

# CURRICULUM VITAE

HAIQING LIN

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## EMPLOYMENT HISTORY:

### University at Buffalo, The State University of New York, Department of Chemical and Biological Engineering

Associate Professor 08/2018 - present  
Assistant Professor 08/2013 – 07/2018

**Membrane Technology and Research, Inc. (MTR)** 09/2005 - 07/2013  
Senior Research Engineer and Team Leader of Gas Separation Group

## EDUCATION:

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

## AWARDS:

- I&EC Research 2017 Excellence in Review Awards ..... 2017
- NSF CAREER Award ..... 2016
- UB SEAS Early Career Researcher of the Year Award ..... 2015
- Distinguished Alumni Award (Chemical Engineering, Xiamen University, China) ..... 2011
- University of Texas CO-OP Research Excellence Award for Best Research Paper in 2006
- AIChE Separation Division Graduate Student Award ..... 2006
- North American Membrane Society Graduate Student First Place Poster Award ..... 2003
- DuPont Fellowship (Xiamen University, China) ..... 1999

## HONORS:

- Advisor to a Ph.D. student (Nima Shahkaramipour) receiving First Prize Poster Award, and a Ph.D. student (Hien Nguyen) receiving Third Prize Poster Award at North American Membrane Society Conference ..... 2018
- Advisor to a Ph.D. student (Nima Shahkaramipour) receiving Air & Waste Management Association (A&WMA) Student Award ..... 2018
- Advisor to a Ph.D. student (Lingxiang Zhu) receiving Dean's Graduate Achievement Award from UB School of Engineering and Applied Sciences ..... 2018

- Advisor to a Ph.D. student (Lingxiang Zhu) receiving the student fellowship award from North American Membrane Society (NAMS) ..... 2018
- Advisor to a Ph.D. student (Lingxiang Zhu) named a Finalist of AIChE Graduate Research Award of Polymers ..... 2017
- Advisor to a Ph.D. student (Milad Yavari) receiving Air & Waste Management Association (A&WMA) Student Award ..... 2017
- Advisor to a student team (including Nima Shahkaramipour, Yichen Tu, and Jennifer Park) winning the 2<sup>nd</sup> place NY P2I Student Competition by Pollution Prevention Program ..... 2016
- Advisor of Ph.D. students (Lingxiang Zhu, Nima Shahkaramipour, James Tran and Hien Nguyen) receiving Elias Klein traveling award from NAMS ..... 2015-2017
- UB Individual Development Award ..... 2015 - 2017
- Advisor of an undergraduate researcher (Mr. Kaipin Huang) receiving SMURI Summer Research Award ..... 2014
- Top cited paper in 2011 and 2012 in *Journal of Membrane Science* ..... 2013
- Most downloaded paper in 2006 and 2007 in *Journal of Molecular Structure* ..... 2008

#### **PROFESSIONAL MEMBERSHIPS AND ACTIVITIES:**

- Editor of Scientific Reports (2016-2018). Editorial board member of *Advances in Polymer Technology* (2018-present) and *Heliyon* (2008-present)
- Guest editor of a special issue “Polymeric Membranes for Gas Separation” for *Membranes*
- Chair and vice-chair of Area 2D of Membrane-based Separation at Separation Division of AIChE (2015-2019)
- Symposium co-organizer of MRS Functional Nanostructured Polymers for Emerging Energy Technologies (November 2016)
- Invitation to participate ACS workshop to develop a road map to accelerate the application of a new generation of energy-efficient fluid separation processes (July 14-15, 2016)
- Symposium organizer of ACS Polymeric Materials: Science and Engineering (PMSE) “Nanostructured Porous Polymers: Synthesis, Property, and Function” (March 2015)
- Panel leader of Membranes for Shale Gas Applications of Gordon Research Conferences on Membranes: Materials and Processes (July 2014)
- Session co-chair at Sino-US Joint Chemical Engineering Conference (2013 and 2015), ACS National Conference (2012 and 2017), AIChE National Conference (2006, 2013-2018), and NAMS conferences (2008, 2009, 2011, 2012, 2016 and 2018)
- Proposal reviewer for NSF DMR and CBET Program (2014 - 2018), UK EPSRC Program (2014-2017), ACS PRF Program (2014-2018), U.S.-Israel Binational Agricultural Research and Development Fund (BARD 2013), DOE Hydrogen Program (2007 and 2009), and DOE Advanced Energy Manufacturing (2009).
- Peer reviewer for research journals (~50 manuscripts/year): *ACS Applied Materials and Interfaces*, *ACS Macro Letters*, *ACS Nano*, *AIChE Journal*, *Chemistry of Materials*, *Industrial & Engineering Chemistry Research*, *Journal of Materials Chemistry A*, *Journal of Membrane Science*, *Macromolecules*, *Nano Letter*, *Nature Communications*, *Polymer*, *Progress in Polymer Science*, *Scientific Reports*, etc.
- Board of Directors, Vice-Chair, and Chair of AIChE Northern California Section: 2006-2012

