

JUSTIN M. NOTESTEIN

Department of Chemical & Biological Engineering
Robert R. McCormick School of Engineering and Applied Science
Northwestern University
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EDUCATION

Princeton University	Chemical Engineering, <i>magna cum laude</i> Certificate in Materials Science and Engineering	B.S.E. 2001
University of California, Berkeley	Chemical Engineering	Ph.D. 2006
Univ. Illinois, Urbana-Champaign	Chemistry Postdoctoral Fellow	2006-2007

PROFESSIONAL EXPERIENCE

- 2013 Associate Professor, Chemical and Biological Engineering, *Northwestern University*
The Notestein group researches engineering approaches to atom-precise materials for heterogeneous catalysis and adsorption. Our group focuses on reactions and processes essential to sustainable energy development and selective oxidations including utilization of renewables and photocatalysis.
- 2007 Assistant Professor, Chemical and Biological Engineering, *Northwestern University*
- 2009 Affiliate, International Institute of Nanotechnology, *Northwestern University*
- 2009 Affiliate, Northwestern Institute for Sustainable Practices, *Northwestern University*
- 2007 Member, Center for Catalysis and Surface Science, *Northwestern University*
- 2006-07 Post-Doctoral Research Associate, Chemistry, *University of Illinois, Urbana Champaign*
Grafted oligomers were developed for switchable porous surfaces in sensing and separations.
- 2001-06 Doctoral Student, Chemical Engineering, *University of California, Berkeley*
A new class of hybrid organic-inorganic materials based on grafted calixarenes was synthesized and characterized for host-guest adsorption and oxidation catalysis.
- 2000-01 Undergraduate Researcher, Chemical Engineering, *Princeton University*
Ring-opening metathesis and anionic polymerization were combined to synthesize diblock copolymers.

JMN RESEARCH RECOGNITION

- DuPont Young Professor Award, 2011, 2012, 2013
"Mover and Shaker", The Catalysis Review magazine, 2011
3M Non-Tenured Faculty Award, 2010, 2011, 2012
Young Investigator Award, International Catalysis Congress, 2008
Camille and Henry Dreyfus New Faculty Award, 2007
Phi Beta Kappa Fellowship, CA alpha chapter, 2006
National Science Foundation Graduate Student Fellowship, 2001-2004

PUBLICATIONS * corresponding author % undergraduate or high school author

1. Z. Bo, S. Ahn, M. A. Ardagh, N. M. Schweitzer, C.P. Canlas, O.K. Farha, J.M. Notestein*, "Synthesis and Stabilization of Small Pt Nanoparticles on TiO₂ partially Masked by SiO₂," *Appl. Catal. A* **2016**, submitted.
2. L.R. McCullough, D.J. Childers, R.A. Watson, B.A. Kilos, D. Barton, E. Weitz, H.H. Kung, J.M. Notestein*, "Acceptorless dehydrogenative coupling of neat alcohols using Group VI sulfide catalysts," *ACS Sustainable Chem. & Eng.* **2016**, under revision.
3. S. Ahn, N. Thornburg, Z. Li, T. Wang, L. Gallington, K. Chapman, J. Notestein, J. Hupp, O. Farha*, "Stable Metal–Organic Framework Supported Niobium Catalysts," *Inorg. Chem.* **2016**, 55, 11954-11961.
4. K.C. Schwartzenberg, J.W.J. Hamilton, A.K. Lucid, E. Weitz, J. Notestein, M. Nolan*, J.A. Byrne*, K.A. Gray*, "Multifunctional photo/thermal catalysis for the reduction of carbon dioxide," *Catal. Today*, **2016**, in press.
5. M. A. Ardagh, Z. Bo, S. L. Nauert, J. M. Notestein*, "Depositing SiO₂ on Al₂O₃: a route to tunable Bronsted acid catalysts," *ACS Catal.*, **2016**, 6, 6156-6164.

