlorine Adsorption in Scrubber Bed Material, PI: Mark Swihart, Co-PI: Haiqing Lin, 8/1/14-10/31/14, AVOX Systems, \$13,972 ((\$6,986 share))
5. Stable Ultrathin Film Composite Membranes with High CO₂ Flux, PI: Haiqing Lin, 6/1/14 - 5/31/17, Korea Carbon Capture and Sequestration R&D Center, \$400,000 (100% share)

New York State, SUNY, and UB Internal Funding

1. Rational Design of Mixed Matrix Membranes for the Production of Blue and Green Hydrogen, PI: Haiqing Lin, Co-PI: Mark Swihart, 10/1/2021 – 7/31/2022, University at Buffalo, \$49,997 (\$24,999 share)
2. Facile fabrication of high performance membranes for industrial gas separations, PI: Haiqing Lin, 2/1/2021 – 10/31/2021, University at Buffalo Technology Accelerator Program, \$66,000 (100% share)
3. Advanced materials for carbon utilization, PI: Nirupam Aich, Co-PIs: Haiqing Lin and Gang Wu, 2/1/2021 – 1/31/2023, Buffalo Blue Sky by University at Buffalo, \$45,000 (\$20,000 share)
3. Molecular-level design of conductive polymer electrolytes for electrochemical energy storage, PI: Tim Cook, Co-PIs: Haiqing Lin and Javid Rzayev, 6/13/19 – 6/30/21, Buffalo Blue Sky by University at Buffalo, \$45,000 (\$20,000 share)
4. Rational Development of Robust Membranes for Nitrate Removal from Wastewater, PI: Haiqing Lin, Co-PI: Jeffrey Errington, 10/1/17 – 9/30/18, Stony Brook University, \$35,000 (\$17,500 share)
5. Mixed Matrix Membranes Comprising Polymers and Metal-Organic Polyhedra for Olefin/Paraffin Separation, PI: Tim Cook, Co-PI: Haiqing Lin, 1/15/17 – 1/14/18, UB IMPACT, \$32,000 (\$16,000 share)
6. Zero Energy Adaptive Façade (ZEAF) for Energy Efficient Buildings, PI: Haiqing Lin, Co-PI: JinYoung Song and Jongmin Shim, 4/1/16-3/31/17, UB SMART, \$34,981 (\$11,660 share)
7. Isoporous Ultrafiltration Membranes by Self-Assembly of Block Copolymers for Water Purification, PI: Javid Rzayev, Co-PI: Haiqing Lin, 2/1/16-1/31/17, UB IMPACT, \$35,000 (\$17,500 share)
8. IMPACT: Robust Nanoscale-Patterned Membranes for Wastewater Treatment Using Laser Chips-Based Lithography, PI: Liang Feng, Co-PI: Haiqing Lin, 5/15/15 - 4/14/16, UB IMPACT, \$34,354 (\$11,451 share)
9. Development of Advanced Membrane Materials for Industrial Gas Separation and Water Reuse, PI: Haiqing Lin, 2/1/15 – 6/30/15, UB CMI, \$25,000 (100% share)
10. Nanostructured Membranes with Sub-Nanometer Channels for Energy Efficient Seawater Desalination and Food Processing, PI: Haiqing Lin, Co-PI: Bing Gong, 9/1/14 – 8/31/15, UB RENEW, \$25,300 (100% share)
11. Feasibility Study of Antifouling Membranes for Wastewater Reuse, PI: Haiqing Lin, Co-PI: Chong Cheng, 8/1/14 - 12/31/16, NY Pollution Prevention Program, \$93,925 (100% share)
12. Ultrathin High Flux Atomic Layer Deposited (ALD) Metal Membranes for Green H₂ Production, PI: Uttam Singiseti, Co-PI: Haiqing Lin and Qiaoqiang Gan, 4/1/14 - 3/31/15, UB IMPACT, \$34,947 (\$11,649 share)