- Membership of American Chemical Society (ACS), American Institute of Chemical Engineers (AIChE), Materials Research Society (MRS), and North American Membrane Society (NAMS)

#### DEPARTMENT SERVICES:

- Advisor to the student chapter of AIChE at UB (5/2014 – present)
- Committee member of undergraduate study (9/2014 – present)
- Committee member of faculty search (10/2015 – 5/2016)
- Committee member of academic grievance (11/2015 – present)
- Committee member of Annual Graduate Research Symposium (9/2013 – present)
- Advised 29 undergraduate students performing research in the laboratory

#### RESEARCH SUPERVISION (Female students' names are in *italics*):

Postdoctoral associate (1): Dr. Liang Huang

Ph.D. students (6): *Xiaoyi Chen*, Junyi Liu, Hien Nguyen, *Maryam Omidvar*, Nima Shahkaramipour and Thien Tran

M.S. students (7): *Shabdiki Chaurasia*, Sarthak Doshi, *Janavi Gohil*, Weiguang Jia, *Kiruthika Santhanam*, Bharath Vaidyanathan, and Gengyi Zhang

Graduated Ph.D. (2): Milad Yavari (Parker Hannifin) and Lingxiang Zhu (DOE NETL)

Graduated M.S. (11): *Xiaoyi Chen* (UB), Xianda Hou (SRCET, China), Benjamin Lam (Helios-NRG), Junyi Liu (UB), Praphulla Mandadapu (Dow Chemical), Nachiket Paranjape (Oath), Sankara Ramanan (MAA Laboratories), Shawreen Shah (Teva Pharmaceuticals), *Yichen Tu* (UB), *Haley Valentine* (Washington Mills), and Shizhong Zhao (Biopeptech)

Visiting scholars (5): *Mingyin Hsiao* (Meiji University, JP), Kisato Nishida (Meiji University, JP), Leiqing Hu (Zhejiang University, China), *Huiling Zhao* (Eastern China University of Science and Technology, China) and Takahiro Suizu (Meiji University, JP)

Undergraduate students (33, including 9 female students, whose names are in *italics*):

2018: *Tanahiry Escamilla*; Suting Huang; Zhihao Feng, Chen Lin, Mohamed Kawy, and Omran Omar

2017: *Stephanie Hall*; Suting Huang; Mingi Ji; *Fleurie Kelley*; Chen Lin; and Yash Savla

2016: *Jennifer Park*; Hunter Steven, *Sumbal Zaman*, *Tanahiry Escamilla*, *Beatrices Bacolod*, and Chris Chan

2015: 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

2014: Po-han Chen; *Dana Havas*; Weiguang Jia; and Min Wei

## CURRENT AND PAST GRANTS AND CONTRACTS AT UNIVERSITY AT BUFFALO

### Summary:

- Total funding of ~\$9.2 million, including ~\$3.9 million for the projects with Haiqing Lin as the PI; and
- PI Lin's lab has a share of ~\$3.3 million.

### Grants and Contracts as a PI

Stat us	Co-PIs	Title	Funding Agent	Effective Dates	Total Amount
Current	Raj Singh and Andrew Sexton	AOI [1] Development of ultrahigh-flux hollow fiber membranes based on carbon molecular sieve with superior H <sub>2</sub> /CO <sub>2</sub> separation properties	DOE NETL	9/1/18-8/31/21	\$800,000
	N/A	Scalable Polymerized Metal-Organic Frameworks with CO <sub>2</sub> -philic Rubbery Polymers for Membrane CO <sub>2</sub> /N <sub>2</sub> Separation	DOE STTR Phase I	7/2/18 – 4/1/19	\$75,000
	Jeff Errington	Rational Development of Robust Membranes for Nitrate Removal from Wastewater	Stony Brook University	10/1/17 – 9/30/18	\$35,000
	N/A	CAREER: SusChEM: Design and Discovery of Polymers with Pendant Rings for Membrane Gas Separations	NSF CBET	3/1/16-2/28/21	\$500,000
	Mark Swihart & Tim Merkel	AOI [1L2] Sorption Enhanced Mixed Matrix Membranes for CO <sub>2</sub> Capture from Precombustion Processes	DOE NETL	10/1/15 - 11/30/18	\$1,470,099
	N/A	Collaborative Research: SusChEM: Molecular Design of Durable Lewis Basic Elastomeric Membranes for Clean Energy Conversion and CO <sub>2</sub> Separation	NSF DMR	7/1/15 - 6/30/19	\$180,102
Past	N/A	Novel Algae Technology for CO <sub>2</sub> Utilization	DOE SBIR/Helios	2/21/17 – 11/20/17	\$35,000
	N/A	Stable Ultrathin Film Composite Membranes with High CO <sub>2</sub> Flux	Korea Carbon Capture and Sequestration R&D Center	6/1/14 - 5/31/17	\$400,000
	Jongmin Shin and Jinyoung Song	Zero Energy Adaptive Façade (ZEAF) for Energy Efficient Buildings	UB SMART	4/1/16-3/31/17	\$34,981
	Chong Cheng	Feasibility Study of Antifouling Membranes for Wastewater Reuse	NY Pollution Prevention Program	8/1/14 - 12/31/16	\$93,925