6. N. E. Thornburg, S. L. Nauert, A. B. Thompson, J. M. Notestein, "Synthesis-structure-function relationships of silica-supported niobium(V) catalysts for alkene epoxidation with H₂O₂," *ACS Catal.*, **2016**, *6*, 6124-6134.
7. Bachrach, M.; Marks, T.*; Notestein, J. M.*, "Understanding the Hydrodenitrogenation of Heteroaromatics on a Molecular Level," *ACS Catal.*, **2016**, *6*, 1455-1476.
8. S. L. Nauert, F. Schax, C. Limberg, J. M. Notestein*, "Cyclohexane oxidative dehydrogenation over copper oxide catalysts," *J. Catal.*, **2016**, *341*, 180-190.
9. Yang, C.-C.; Kilos, B.; Barton, D.; Weitz, E.; Notestein, J. M.*, "Increased Productivity in Ethylene Carbonylation by Zeolite-Supported Molybdenum Carbonyls," *J. Catal.*, **2016**, *338*, 313-320.
10. M. Bachrach, T. Marks*, J. M. Notestein*, "C-N bond hydrogenolysis of aniline and cyclohexylamine over TaOx-Al₂O₃," *New J. Chem.*, **2016**, *7*, 6001-6004.
11. C. A. Roberts*, L. Savereide, D. J. Childers, T. C. Peck, J. M. Notestein, "In situ FTIR spectroscopy of highly dispersed FeOx catalysts for NO reduction: Role of Na promoter," *Catal. Today*, **2016**, *267*, 56-64.
12. N. E. Thornburg, Y. Liu, P. Li, J. T. Hupp, O. K. Farha, J. M. Notestein*, "MOFs and their grafted analogues: regioselective epoxide ring-opening with Zr6 nodes," *Catal. Sci. Technol.*, **2016**, *6*, 6480-6484.
13. Yacob, S.; Kilos, B. A.; Barton, D.; Notestein, J. M.*, "Vapor Phase Ethanol Carbonylation Over Rh Supported on Zeolite 13X," *Appl. Catal. A.*, **2016**, *520*, 122-131.
14. Ignacio de Leon, P. A.; Contreras, C. A.; Thornburg, N.E.; Thompson, A.B.; Notestein, J.M.*, "Catalyst structure and substituent effects on epoxidation of styrenics with immobilized Mn(tmtacn) complexes," *Appl. Catal. A.*, **2016**, *511*, 78-86.
15. Grosso-Giordano, N. A.*; Eaton, T.; Bo, Z.; Yacob, S.; Yang, C.-C.; Notestein, J. M.*, "Silica Support Modifications to Enhance Pd-catalyzed Deoxygenation of Stearic Acid," *Appl. Catal. B.*, **2016**, *192*, 93-100.
16. Contreras, C. A.; Ignacio de Leon, P. A.; Notestein, J. M.*, "Synthesis of a family of peracid-silica materials and their use as alkene epoxidation reagents," *Microporous Mesoporous Mater.*, **2016**, *225*, 289-295.
17. Thornburg, N. E.; Thompson, A. B.; Notestein, J. M.*, "Periodic Trends in Highly Dispersed Groups IV and V Supported Metal Oxide Catalysts for Alkene Epoxidation with H₂O₂," *ACS Catal.* **2015**, *5*, 5077-5088.
18. Prieto-Centurion, D.; Eaton, T. R.; Roberts, C. A.; Fanson, P. T.; Notestein, J. M.*, "Catalytic reduction of NO with H₂ over redox-cycling Fe on CeO₂," *Appl. Catal. B*, **2015**, *168*, 68-76.