GRANT AND CONTRACT BEFORE UB

16. California Energy Commission, Energy Innovations Small Grant Programs, “Prototype and Demonstration of Membrane Processes for Natural Gas Dehydration,” \$94,995, 1/2012-12/2012
15. DOE Small Business Innovation Program (SBIR) Phase II, “Advanced Membrane Technology for Helium Recovery,” \$67,000, 11/2011 – 9/10/13, [subcontractor to Helios-NRG (PI)]
14. EPA SBIR Phase II, “Novel Membrane Process to Utilize Dilute Methane Streams,” \$225,000, 5/2011 – 4/2013

13. DOE SBIR Phase I, "Novel Thermally Rearranged Polymers for Olefin-Paraffin Separations," \$150,000, 6/2011 – 3/2012 (with University of Texas at Austin)
12. EPA SBIR Phase I, "Novel Membranes for Natural Gas Dehydration," \$80,000, 3/2011 – 8/2011
11. DOE SBIR Phase III Xlerator program, "Field Demonstration of CO₂ Capture from Coal-Derived Syngas," \$1,499,990, 9/2010 – 6/2013
10. DOE Industrial Technology Program Grand Challenge Project, "Novel Membrane and Processes for Oxygen Enrichment," \$385,819, 8/2010 – 8/2011 (with Gas Technology Institute and Tetramer Technology)
9. EPA SBIR Phase I, "Novel Membrane Process to Utilize Dilute Methane Streams," \$70,000, 3/2010 – 9/2010
8. EPA SBIR Phase I, "High Flux Membranes to Upgrade Biogas from Anaerobic Digesters," \$70,000, 2/2009 – 7/2009
7. DOE SBIR Phase II, "Membrane System for Coal Bed CO₂ Sequestration and Methane Production," \$750,000, 8/2008 – 7/2010
6. NSF SBIR Phase II, "New Synthesis Approach to High Performance, Low Cost CO₂/CH₄ Gas Separation Membranes," \$500,000, 2/2008 – 2/2010 (subcontract to Tetramer Technologies)
5. EPA SBIR Phase II, "A Membrane Pre-concentrator for Portable Trace VOC Detector," \$225,000, 5/2007 – 4/2009
4. DOE NETL, "Membrane Process to Sequester CO₂ from Power Plant Flue Gas," \$800,000, 4/2007 – 3/2009 (I participated in this project, which led to the second and third phases of the technology development with a total funding of \$20,000,000 from DOE)
3. DOE SBIR Phase I, "Energy-Efficient Process to Utilize Dilute Methane Emissions," \$100,000, 9/2006 – 3/2007
2. EPA SBIR Phase I, "A Membrane Pre-concentrator for Portable Trace VOC Detector," \$70,000, 2/2006 – 8/2006
1. DOE SBIR Phase II, "Stable Membranes for Separating Hydrogen Containing Petrochemical and Refinery Stream," \$750,000, 7/2005 – 7/2007

PUBLICATIONS

- Google Scholar Citation of 9352 in total; H-index: 45; i10-index: 97 (2/1/2023)
- Link: <https://scholar.google.com/citations?user=7cxhEhwAAAAJ&hl=en>
- ORCID: <https://orcid.org/0000-0001-8042-154X>

Patents and Applications

10. L. Zhu, L. Huang, M.T. Swihart, and H. Lin, "Organosilica membrane compositions, devices comprising such membranes, and methods for making and using" Patent Application, No. 62/962,809 (January 17, 2021); WO2021146733A1 (published July 22, 2021).
9. J. Rzayev, J. Mapas, and H. Lin, "Ultrahigh Molecular Weight Block Copolymers and Polymers, Methods of Making Same, and Uses of Same", US Patent Application 2020062882A1 (May 4, 2018), and WO Patent Application PCT/US2018/031215 (May 4, 2018)
8. N.P. Wynn, H. Lin, A. M. Zhou, J. Ly, and T. C. Merkel, "Low-energy process to produce oxygen-enriched air using membrane technology," US Patent Application 13/439,716 (April 1, 2012), Publication US20130263734A1.