	N/A	Novel Integrated Technology Incorporating Anti-fouling Membranes to Dewater Algal Harvests	DOE SBIR Phase I	6/8/15 - 3/7/16	\$45,000
	N/A	Development of Advanced Membrane Materials for Industrial Gas Separation and Water Reuse	UB CMI	2/1/15 – 6/30/15	\$25,000
	N/A	Nanofiltration membranes for Li recovery	FMC	12/5/14 – 6/5/15	\$3,600
	N/A	Membrane Testing for Lubrizol	Lubrizol	12/5/14 – 6/5/15	\$8,995
	Bing Gong	Nanostructured Membranes with Sub-Nanometer Channels for Energy Efficient Seawater Desalination and Food Processing	UB RENEW	9/1/14 – 8/31/15	\$25,300
	N/A	SBIR: Advanced Membrane Technology for Helium Recovery	Helios/DOE	4/1/14 - 3/31/15	\$10,000

### Grants and Contracts as co-PI

Status	PI	Title	Funding Agent	Effective Dates	Total Amount
Current	Mark Swihart (PI) and Carl Lund (co-PI)	Manufacturing USA: GOALI: Designing Catalytic Membrane Reactors (CMRs) for Low-Temperature CO <sub>2</sub> Utilization and Methane Dry Reforming	NSF	8/1/18-7/31/21	\$360,000
	Hans Wijmans	AOI [1] Development of Self-Assembly Isoporous Supports Enabling Transformational Membrane Performance for Cost-Effective Carbon Capture	DOE NETL	4/1/18 – 3/31/21	\$2,907,219
	Ning Dai	Innovative Seawater Desalination Systems Coupling Peroxide Oxidation and Reactive Graphene Oxide Modified Membranes	Department of Interior	3/1/18 – 8/31/19	\$150,000
	Liang Feng	Laser Chip Lithography-Patterned Nanomembranes for Wastewater Treatment	NSF CMMI	9/1/16 - 8/31/19	\$250,000
	Bing Gong	Nanoporous Membranes Based on Sub-Nanometer Pores	NSF CBET	6/15/15 - 5/31/19	\$300,000
Past	Tim Cook	Mixed Matrix Membranes Comprising Polymers and Metal-Organic Polyhedra for Olefin/Paraffin Separation	UB IMPACT	1/15/17 – 1/14/18	\$32,000
	Javid Rzayev	Isoporous Ultrafiltration Membranes by Self-Assembly of Block Copolymers for Water	UB IMPACT	2/1/16-1/31/17	\$35,000

		Purification			
	Liang Feng	IMPACT: Robust Nanoscale-Patterned Membranes for Wastewater Treatment Using Laser Chips-Based Lithography	UB IMPACT	5/15/15 - 4/14/16	\$34,354
	Uttam Singiseti (PI) and Qiaoqiang Gan (Co-PI)	Ultrathin High Flux Atomic Layer Deposited (ALD) Metal Membranes for Green H <sub>2</sub> Production	UB IMPACT	4/1/14 - 3/31/15	\$34,947
	Mark Swihart	Study of Chlorine Adsorption in Scrubber Bed Material	AVOX Systems	8/1/14 - 10/31/14	\$13,972