19. Roberts, C. A.*; Prieto-Centurion, D.; Nagai, Y.; Nishimura, Y. F.; Desautels, R.; van Lierop, J.; Fanson, P. T.; Notestein, J. M.*, In Situ Characterization of highly dispersed, ceria-supported Fe sites for NO reduction by CO. *J. Phys. Chem. C* **2015**, *119*, 4334-4234.
20. Bo, Z.; Eaton, T. R.; Gallagher, J. R.; Canlas, C. P.; Miller, J. T.; Notestein, J. M.*, Size-selective synthesis and stabilization of small Ag nanoparticles on TiO₂ partially masked by SiO₂. *Chem. Mater.* **2015**, *27*, 1269-1277.
21. Yacob, S.; Park, S.; Kilos, B. A.; Barton, D. G.; Notestein, J. M.*, "Vapor phase ethanol carbonylation with heteropolyacid-supported Rh," *J. Catal.* **2015**, *325*, 1-8.
22. M. Bachrach, N. Morlanes, C. P. Canlas, J. T. Miller, T. J. Marks, J. M. Notestein*, "Increasing the Aromatic Selectivity of Quinoline Hydrogenolysis Using Pd/MOx-Al₂O₃," *Catal. Lett.* **2014**, *144*, 1832-1838.
23. C-C Yang, B. A. Kilos, D. G. Barton, E. Weitz, J. M. Notestein*, "The role of iodide promoters and the mechanism of ethylene carbonylation catalyzed by molybdenum hexacarbonyl," *J. Catal.* **2014**, *319*, 211-219.
24. T. R. Eaton, A. M. Boston,* A. B. Thompson, K. A. Gray, J. M. Notestein*, "Counting Active Sites on Titanium Oxide-Silica Catalysts for Hydrogen Peroxide Activation through In Situ Poisoning with Phenylphosphonic Acid," *ChemCatChem* **2014**, *6*, 3215-3222.
25. A. B. Thompson, R. C. Scholes*, J. M. Notestein*, "Recovery of Dilute Aqueous Acetone, Butanol, and Ethanol with Immobilized Calixarene Cavities," *ACS Appl. Mater. & Interfaces*, **2014**, *6*, 289-297.
26. T. R. Eaton, M. P. Campos,* K. A. Gray, J. M. Notestein*, "Quantifying accessible sites and reactivity on titania-silica (photo)catalysis: Refining TOF calculations," *J. Catal.* **2014**, *309*, 156-165.
27. C. P. Canlas, J. Lu, N. A. Ray, N. A. Grosso-Giordano*, J. W. Elam, S. Lee, R. E. Winans, P. C. Stair, R. P. Van Duyne, and J. M. Notestein*, "Shape-Selective Sieving Layers on an Oxide Catalyst Surface," *Nature Chem.*, **2012**, *4*, 1030-1036.
28. D. Prieto-Centurion, A. M. Boston*, J. M. Notestein*, "Structural and electronic promotion with alkali cations of silica-supported Fe(III) sites for alkane oxidation," *J. Catal.*, **2012**, *296*, 77-85.
29. K. R. Bjorkman, N. J. Schoenfeldt, J. M. Notestein, L. J. Broadbelt*, "Microkinetic modeling of cis-cyclooctene oxidation on heterogeneous Mn-tmtacn complexes," *J. Catal.*, **2012**, *291*, 17-25.