7. N.P. Wynn, H. Lin, M. Zhou, J. Ly, A. Serbanescu-Martin, "Membrane-Based Gas Separation Process Using Ejector-Driven Gas Recycle," US Patent Number 9,017,451 B2 (April 28, 2015).
6. N.P. Wynn, S. Thomas-Doz, M. Zhou, J. He, and H. Lin, "Process for the Production of Methanol Including Two Membrane Separation Steps," US Patent Number 8,623,926 B2 (January 7, 2014).
5. N.P. Wynn, D.E. Gottschlich, and H. Lin, "Gas separation process for production of hydrogen by autothermal reforming of natural gas, with carbon dioxide recovery," US Patent 8,771,637 B2 (July 8, 2014).
4. J.G. Wijmans, T.C. Merkel, H. Lin, S. Thompson, and R. Daniels, "Efficient gas separation process to upgrade dilute methane stream for use as fuel," US Patent 8,128,733 B2 (March 6, 2012).
3. R.W. Baker, J.G. Wijmans, T.C. Merkel, H. Lin, R. Daniels, and S. Thompson, "Combustion systems, power plants, and flue gas treatment systems incorporating sweep-based membrane separation units to remove carbon dioxide from combustion gases," US Patent 8,016,923 B2 (September 13, 2011).
2. R.W. Baker, J.G. Wijmans, T.C. Merkel, H. Lin, R. Daniels, and S. Thompson, "Gas separation processes using membranes with permeate sweep to remove CO₂ from combustion gases," US Patent 7,964,020 B2 (June 21, 2011).
1. B.D. Freeman, S. Matteucci, and H. Lin, "Metal oxide nanoparticle filled polymers," U.S. Patent 7,510,595 B2 (March 31, 2009), International Publication Number WO 2007/084169 A2.

Refereed Journal Articles (* denotes graduate students and postdocs advised by Prof. Lin, + denotes undergraduate student, § denotes the corresponding author)

2024

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Book Chapters

7. X. Chen, F. Shi, D. Hopkinson, H. Lin, and S. Yi, Membrane Technologies and Applications to Produced Water Treatment, *Solid-Liquid Separation Technologies*, CRC Press, (2022)
6. X. Hou, J. Liu, H. Nguyen, and H. Lin, "Doping Polymers with Ionic Liquids to Manipulate Morphology and Membrane Gas Separation Properties," in *Polymerized Ionic Liquids*, Edited by A. Eftekhari, Royal Society of Chemistry, 262-279 (2018)
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2. V.A. Kusuma, H. Lin, B.D. Freeman, M. Yose-Yacaman, S. Kalakkunnath, and D.S. Kalika, "Structure/property characteristics of polar rubbery polymeric membranes for carbon dioxide removal from mixtures with light gas," in *Membranes: Manufacturing Utilizing Six Sigma and Applications*, edited by N.N. Li, A.G. Fane, W.S.W. Ho, and T. Matsuura, Wiley, New York, pp. 929-953 (2008).
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INVITED TECHNICAL PRESENTATIONS

69. H. Lin, "The role of thin polyethylenimine films in direct air capture of CO₂," DOE NETL Monthly Meeting, April 25, 2024
68. H. Lin, "Hierarchically Porous Carbon Molecular Sieves for CO₂ Capture and Resource Recovery," Department of Chemical Engineering, University of Rochester, February 7, 2024
67. H. Lin, "A Tale of Materials and Membranes for Post-Combustion Carbon Capture: Apparent Challenges and Untold Pitfalls," Gyeongsang Research Symposium (GRS), virtual meeting, January 27, 2024
66. H. Lin, "Energy-Efficient Membranes to Enable Hydrogen Economy," Department of Chemical and Biomolecular Engineering, University of Notre Dame, September 12, 2023
65. H. Lin, "Molecularly Engineering Polymeric Membranes for Carbon Capture," Chemical Engineering Program, National University of Singapore, March 3, 2023