**PAST GRANTS AND CONTRACTS AT MEMBRANE TECHNOLOGY AND RESEARCH, INC. (MTR, 2005 - 2013)**

**Summary:** Total funding of ~\$3.7 million, with HL as the PI unless otherwise noted

1. California Energy Commission, Energy Innovations Small Grant Programs, “Prototype and Demonstration of Membrane Processes for Natural Gas Dehydration,” \$94,995, 1/2012-12/2012
2. 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)]
3. EPA SBIR Phase II, “Novel Membrane Process to Utilize Dilute Methane Streams,” \$225,000, 5/2011 – 4/2013
4. DOE SBIR Phase I, “Novel Thermally Rearranged Polymers for Olefin-Paraffin Separations,” \$150,000, 6/2011 – 3/2012 (with University of Texas at Austin)
5. EPA SBIR Phase I, “Novel Membranes for Natural Gas Dehydration,” \$80,000, 3/2011 – 8/2011
6. DOE SBIR Phase III Xlerator program, “Field Demonstration of CO<sub>2</sub> Capture from Coal-Derived Syngas,” \$1,499,990, 9/2010 – 6/2013
7. 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)
8. EPA SBIR Phase I, “Novel Membrane Process to Utilize Dilute Methane Streams,” \$70,000, 3/2010 – 9/2010
9. EPA SBIR Phase I, “High Flux Membranes to Upgrade Biogas from Anaerobic Digesters,” \$70,000, 2/2009 – 7/2009
10. DOE SBIR Phase II, “Membrane System for Coal Bed CO<sub>2</sub> Sequestration and Methane Production,” \$750,000, 8/2008 – 7/2010
11. NSF SBIR Phase II, “New Synthesis Approach to High Performance, Low Cost CO<sub>2</sub>/CH<sub>4</sub> Gas Separation Membranes,” \$500,000, 2/2008 – 2/2010 (subcontract to Tetramer Technologies)
12. EPA SBIR Phase II, “A Membrane Pre-concentrator for Portable Trace VOC Detector,” \$225,000, 5/2007 – 4/2009
13. DOE NETL, “Membrane Process to Sequester CO<sub>2</sub> from Power Plant Flue Gas,” \$800,000, 4/2007 – 3/2009 (I participated in this project, which lead to the second and third phases of the technology development with a total funding of \$20,000,000 from DOE)
14. DOE SBIR Phase I, “Energy-Efficient Process to Utilize Dilute Methane Emissions,” \$100,000, 9/2006 – 3/2007

15. EPA SBIR Phase I, “A Membrane Pre-concentrator for Portable Trace VOC Detector,” \$70,000, 2/2006 – 8/2006
16. 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 4554 in total, and 2949 since 2013; H-index: 25; <https://scholar.google.com/citations?hl=en&user=7cxhEhwAAAAJ&sortby=pubdate>)

**Note 1:** Articles with the title in bold have Prof. Lin as the corresponding author.

**Note 2:** The students’ names from PI Lin’s group at UB are in italics.

### ***Refereed Journals after Graduation***

1. *T. Tran, C. Lin, S. Chaurasia, and H. Lin, Elucidating the relationship between states of water and ion transport properties in hydrated polymers, submitted to Journal of Membrane Science*
2. *L. Huang, S. Huang, S.R. Venna and H. Lin, Rightsizing Nanochannels in Reduced-Graphene Oxide Membranes by Solvating for Dye Desalination, submitted to EST*
3. *S. Konda, M. M. Mohammadi, R. D. Buchner, H. Lin and M. T. Swihart, Flame-based Synthesis and in situ Functionalization of Palladium Alloy Nanoparticles, AIChE J., in press*
4. *S. Luo, Q. Zhang, L. Zhu, H. Lin, B. A. Kazanowska, C. M. Doherty, A. J. Hill, P. Gao and R. Guo, Ultra-selective and ultra-permeable thermally rearranged polymer membranes for hydrogen purification and CO<sub>2</sub> removal from natural gas, Chemistry of Materials, 30, 15, 5322 – 5332 (2018)*
5. *J. Xu, T. Tran, H. Lin, and N. Dai, Removal of Disinfection Byproducts in Forward Osmosis for Wastewater Recycling, Journal of Membrane Science, 564, 352-360 (2018)*
6. *L. Zhu, D. Tian, D. Shin, W. Jia, C. Bae and H. Lin, Effects of tertiary amines and quaternary ammonium halides in polysulfone on membrane gas separation properties, Journal of Polymer Science Part B: Polymer Physics, In press*
7. *A. Ghadimi, S. Norouzbahari, H. Lin, H. Rabiee, and B. Sadatnia, Geometric Restriction of Microporous Supports on Gas Permeance Efficiency of Thin Film Composite Membranes, Journal of Membrane Science, 563, 643-654 (2018)*
8. *L. Hu, J. Liu, L. Zhu, X. Hou, L. Huang, H. Lin, and J. Cheng, Highly permeable mixed matrix materials comprising crosslinked poly(ethylene oxide) and ZIF-8 nanoparticles for CO<sub>2</sub> capture, Separation and Purification Technology, 205, 58-65 (2018)*
9. *S. N. Ramanan, N. Shahkaramipour, T. Tran, L. Zhu, S. R. Venna, C. Lim, A. Singh, P. N. Prasad and H. Lin, Self-cleaning membranes for water purification by co-deposition of photo-mobile 4,4'-azodianiline and bio-adhesive polydopamine, Journal of Membrane Science, 554, 164-174 (2018)*
10. *M. Yavari, M. Fang, H. Nguyen, T. C. Merkel, H. Lin, and Y. Okamoto, Dioxolane-based Perfluoropolymers with Superior Membrane Gas Separation Properties, Macromolecules, 51 (7), 2489-2497 (2018)*
11. *C. P. Fulong, J. Liu, V. J. Pastore, H. Lin, and T. R. Cook, Mixed-matrix materials using metal-organic polyhedra with enhanced compatibility for membrane gas separation, Dalton Transactions, 47 (24) 7905-7915 (2018)*
12. *M. Omidvar, H. Nguyen, J. Liu, and H. Lin, Sorption-Enhanced Membrane Materials for Gas Separation: A Road Less Traveled, Current Opinion in Chemical Engineering, 20, 50-9, 2018*
13. *N. Shahkaramipour, C. K. Lai, S. R. Venna, C. Cheng, and H. Lin, Co-deposition of thiol-containing zwitterionic polymers and polydopamine to enhance surface antifouling properties of ultrafiltration membranes, Industrial & Engineering Chemistry Research, 57 (6), 2336-2345, 2018*