30. J. M. Notestein*, "Review: R. Sebesta (ed): Enantioselective Homogeneous Supported Catalysis," *Catal. Lett.*, **2012**, *142*, 1150-1151.
31. P. Young, J. M. Notestein*, "The Role of Amine Surface Density on Carbon Dioxide Adsorption on Functionalized Mixed Oxide Surfaces," *ChemSusChem*, **2011**, *4*, 1671-1678.
32. N. J. Schoenfeldt, Z. Ni, A. W. Korinda, R. J. Meyer, J. M. Notestein*, "Manganese Triazacyclononane Oxidation Catalysts Grafted under Reaction Conditions on Solid Co-Catalytic Supports," *J. Am. Chem. Soc.*, **2011**, *133*, 18684-18695.
33. N. J. Schoenfeldt, J. M. Notestein*, "Solid Co-catalysts for Immobilizing and Activating Manganese Triazacyclononane Oxidation Catalysts," *ACS Catal.*, **2011**, *1*, 1691-1701.
34. A. B. Thompson, S. Cope%, T. D. Swift%, J. M. Notestein*, "Adsorption of n-Butanol from Dilute Aqueous Solution with Grafted Calixarenes," *Langmuir*, **2011**, *27*, 11990-11998.
35. D. Prieto-Centurion, J. M. Notestein*, "Surface speciation and alkane oxidation with isolated Fe sites on silica," *J. Catal.*, **2011**, *279*, 103-110.
36. N. J. Schoenfeldt, A. W. Korinda, J. M. Notestein*, "A heterogeneous, selective oxidation catalyst based on Mn triazacyclononane grafted under reaction conditions," *Chem. Commun*, **2010**, *46*, 1640-1642.
37. N. Morlanes, J. M. Notestein*, "Grafted Ta-calixarenes: tunable, selective catalysts for direct olefin epoxidation with aqueous H₂O₂," *J. Catal.*, **2010**, *275*, 191-201.
38. N. Morlanes, J. M. Notestein*, "Kinetic Study of cyclooctene epoxidation with aqueous hydrogen peroxide over silica-supported calixarene Ta(V)," *Appl. Catal. A-General*, **2010**, *22*, 5319-5327.
39. J. M. Notestein*, C. Canlas, J. Siegfried%, J. S. Moore, "Covalent grafting of m-phenylene-ethynylene oligomers to oxide surfaces," *Chem. Mater.* **2010**, *22*, 5319-5327.
40. A. Solovyov, J. M. Notestein, K. A. Durkin, A. Katz*, "Graftable chiral ligands for surface organometallic materials: calixarenes bearing asymmetric centers directly attached to the lower rim," *New J. Chem.* **2008**, *32*, 1314-1325.
41. J. M. Notestein, L. R. Andrini, A. Solovyov, F. G. Requejo, A. Katz*, E. Iglesia*, "The role of outer-sphere surface acidity in alkene epoxidation catalyzed by calixarene-Ti(IV) complexes," *J. Am. Chem. Soc.* **2007**, *129*, 15585-15595.
42. J. M. Notestein, A. Katz*, E. Iglesia*, "Photoluminescence and charge transfer complexes of calixarenes grafted on TiO₂ nanoparticles," *Chem. Mater.* **2007**, *19*, 4998-5005.
43. J. M. Notestein, L. R. Andrini, V. I. Kalchenko, F. G. Requejo*, A. Katz*, E. Iglesia*, "Structural assessment and catalytic consequences of the oxygen coordination environment in grafted Ti-calixarenes," *J. Am. Chem. Soc.* **2007**, *129*, 1122-1131.
44. J. M. Notestein, A. Katz*, "Enhancing heterogeneous catalysis through cooperative hybrid organic-inorganic interfaces," *Chem. Eur. J.* **2006**, *12*, 3954-3965.
45. J. M. Notestein, A. Katz*, E. Iglesia*, "Energetics of small molecule and water complexation in hydrophobic calixarene cavities," *Langmuir* **2006**, *22*, 4004-4014.
46. J. M. Notestein, E. Iglesia, A. Katz*, "Grafted metallocalixarenes as single-site surface organometallic catalysts," *J. Am. Chem. Soc.* **2004**, *126*, 16478-16486.
47. A. Katz*, P. DaCosta, A. C. P. Lam%, J. M. Notestein, "The first single-step immobilization of a calix[4]arene onto the surface of silica," *Chem. Mater.* **2002**, *14*, 3364-3368.
48. J. M. Notestein%, L. B. W. Lee, R. Register*, "Well-defined diblock copolymers via termination of living ROMP with anionically polymerized macromolecular aldehydes," *Macromolecules* **2002**, *35*, 1985.