64. H. Lin, "Engineering hierarchical nanochannels and chemistries in graphene oxide membranes for highly efficient dye desalination," International Conference on Membrane Separations (ICMS), LUMS, Pakistan, February 28, 2023
63. H. Lin, "Molecularly Engineering Polymeric Membranes for Pre-combustion Carbon Capture," Gyeongsang Research Symposium (GRS), virtual meeting, January 28, 2023
62. H. Lin, "Molecularly Engineering Polymeric Membranes for Pre-combustion Carbon Capture," Chemical Engineering Program, King Abdullah University of Science and Technology (KAUST), November 29, 2022
61. H. Lin, "Polyethers Beyond Poly(ethylene oxide) with Superior CO₂/N₂ Separation Properties," ACS Spring Conference, Chicago, IL, August 24, 2022
60. H. Lin, "Polyamines for Carbon Capture: The Obvious, The Unexpected, and The Puzzling," Gordon Research Conference of Membranes: Materials and Processes, New London, NH, August 1, 2022
59. H. Lin, "Engineering Polymeric Membranes for Pre-Combustion Carbon Capture: Integrating Fundamental Discovery and Technology Impact," Gordon Research Seminar of Membranes: Materials and Processes, New London, NH, July 30, 2022
58. H. Lin, "Metal Ion-Coordinated Supramolecular Polymer Networks for Post-combustion Carbon Capture," International Conference on Carbon Capture Science and Technology, July 22, 2022
57. H. Lin, "Highly Flexible Poly(1,3-dioxolane)-Based Polymers with Superior CO₂/N₂ Separation Properties," The 11th Young Researcher Forum of Egypt, May 10, 2022
56. H. Lin, "Molecularly Engineering Polymeric Membranes for Carbon Capture." Department Seminar, West Virginia University, WV, January 21, 2022
55. H. Lin, "Polybenzimidazole-based Membranes for Gas Separation," Pentair, October 27, 2021
54. H. Lin, "Molecularly Engineering Polymeric Membranes for Carbon Capture," SPT International Lectureship, October 20, 2021
53. H. Lin, "Scalable Polymeric Membranes for Carbon Capture," Pentair, October 18, 2021
52. H. Lin, "Membrane Solutions to Clean Air and Clean Water," Pall Corporation, March 25, 2021
51. H. Lin, "Highly Branched Polymers with High Ether Oxygen Content for Membrane CO₂/N₂ Separation," ICOM Meeting, December 9, 2020
50. H. Lin, "Molecularly engineering polymeric membranes for pre-combustion CO₂ capture at 150 °C and above," AIChE Meeting, November 2020
49. H. Lin, "Few-nanometer thick organosilica membranes for high-temperature H₂/CO₂ separation" Materials Science & Technology 2020 Technical Meeting, October 2020
48. H. Lin, "Molecularly Engineered Sorption-enhanced Membrane Materials for CO₂ Capture," Department Seminar, Michigan State University, September 25, 2019
47. H. Lin, "Refining Polybenzimidazole (PBI) for Membrane H₂/CO₂ Separation," Air Liquide, America, September 16, 2019
46. H. Lin, "Molecularly Engineered Sorption-enhanced Membrane Materials for CO₂ Capture," Hanyang University, South Korea, August 2, 2019
45. H. Lin, "Molecularly Engineered Sorption-enhanced Membrane Materials for CO₂ Capture," Department Seminar, Beijing University of Technology, China, July 18, 2019
44. H. Lin, "Molecularly Engineered Sorption-enhanced Membrane Materials for CO₂ Capture," Research Institute of Innovative Technology for the Earth (RITE), Japan, July 12, 2019