14. L. Zhu, M. Swihart and H. Lin, **Unprecedented size-sieving ability in polybenzimidazole doped with polyprotic acids for membrane H<sub>2</sub>/CO<sub>2</sub> separation**, *Energy & Environmental Science*, 11, 94-100, 2018
15. M. Yavari, Y. Okamoto, and H. Lin, **The Role of Halogens in Polychlorotrifluoroethylene (PCTFE) in Membrane Gas Separations**, *Journal of Membrane Science*, 548, 380-9, 2018
16. L. Zhu, M. Swihart and H. Lin, **Tightening nanostructure of PBI for membrane H<sub>2</sub>/CO<sub>2</sub> separation**, *Journal of Materials Chemistry A*, 5, 19914-19923, 2017, DOI: 10.1039/C7TA03874G
17. M. Wang, J. M. Gorham, J. P. Killgore, M. Omidvar, H. Lin, F. W. DelRio, L. M. Cox, Z. Zhang, and Y. Ding, **Formation of a crack-free, hybrid skin layer with tunable surface topography and improved gas permeation selectivity on elastomers using gel-liquid infiltration polymerization**, *ACS Applied Materials & Interfaces*, 9 (33) 28100-28106, 2017, DOI: 10.1021/acsami.7b09274
18. N. Shahkaramipour, S. N. Ramanan, D. Fister, E. Park, S. R. Venna, H. Sun, C. Cheng, and H. Lin, **Facile grafting of zwitterions onto membrane surface to enhance antifouling properties for wastewater reuse**, *Industrial & Engineering Chemistry Research*, 56 (32), 9202-9212, 2017.
19. N. Shahkaramipour, T. N. Tran, S. Ramanan, and H. Lin, **Membranes with surface-enhanced antifouling properties for water purification**, *Membranes*, 7 (1), 13, 2017
20. Tran, T.; Ramanan, S.; and H. Lin, **Synthesis of hydrogels with antifouling properties as membranes for water purification**, *Journal of Visualized Experiments* 2017, 122, doi: 10.3791/55426.
21. H Fan, R Wang, L Shan, H Yan, J Li, S Ji, H. Lin, G Zhang, **One-step assembly of molecular separation membranes by direct atomizing oligomer**, *ACS Applied Materials & Interfaces*, 9(4), 4074-4083, 2017.
22. N Paranjape, P Chandra, G Wu and H. Lin, **Highly-branched cross-linked poly (ethylene oxide) with enhanced ionic conductivity**, *Polymer*, 111, 1-8, 2017
23. L Zhu, M Yavari, W Jia, EP Furlani and H. Lin, **Geometric restriction of gas permeance in ultrathin film composite membranes evaluated using an integrated experimental and modeling approach**, *Industrial & Engineering Chemistry Research*, 56 (1), 351-358, 2017
24. D Havas and H. Lin, **Optimal membranes for biogas upgrade by removing CO<sub>2</sub>: High permeance or high selectivity?** *Separation Science and Technology*, 52 (2), 186-196, 2017
25. M. Yavari, S. Maruf, Y. Ding, H. Lin, **Physical aging of glassy perfluoropolymers in thin film composite membranes. Part II. Glass transition temperature and the free volume model**, *Journal of Membrane Science*, 525, 399-408, 2017
26. M. Yavari, T. Le, H. Lin, **Physical aging of glassy perfluoropolymers in thin film composite membranes. Part I. Gas transport properties**, *Journal of Membrane Science*, 525, 387-398, 2017
27. S. Luo, J. Liu, H. Lin, B. A. Kazanowska, M. D. Hunckler, R. K. Roeder, R. Guo, "Preparation and gas transport properties of triptycene-containing polybenzoxazole (PBO)-based polymers derived from thermal rearrangement (TR) and thermal cyclodehydration (TC) processes", *Journal of Materials Chemistry A* 4, 17050-17062, 2016.
28. J. Liu, X. Hou, H. B. Park, H. Lin, **"High-performance polymers for membrane CO<sub>2</sub>/N<sub>2</sub> separation"**, *Chemistry - A European Journal*, 22 (45), 15980-15990, 2016.
29. H. J. Yen, H. Tsai, M. Zhou, A. Chen, E. F. Holby, S. Choudhury, H. Zhang, L. Zhu, H. Lin, L. Dai, L. Adamska, S. Tretiak, G. Wu, H. L. Wang, "Structurally defined nanographene assemblies via bottom-up chemical synthesis for highly efficient lithium storage", *Advanced Materials*, 28 (46), 10250-10256, 2016.
30. S Shah, J Liu, S Ng, S Luo, R Guo, C Cheng, H. Lin, **Transport properties of small molecules in zwitterionic polymers**, *Journal of Polymer Science Part B: Polymer Physics*, 54, 1924-1934 (2016)
31. B Lam, M Wei, L Zhu, S Luo, R Guo, A Morisato, P Alexandridis, H. Lin, **Cellulose triacetate doped with ionic liquids for membrane gas separation**, *Polymer*, 89, 1-11, 2016.
32. L Zhu, W Jia, M Kattula, K Ponnuru, EP Furlani, and H. Lin, **Effect of porous supports on the permeance of thin film composite membranes: Part I. Track-etched polycarbonate supports**, *Journal of Membrane Science*, 514, 684-695, 2016.