PATENTS

49. "Catalysts and Related Methods for Photocatalytic Production of H₂O₂ and Thermocatalytic Reactant Oxidation," Gray, K. A.; Notestein, J. M.; Eaton, T. R., Application US2016023044, **2016**.
50. "Fabrication of catalyst used in catalytic converter of automotive vehicle, involves contacting substrate containing with transition/post transition metal, and contacting substrate with alkali/alkaline earth metal cations", J. M. Notestein, D. Prieto-Centurion, P. T. Fanson, C. A. Roberts, Applications WO2015077268, US20150139883, **2015**.
51. "New catalyst for useful for oxidizing alkane e.g. ethane to acetaldehyde, ethanol, methanol, and formaldehyde comprises support modified with carboxylate group which is functionalized with manganese complex", J. M. Notestein, N. J. Schoenfeldt, A. W. Korinda, US Patent 9,024,076, **2015**.
52. "Immobilized Calixarenes and Related Compounds and Process for their Production" A. Katz, E. Iglesia, J. M. Notestein, US Patent 6,951,690, **2005**.

SELECT INVITED EXTERNAL PRESENTATIONS by JMN

Invited Talk, Division of Catalysis and Reaction Engineering, AIChE Fall National Meeting, San Francisco, CA, Nov 2016
Invited Talk, Division of Catalysis Science and Technology, ACS Spring National Meeting, San Diego, CA, March 2016
Departmental Seminar, Chemical Engineering, California Institute of Technology, October 2015
Keynote, "Catalytic Materials and Technologies for Upgrading of CO_x and Natural Gas," ACS National Meeting, Denver, March 2015.
Emerging Leaders Lecture Series, University of Toronto, March 2015
External Speaker Series, Exxon-Mobil, May 2014
Departmental Seminar, Chemical Engineering, Penn State, April 2014
Department Seminar, Chemical Engineering, University of Oklahoma, April 2014
Invited Lecture, Michigan Catalysis Society, March 2014
Keynote Lecture, Calixarenes 12, St. Johns, Newfoundland, Canada, July 2013
Department Seminar, Chemistry, University of Wisconsin Madison, February 2013.
Department Seminar, Chemical and Biological Engineering, Northwestern University, October 2012
Invited Talk, Catalysis and Reaction Engineering Division, AIChE National Meeting, Pittsburgh, October 2012
Keynote Lecture, Catalysis Gordon Conference, Colby Sawyer College, NH, June 2012
Invited Talk, Division of Catalysis Science and Technology, ACS Fall National Meeting, San Diego, CA, March 2012
Department Seminar, Chemical and Biological Engineering, Princeton University, March 2012
Award lecture, DuPont, Wilmington DE, October 2011
Corporate meeting, 3M, St. Paul MN, October 2011
Invited Talk, Materials Engineering and Sciences Division, AIChE National Meeting, Minneapolis MN, October 2011
Invited Poster, Department of Energy Contractors Meeting, 'Heterogeneous Catalysis,' Annapolis MD, October 2011
Keynote Lecture. 15th International Symposium on Relation between Homogeneous and Heterogeneous Catalysis, Berlin, September 2011
Corporate meeting, The Dow Chemical Company, Midland MI, August 2011
Invited Talk, Hydrotreating Symposium, Energy and Fuels Division, ACS National Meeting, Denver CO, August 2011
Invited Talk, Division of Catalysis Science and Technology, ACS National Meeting, Anaheim CA, March 2011
Invited poster, Department of Energy Contractors Meeting, 'Homogeneous Catalysis,' Annapolis MD, June 2010
Invited Talk, Division of Catalysis Science and Technology, ACS National Meeting, San Francisco, March 2010
Department Seminar, Chemical Engineering, University of Illinois at Chicago, January 2010
Invited poster, Department of Energy Contractors Meeting, 'Heterogeneous Catalysis,' Annapolis MD, June 2009
Annual Meeting, UNICAT, Fritz Haber Institute, Berlin, Germany, May 2009
Annual Meeting, Institute for Catalysis in Energy Processes, Northwestern University, April 2009
Department Seminar, Environmental Engineering, Northwestern University, February 2009
Workshop, 2nd Northwestern-Berkeley-Heidelberg Workshop on Catalysis, Heidelberg Germany, September 2008
Department Seminar, Center for Catalysis and Surface Science, Northwestern University, January 2008
Corporate Meeting, UOP, September 2007
Departmental Colloquium, Chemical Engineering, MIT, 2006
Departmental Colloquium, Chemical and Biological Engineering, Northwestern University, 2006
Departmental Colloquium, Chemical Engineering, Stanford University, 2006