- 43.H. Lin, "Molecularly Engineered Sorption-enhanced Membrane Materials for CO₂ Capture," Department Seminar, Kobe University, Japan, July 11, 2019
- 42.H. Lin, "Molecularly Engineered Sorption-enhanced Membrane Materials for CO₂ Capture," Department Seminar, Meiji University, Japan, July 9, 2019
- 41.H. Lin, "Designing Sorption-Enhanced Mixed Matrix Membranes for H₂/CO₂ Separation Using an Integrated Experimental and Modeling Approach," AIChE Conference, Pittsburgh, PA, October 29, 2018
- 40.H. Lin, "Molecularly Engineering Membranes for Sorption-enhanced Gas Separation," Department Seminar, Beijing University of Chemical Technology, October 18, 2018
- 39.H. Lin, "Advanced Membranes for Water Reuse and Algae Dewatering," Department Seminar, Beijing Union University, October 17, 2018
- 38.H. Lin, "Molecularly Engineering Membranes for Sorption-enhanced Gas Separation," Department Seminar, North China Electric Power University, China, October 16, 2018
- 37.H. Lin, "Sorption-enhanced mixed matrix membranes for pre-combustion CO₂ capture," Clearwater Clean Energy Conference, Clearwater, FL, June 4, 2018
- 36.H. Lin, "Effect of membrane surface chemistry on water permeance and antifouling properties," ACS Spring meeting, New Orleans, LA, March 19, 2018
- 35.H. Lin, "Molecularly Engineering of Membrane Materials for Separations through Enhanced Interactions: A Road Less Traveled," Department Seminar, Department of Chemical Engineering, University of Cincinnati, March 2, 2018
- 34.H. Lin, "Molecularly Engineering of Membrane Materials for Separations through Enhanced Interactions: A Road Less Traveled," Department Seminar, Department of Chemical Engineering, University of Waterloo, January 18, 2018
- 33.H. Lin, "Molecularly Engineering of Membrane Materials for Separations through Enhanced Interactions: A Road Less Traveled," Department Seminar, Department of Chemical Engineering, Zhejiang University, December 2017
- 32.H. Lin, "Molecularly Engineering of Membrane Materials for Separations through Enhanced Interactions: A Road Less Traveled," Department Seminar, Department of Chemical Engineering, Tianjin University, December 2017
- 31.H. Lin, "Molecularly Engineering of Membrane Materials for Separations through Enhanced Interactions: A Road Less Traveled," Department Seminar, Department of Chemical Engineering, Tianjin Polytechnic University, December 2017
- 30.H. Lin, "Molecularly Engineering of Membrane Materials for Separations through Enhanced Interactions: A Road Less Traveled," Department Seminar, Department of Chemical and Materials Engineering, University of Kentucky, March 1, 2017
- 29.H. Lin, "Facile Grafting of Zwitterions onto Membrane Surface to Improve Antifouling Properties for Wastewater Reuse," ACS Spring, San Francisco, CA, April 6, 2017
- 28.H. Lin, "Molecularly Engineering Polymeric Materials with Enhanced Gas Sorption for Membrane CO₂ Capture," Department Seminar, Department of Chemical Engineering, University of Rochester, October 5, 2016
- 27.H. Lin, L. Zhu, J. Liu and B. Lam, "Polymeric Membranes for CO₂ Separation," American Chemical Society PacificChem, Honolulu, HI, December 17, 2015
- 26.H. Lin, "Impregnated Membranes for Water Purification by Forward Osmosis," The 8th Sino-US Chemical Engineering Conference, Shanghai, China, October 2015
- 25.H. Lin, "Designing functional molecules for CO₂ Sorption," Praxair Inc., Buffalo, NY, September 29, 2015
- 24.H. Lin, "Development of Membranes for H₂ Purification and CO₂ Capture: From Material Molecular Engineering to Technology Commercialization," Invited