33. S Zhao, K Huang and H Lin, **Impregnated membranes for water purification using forward osmosis**, *Industrial & Engineering Chemistry Research*, 54 (49), 12354-12366, 2015.
34. M. Kattula, K. Ponnuru, L. Zhu, W. Jia, H. Lin and E. P. Furlani, **Design ultrathin film composite membranes: the impact of a gutter layer**, *Scientific Report*, 5, DOI: 10.1038/srep15016, 2015.
35. H. Lin and M. Yavari, **Upper bound of polymeric membranes for mixed-gas CO<sub>2</sub>/CH<sub>4</sub> separations**, *Journal of Membrane Science*, 475, 101-109, 2015.
36. C. H. Jones, M. F. Chen, A. Gollakota, A. Ravikrishnan, G. J. Zhang, S. Lin, M. Tan, C. Cheng, H. Lin, B. A. Pfeifer, **Structure Function Assessment of Mannosylated Poly(beta-amino esters) upon Targeted Antigen Presenting Cell Gene Delivery**, *Biomacromolecules* 16, 1534-1541, 2015
37. H. Lin, **Integrated membrane material and process development for gas separation**, *Current Opinions in Chemical Engineering*, 4, 54-61, 2014.
38. H. Lin; Z. He, Z. Sun.; J. Kniep; A. Ng; R. W. Baker; and T. C. Merkel, **CO<sub>2</sub>-selective membranes for hydrogen production and CO<sub>2</sub> capture. Part II: Techno-economic analysis.**, *Journal of Membrane Science*, 493, 794-806 (2015).
39. R. R. Tiwari, Z. Smith, H. Lin, B. D. Freeman and D. R. Paul, **Gas permeation in thin films of "high free-volume" glassy perfluoropolymers: Part II CO<sub>2</sub> plasticization and sorption**, *Polymer* 61, 1-14 (2015)
40. R. R. Tiwari, Z. Smith, H. Lin, B. D. Freeman and D. R. Paul, **Gas permeation in thin films of "high free-volume" glassy perfluoropolymers: Part I physical aging**, *Polymer* 55 (22), 5788-5800 (2014).
41. H. Lin, R. Daniels, S. M. Thompson, K. D. Amo, Z. He, T. C. Merkel, J. G. Wijmans, **Membrane selective exchange process for dilute methane recovery**, *Journal of Membrane Science*, 469, 11-18 (2014).
42. H. Lin, Z. J. He, Z. Sun, J. M. Vu, A. Ng, M. Mohammed, J. Kniep, T. C. Merkel, T. Wu, R. C. Lambrecht, **CO<sub>2</sub>-selective membranes for hydrogen production and CO<sub>2</sub> capture - Part I: Membrane development**, *Journal of Membrane Science*, 457, 149-161 (2014).
43. H. Lin, M. Zhou, J. Ly, J. Vu, J.G. Wijmans, T.C. Merkel, J. Jin, A. Haldeman, E. H. Wagener and D. Rue, **Membrane-based oxygen-enriched combustion**, *Industrial Engineering & Chemistry Research*, 52, 10820-10834 (2013).
44. H. Lin, S.M. Thompson, A. Serbanescu-Martin, J.G. Wijmans, K.D. Amo, K.A. Lokhandwala, B. Low and T.C. Merkel, **Dehydration of natural gas using membranes. Part II: countercurrent design and field test**, *Journal of Membrane Science*, 432, 106-114 (2013).
45. H. Lin, S.M. Thompson, A. Serbanescu-Martin, J.G. Wijmans, K.D. Amo, K.A. Lokhandwala and T.C. Merkel, **Dehydration of natural gas using membranes. Part I: composite membranes**, *Journal of Membrane Science*, 413-414, 70-81 (2012).
46. T.C. Merkel, H. Lin, X. Wei, and R.W. Baker, **Power plant post-combustion carbon dioxide capture: an opportunity for membranes**, *Journal of Membrane Science*, 359 (1-2), 126-139 (2010).
47. H. Lin, B.D. Freeman, S. Kalakunnath, and D.S. Kalika, **Effect of copolymer composition, temperature and carbon dioxide fugacity on pure- and mixed-gas permeability in poly(ethylene glycol)-based materials: free volume interpretation**, *Journal of Membrane Science*, 291(1-2), 131-139 (2007).