EDUCATION and UNIVERSITY SERVICE and RECOGNITION

McCormick (School of Engineering) Advisor of the Year, *Northwestern University*, 2009-2010
Associated Student Government Faculty Honor Roll, *Northwestern University*, 2013, 2010, 2008
Dow Outstanding Teaching Assistant Award, *UC Berkeley*, 2002

Chemical and Biological Engineering Director of Graduate Studies, 2014-

Executive committee, Center for Catalysis and Surface Science, 2014-

University Office of Safety Board, 2015-

University Library Committee, 2014-

McCormick Teaching and Mentorship Award Committee, 2012-2014

British and Selective Fellowships Committee, 2008-2014

American Institute of Chemical Engineers Advisor, 2008-2014

Omega Chi Epsilon Student Chapter Advisor, 2008-

Professor: Process Economics, Design & Evaluation (undergraduate), F07, F08, W10, W14

Analysis of Chemical Process Systems (undergraduate), W08, W09, F09, F10, F11, F12

Kinetics and Reactor Design (graduate), F09, F12, F13, F14, F15, F16

Chemical Product Design (undergraduate), W12, W13, W14, W15, W16, S17

Participation in NSF-funded educational study, "Critical Thinking Initiative in STEM," 2011-2013

Invited lecturer, "Reconceptualizing the Research Paper," for the Teaching, Learning, & Technology series of workshops at Northwestern University, Spring 2010, 2011

Searle Teaching Fellow, a selective program at Northwestern University that develops teaching strategies, assessment methods, and project-based learning, 2008-2009.

Grant recipient, "Chemical Product Design: A New Course and a Theme for Independent Undergraduate Research," Alumnae Association of Northwestern," 4/2011-6/2012

Grant recipient, "Chemical Product Design at Northwestern: A new course and a new approach to chemical engineering education," P&G Fund of The Greater Cincinnati Foundation, 2/2013

PROFESSIONAL SERVICE (denotes group members)

Meeting Chair, 26th Meeting of the North American Catalysis Society, 2019, Chicago.

Participant, Safety by Design, Improving Safety in Research Laboratories, 2016 (Gosavi)

Co-instructor, Responsible Conduct of Research, 2015 (Raimondo)

Member, Roundtable on Industrial Catalysis Revitalization, American Chemical Council, 2015

Organizing committee, Meeting on *Interfaces of Heterogeneous and Homogeneous Catalysis*, Utrecht, 2105.

Organizing committee, ACS Division of Catalysis, 2010-

Steering committee, Midwest Regional AIChE Conference, 2013, 2014

Academic liaison, Chicago section of the AIChE, 2009-

Organic Reactions Catalysis Society Editorial Board, 2012

Session Chair or Co-Chair at AIChE: Fundamentals of Oxide Catalysis, Fundamentals of Supported Catalysis, Reaction Engineering in Pharmaceuticals and Fine Chemicals, Catalyst Preparation; ACS, NAM, 2007-current

Symposium Organizer: 2013 Spring National ACS, Frustrated Acid-Base Pairs, Division of Catalysis; 2011 Midwest Regional AIChE, Student Poster Session; 2011 Spring National AIChE, Student Poster Session; 2010 National ACS, Photocatalysis; 2010 Midwest Regional AIChE, 2009 Chicago Regional AIChE.

Reviewer for NSF panels, ACS PRF, DOE, North American Catalysis Meeting, International Catalysis Congress, *Science*, *Nature Chemical Biology*, *Catal. Lett.*, *Chem. Eng. J.*, *Fuel*, *J. Am. Chem. Soc.*, *Appl. Catal.*, *Org. Proc. Res. Dev.*, *J. Catal.*, *Energy and Fuels*, *Ind. Eng. Chem. Res.*, *J. Phys. Chem.*, *Organometallics*, *Int. J. Hydrogen Energy*, *Langmuir*, *ACS Nano*, *ACS Catal.*, *Green Chem.*, *ChemSusChem*, and others.