- presentation at the Fourth EITA Young Investigator Conference, Boston, MA, August 27, 2015
23. H. Lin, M. Yavari and L. Zhu, "Integrated Membrane Materials and Process Development for Gas Separation," Conference of American Institute of Chemical Engineering (AIChE), Atlanta, GA, November 17, 2014
 22. H. Lin, "Advances in Membrane Technology for Water Treatment," Department Seminar, Department of Civil, Structure and Environmental Engineering, University at Buffalo, December 4, 2014
 21. H. Lin, "Development of Membranes for H₂ Purification and CO₂ Capture: From Material Molecular Engineering to Technology Commercialization," Department Seminar, Department of Chemical and Biomolecular Engineering, Ohio State University, September 25, 2014
 20. H. Lin, "Membrane Processes and Economics for Industrial Gas Separation," Praxair Inc., Buffalo, NY, March 19, 2014
 19. H. Lin, R. Daniels, T. Merkel and J. Wijmans, "Dilute Methane Utilization Using A Membrane Gas Exchanger," AIChE Conference, San Francisco, CA, November 4, 2013
 18. H. Lin, "Understanding the Practical Upper Bound for CO₂/CH₄ Separation Using Polymeric Membranes," The 7th Sino-US Chemical Engineering Conference, Beijing, China, October 15, 2013
 17. H. Lin, "Understanding the Practical Upper bound for CO₂/CH₄ Separation," *The 7th Sino-US Joint Chemical Engineering Conference*, Beijing, China, October 15, 2013.
 16. H. Lin, "Development of Membranes for H₂ Purification and CO₂ Capture: From Material Molecular Engineering to Technology Commercialization," Department Seminar, Department of Chemical and Biomolecular Engineering, Xiamen University, July 31, 2014
 15. H. Lin, "Membrane Development for Precombustion CO₂ Capture: From Molecular Engineering to Product Demonstration," Department Seminar, North China Electric Power University, China, October 17, 2013
 14. H. Lin, "Development of Membranes for H₂ Purification and CO₂ Capture: From Material Molecular Engineering to Technology Commercialization," Department Seminar, Tianjin University, China, October 14, 2013
 13. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H₂ Purification and CO₂ Capture," Auburn University, April 1, 2013 (*Interview*)
 12. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H₂ Purification and CO₂ Capture," University of Houston, March 1, 2013 (*Interview*)
 11. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H₂ Purification and CO₂ Capture," Clemson University, February 19, 2013 (*Interview*)
 10. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H₂ Purification and CO₂ Capture," University at Buffalo, SUNY, February 14, 2013 (*Interview*)
 9. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H₂ Purification and CO₂ Capture," North Carolina State University, February 12, 2013 (*Interview*)
 8. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H₂ Purification and CO₂ Capture," Pennsylvania State University, February 5, 2013 (*Interview*)
 7. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H₂ Purification and CO₂ Capture," Texas Tech University, January 28, 2013 (*Interview*)
 6. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H₂ Purification and CO₂ Capture," Drexel University, January 24, 2013 (*Interview*)
 5. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H₂ Purification and CO₂ Capture," University of Texas at Austin, January 17, 2013

4. H. Lin, A. Serbanescu-Martin, M. Zhou, and T.C. Merkel, "Oxygen Enrichment Using Membranes," *The 244th ACS National Conference*, Philadelphia, August 19, 2012.
3. H. Lin, T.C. Merkel, J. He, J. Kaschemekat, A. Ng, S. Pande, A. Serbanescu-Martin, S. Thomas-Droz, J. Vu, L.S. White, and M. Zhou, "Field Demonstration of CO₂ Capture from Coal-Derived Syngas," *The DOE Project Review Meeting at National Carbon Capture Center*, Wilsonville, AL, December 7, 2011.
2. H. Lin, A. Serbanescu-Martin, M. Zhou, and T.C. Merkel, "Understanding the Practical Upper bound for CO₂/CH₄ Separation," *The 240th ACS National Conference*, Boston, August 25, 2010.
1. H. Lin, "Hydrogen Purification and CO₂ Sequestration Using Polymeric Membranes," *Golden Gate Polymer Forum Dinner Meeting*, Mountain View, CA, May 18, 2009.