#### **Book Chapters after Graduation (5)**

1. 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
2. L Zhu, M Omid, and H. Lin, **Manipulating Polyimide Nanostructures via Cross-linking for Membrane Gas Separation**, in *Membranes for Gas Separation*, Edited by M. A. Carreon, World Scientific, Volume 1, 243-270, 2017.
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### **Refereed Journals before Graduation (19)**

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15. R.S. Prabhakar, R. Raharjo, L.G. Toy, H. Lin, and B.D. Freeman, “Self-consistent model of concentration and temperature dependence of permeability in rubbery polymers,” *Industrial Engineering & Chemistry Research*, 44, 1547-1556 (2005).
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### **Book Chapters before Joining UB (I)**

1. H. Lin and B.D. Freeman, "Permeation and diffusion," in *Springer-Handbook of Materials Measurement Methods*, edited by H. Czichos, L.E. Smith, and T. Saito, Springer, pp. 371-387 (2006).

### **Patents and Applications**

1. 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.
2. 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).
3. 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).
4. 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).
5. 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).
6. 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).
7. 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 CO<sub>2</sub> from combustion gases," US Patent 7,964,020 B2 (June 21, 2011).
8. 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.

### **Invited Talks:**

1. H. Lin, "Sorption-enhanced mixed matrix membranes for precombustion CO<sub>2</sub> capture," Clearwater Clean Energy Conference, Clearwater, FL, June 4, 2018
2. H. Lin, "Effect of membrane surface chemistry on water permeance and antifouling properties," ACS Spring meeting, New Orleans, LA, March 19, 2018
3. H. Lin, "Molecularly Engineering of Membrane Materials for Separations through Enhanced Interactions: A Road Less Traveled," Department of Chemical Engineering, University of Cincinnati, March 2, 2018
4. H. Lin, "Molecularly Engineering of Membrane Materials for Separations through Enhanced Interactions: A Road Less Traveled," Department of Chemical Engineering, University of Waterloo, January 18, 2018
5. H. Lin, "Molecularly Engineering of Membrane Materials for Separations through Enhanced Interactions: A Road Less Traveled," Department of Chemical Engineering, Zhejiang University, December 2017
6. H. Lin, "Molecularly Engineering of Membrane Materials for Separations through Enhanced Interactions: A Road Less Traveled," Department of Chemical Engineering, Tianjin University, December 2017