COMMUNITY OUTREACH

National conference representative to National Society of Black Engineers, 2014, 2015 (Yacob)

Northwestern Library Exhibit, *"Two Degrees and You: An NU Approach to Climate Change"*, 2014

Collaboration with Dr. Adam Pelzer. Two group members (Ignacio-deLeon and Yacob) developed talks about their research for presentation at Harold Wilson College, one of the Chicago Community Colleges. Yacob has also developed a video describing her research for the same audience as part of the career development program 'Ready, Set, Go.'

Career Day for Girls, Host Laboratory. Career Day is the College of Engineering's largest outreach program targeting local and regional junior high and high school girls. Developed hands-on demonstrations on catalysis. (Young)

Participation in 'Science in the Classroom,' which led basic science lessons and experiments for 3rd graders at a school in an underprivileged Chicago neighborhood, 2011-2012. (Bachrach)

Mentoring for high school regional and state science fairs. 2011-current, (Bachrach, Thornburg)

Project EXCITE tutoring at local schools, 2011-2012 (Eaton)

RESEARCH ADVISING

STUDENTS ADVISED (18): Alex Grant 2015-2020 (PhD, co-advising with Dick Co, ISEN); Sol Ahn 2014-2019 (PhD, co-advising with Omar Farha, Chemistry); Abha Ghosavi 2014-2019 (PhD, co-advising with Chad Mirkin, Chemistry); Scott Nauert 2013-2018 (PhD); M. Alexander Ardagh, 2013-2018 (PhD); Louisa Savereide, 2013-2018 (PhD); Bo Zhenyu, 2012-2017 (PhD, MSE); Nicholas Thornburg, 2012-2017 (PhD); Rachel Watson, 2012-2017 (PhD, co-advising with Harold Kung); Lauren McCullough, 2012-2017 (PhD, co-advising with Harold Kung); Christian Contreras, 2011-2013 (MS, PhD Northwestern); Sara Yacob, 2011-2016 (PhD, Exxon-Mobil); Todd Eaton, 2010-2015 (PhD, joint with Prof. Gray, NREL); Mark Bachrach, 2010-2014 (PhD Chemistry, joint with Prof. Marks, PD U. Minn.); Anthony Thompson, 2009-2014 (PhD, ORNL); Dario Prieto-Centurion, 2008-2013 (PhD, SABIC); Pria Young, 2008-2013 (PhD, BP); Andrew Korinda, 2007-2012 (PhD, Hemlock Semiconductor)

POSTDOCTORAL SCHOLARS SPONSORED (8): Corinna Raimondo, 2015-2016 (NU Office of Research Integrity); Sherzod Madrahimov (joint with Prof. Nguyen, Faculty, Texas A&M at Qatar), 2014-2015; David Childers, 2014-; Chieh-Chao Yang (joint with Prof. Weitz), 2012-2016 (DuPont); Sergio Garibay (joint with Prof. Nguyen), 2012-; Patricia Ignacio-deLeon, 2012-2014 (Argonne); Sunyoung Park, 2012-2013 (KIST); Christian Canlas, 2010-2012 (Argonne); Nicholas Schoenfeldt, 2008-2011 (UOP); Natalia Morlanés-Sánchez, 2009-2011 (KAUST)

UNDERGRADUATE AND HIGH SCHOOL STUDENT RESEARCH MENTORING %indicates published or submitted manuscript

UNDERGRADUATE: Mr. Sam Dull, 2016; Mr. Eric Taw, 2016; Mr. Reed Kolbe, 2015; Mr. Chi Hun Choi, 2013-2015; Mr. Andrew Boston%, 2011, 2013-2014 (Colorado PhD); Ms. Yuanxi Zhao, 2013, Mr. Mitchell Kirshner, 2013; Mr. Michael P. Campos (Chem, Columbia PhD),% Mr. PJ Santos%, 2012; Ms. Rachel Scholes% (Berkeley, PhD, NSF), 2011-2013; Mr. Nicolas Grosso% (Berkeley PhD) 2011-2013; Mr. Joshua Kaplan, 2011; Ms. Sydney Cope%, 2010; Ms. Lisa Felberg, 2009-2010 (Berkeley PhD); Mr. Theodore D. Swift% (Delaware PhD), 2009; Mr. John Siegfried%, 2008-2009; Mr. David Gabriel, 2008-2009