7. H. Lin, "Molecularly Engineering of Membrane Materials for Separations through Enhanced Interactions: A Road Less Traveled," Department of Chemical Engineering, Tianjin Polytechnic University, December 2017
8. H. Lin, "Molecularly Engineering of Membrane Materials for Separations through Enhanced Interactions: A Road Less Traveled," Department of Chemical and Materials Engineering, University of Kentucky, March 1, 2017
9. H. Lin, "Facile Grafting of Zwitterions onto Membrane Surface to Improve Antifouling Properties for Wastewater Reuse," ACS Spring, San Francisco, CA, April 6, 2017
10. H. Lin, "Molecularly Engineering Polymeric Materials with Enhanced Gas Sorption for Membrane CO<sub>2</sub> Capture," Department of Chemical Engineering, University of Rochester, October 5, 2016
11. H. Lin, L. Zhu, J. Liu and B. Lam, "Polymeric Membranes for CO<sub>2</sub> Separation," American Chemical Society PacificChem, Honolulu, HI, December 17, 2015
20. H. Lin, "Impregnated Membranes for Water Purification by Forward Osmosis," The 8th Sino-US Chemical Engineering Conference, Shanghai, China, October 2015
21. H. Lin, "Designing functional molecules for CO<sub>2</sub> Sorption," Praxair Inc., Buffalo, NY, September 29, 2015
22. H. Lin, "Development of Membranes for H<sub>2</sub> Purification and CO<sub>2</sub> 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
12. H. Lin, "Advances in Membrane Technology for Water Treatment," Department of Civil, Structure and Environmental Engineering, University at Buffalo, December 4, 2014
13. H. Lin, "Development of Membranes for H<sub>2</sub> Purification and CO<sub>2</sub> Capture: From Material Molecular Engineering to Technology Commercialization," Department of Chemical and Biomolecular Engineering, Ohio State University, September 25, 2014
14. H. Lin, "Membrane Processes and Economics for Industrial Gas Separation," Praxair Inc., Buffalo, NY, March 19, 2014
15. 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
16. H. Lin, "Understanding the Practical Upper Bound for CO<sub>2</sub>/CH<sub>4</sub> 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 CO<sub>2</sub>/CH<sub>4</sub> Separation," *The 7<sup>th</sup> Sino-US Joint Chemical Engineering Conference*, Beijing, China, October 15, 2013.
18. H. Lin, "Development of Membranes for H<sub>2</sub> Purification and CO<sub>2</sub> Capture: From Material Molecular Engineering to Technology Commercialization," Department of Chemical and Biomolecular Engineering, Xiamen University, July 31, 2014
19. H. Lin, "Membrane Development for Precombustion CO<sub>2</sub> Capture: From Molecular Engineering to Product Demonstration," North China Electric Power University, China, October 17, 2013
20. H. Lin, "Development of Membranes for H<sub>2</sub> Purification and CO<sub>2</sub> Capture: From Material Molecular Engineering to Technology Commercialization," Tianjin University, China, October 14, 2013
21. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H<sub>2</sub> Purification and CO<sub>2</sub> Capture," Auburn University, April 1, 2013 (*Interview*)
22. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H<sub>2</sub> Purification and CO<sub>2</sub> Capture," University of Houston, March 1, 2013 (*Interview*)
23. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H<sub>2</sub> Purification and CO<sub>2</sub> Capture," Clemson University, February 19, 2013 (*Interview*)
24. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H<sub>2</sub> Purification and CO<sub>2</sub> Capture," University at Buffalo, SUNY, February 14, 2013 (*Interview*)

25. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H<sub>2</sub> Purification and CO<sub>2</sub> Capture," North Carolina State University, February 12, 2013 (*Interview*)
26. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H<sub>2</sub> Purification and CO<sub>2</sub> Capture," Pennsylvania State University, February 5, 2013 (*Interview*)
27. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H<sub>2</sub> Purification and CO<sub>2</sub> Capture," Texas Tech University, January 28, 2013 (*Interview*)
28. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H<sub>2</sub> Purification and CO<sub>2</sub> Capture," Drexel University, January 24, 2013 (*Interview*)
29. H. Lin, "Molecular Engineering of Polymeric Membrane Materials for H<sub>2</sub> Purification and CO<sub>2</sub> Capture," University of Texas at Austin, January 17, 2013
30. H. Lin, A. Serbanescu-Martin, M. Zhou, and T.C. Merkel, "Oxygen Enrichment Using Membranes," *The 244<sup>th</sup> ACS National Conference*, Philadelphia, August 19, 2012.
31. 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 CO<sub>2</sub> Capture from Coal-Derived Syngas," *The DOE Project Review Meeting at National Carbon Capture Center*, Wilsonville, AL, December 7, 2011.
32. H. Lin, A. Serbanescu-Martin, M. Zhou, and T.C. Merkel, "Understanding the Practical Upperbound for CO<sub>2</sub>/CH<sub>4</sub> Separation," *The 240<sup>th</sup> ACS National Conference*, Boston, August 25, 2010.
33. H. Lin, "Hydrogen Purification and CO<sub>2</sub> Sequestration Using Polymeric Membranes," *Golden Gate Polymer Forum Dinner Meeting*, Mountain View, CA, May 18, 2009.