REU: Ms. Megan Raysor (Fayetteville State University), 2015; Ms. Ludmilla Sorokina (Harold Washington Community College, Chicago), 2014; Ms. Hannah Hinton (Cerritos Community College (CA)), 2013; Ms. Amen Eloramen (Illinois Institute of Technology), 2013; Mr. Andrew Karas (Polytechnic University of NY), 2012; Mr. Stephen Brand (NU, now CalTech PhD), 2011; Mr. Alex Baron (University of Miami at Ohio), 2009.

SROP: Ms. Yeilyn Colon (University of Notre Dame), 2014; Mr. Justin Swaney (University of Wisconsin, Madison), 2013.

HIGH SCHOOL: Mr. Ryan Franks (Illinois Math and Science Academy, IMSA) 2014-2015; Ms. Nishida Kumar (IMSA) 2011-2012, Ms. Ashley Radee (IMSA) 2011-2012, Ms. Elizabeth Ott (IMSA) 2010-11; Mr. Samir Mishra (IMSA) 2009-10; Ms. Jessie Salter (Evanston Township High School) 2010.

ACHIEVEMENTS by GROUP MEMBERS

The Graduate School Terminal Year Fellowship, 2016 (Thornburg)

Gore Fellows 1st Prize, 2015 (Thornburg)

Christine Mirzayan Science & Technology Policy Fellowship, National Academies, 2016 (Raimondo)

The Graduate School Terminal Year Fellowship, 2015 (Yacob)

Distinguished Graduate Researcher, runner up, 2015 (Yacob)

Industrial & Engineering Chemistry Graduate Student Award, ACS, 2015 (Yacob)

Kokes Travel Award, North American Catalysis Society, 2015 (Yacob)

George Thodos Teaching Assistant Award 2015 (Ardagh and Thornburgh)

AIChE Chicago Annual Poster Competition, 1st Prize, 2015 (Watson)

NSF Graduate Research Fellowship 2014-2017 (Nauert)

NSF Graduate Research Fellowship 2104-2017 (Scholes, former undergraduate)

1st Place Poster, Catalysis Club of Chicago annual Symposium, 2014 (Yacob)

Ryan Nanotechnology fellowship 2013 (Nauert)

NIH – Initiative to Maximize Student Development Fellowship 2011-2013 (Yacob)

Christine Mirzayan Science & Technology Policy Fellowship, National Academies, 2012 (Young)

First Place Poster, Undergraduate Poster Session, AIChE Annual National Meeting 2012 (Grosso-Giordano)

Carl Storm Fellowship, Catalysis Gordon Conference 2012 (Yacob)

George Thodos Teaching Assistant award 2012 (Contreras)

Separations Division Travel Award, AIChE Annual Meeting 2012 (Thompson)

Catalysis and Reaction Engineering Division Travel Award, AIChE Annual Meeting 2012 (Young)

Catalysis and Reaction Engineering Division Travel Award, AIChE Annual Meeting 2011 (Prieto)

Kokes Travel Award, North American Catalysis Society, 2011 (Prieto)

Northwestern University Graduate Leadership Council, Elected Chair, 2011 (Young)

MRSEC Fellow, 2010-2011 (Young)

McCormick Graduate Leadership Council, Elected Chair, 2010-2011 (Young)

Women's Initiative Committee Travel Award, AIChE Annual Meeting 2010 (Young)

ISEN Cluster Fellowship, 2009-2010 (Young)

George Thodos Teaching Assistant award 2009 (Korinda)

Link Energy Fellowship, runner up 2009 (Prieto)

Ryan Nanotechnology Fellowship 2008 (Prieto)