

Curriculum Vitae

RAKESH AGRAWAL

Work Address:

Davidson School of Chemical Engineering
Purdue University
480 Stadium Mall Drive
West Lafayette, IN 47907-2100
Telephone (765) 494-2257; Fax: (765)-494-0805
Email agrawalr@purdue.edu
Group Website: <http://agrawalrakesh.org>

Education:

Sc.D. Massachusetts Institute of Technology, 1980 (Ch.E.)
M.Ch.E. University of Delaware, 1977
B. Tech. Indian Institute of Technology, Kanpur, India, 1975

Professional Experience:

- Winthrop E. Stone Distinguished Professor, School of Chemical Engineering, Purdue University. (2004-Present)
- Faculty Affiliate, Division of Environmental and Ecological Engineering, Purdue University (2011 - Present)
- Director, Solar Economy Integrative Graduate Education and Research Traineeship (IGERT) Center. (2009-2016)
- Director, Sustainable Food, Energy and Water Systems Center, an NSF NRT Center (2017-Present)
- Visiting Professor, École Polytechnique Fédérale de Lausanne, Switzerland (Sept 2010, May – June 2018).
- Visiting Scientist, Helmholtz-Zentrum Berlin für Materialien und Energie, Berlin, Germany (Oct 2010-Feb. 2011).
- ExxonMobil Visiting Chair Professor, Department of Chemical and Biomolecular Engineering, National University of Singapore (2011-2014).
- Fellow of the Hagler Institute for Advanced Study at Texas A&M University (2014-2015).
- Visiting Professor, University of Melbourne, Melbourne, Australia (January- February 2018)
- Visiting Scientist, National Renewable Energy Laboratory (NREL), Golden, CO (March – April 2018).
- Guest Professor, Tianjin University, Tianjin, China (2018-2020)
- Distinguished Adjunct Professor, Institute of Chemical Technology, Mumbai, India (2019-2021)

Air Products and Chemicals, Inc., Allentown, USA. (1980-2004)

2003-2004

*Air Products Fellow (The highest technical position at Air Products)
Chair, Air Products' Technology Board
Participating Member, Air Products' Technology Executive Team.*

1980-2003

Process Engineer, Principal Research Engineer, Senior Principal Research Engineer, Lead Research Engineer, Process Manager, Senior Engineering Associate, Principal Engineering Associate; Chief Engineer.

Managerial Experience:

At Air Products, supervised and coordinated teams of about a dozen chemical engineers; provided technical leadership in the areas of gas separation and gas liquefaction; provided linkages between research, development, process, and business groups; supported technical sales; prepared R&D budgets and planned long and short-term R&D projects. Established a state-of-the-art Process Synthesis group for separation process evaluation, development, and commercialization.

Instrumental in developing and driving Air Products' "New Waves" document that set out some major growth opportunities for Air Products based on the emerging social and technological trends and many of the opportunities were implemented.

Research Interests:

Solution-processed electronic devices including solar cells; Nanoparticle synthesis and use; Energy systems analysis; Energy transformation and use issues for solar, natural gas, coal, biomass, and hydrogen economy; PV-Aglectric Farming (Agrivoltaics); Novel separation processes using distillation, membranes, and adsorption; Process development; Cryogenics and gas liquefaction processes.

Patent Activities:

- One hundred and thirty-seven U. S. patents; nearly five hundred non-U.S. patents; and six pending US Patent Applications.
- The patented ideas have been applied to over 100 operating plants with total capital investments of multi-billion dollars.

Publications and Presentations:

- Two hundred ninety-one technical papers (Two hundred twenty-three in refereed journals, six book chapters).
- Two hundred seventy-six technical presentations and two hundred ninety-seven invited lectures.
- Co-author of ten annual technology symposium papers. This is a prestigious proprietary annual symposium at Air Products and Chemicals.

Professional Societies:

- Fellow, American Institute of Chemical Engineers (AIChE),
- Fellow, American Academy of Arts and Sciences (AAAS),
- Fellow, Indian National Academy of Engineering (INAE),
- Fellow, National Academy of Inventors (NAI).
- Member, U.S. National Academy of Engineering (NAE);
- Member, American Chemical Society (ACS),
- Member, Institute of Electrical and Electronic Engineers (IEEE),
- Member, Material Research Society (MRS),
- Member, Sigma-Xi

Professional Service:

1. National:

Industrial Technical Advisory Boards:

- Member, Technology Board, Air Products and Chemicals (2004-2007)

- Member, Technical Advisory Board, Dow Chemical (2007- 2014)
- Member, Technical Advisory Board, Kyrogen Ltd. (2007-2010)
- Member, Technical Advisory Board, Weyerhaeuser (2008- 2009)
- Member, Engineering Advisory Board, Genomatica (2009 - 2013)
- Member, Technical Advisory Board, ATMI (2010-2012)
- Member, Aspen Tech Academy, Aspen Tech (2012 - 2017)

Academic Advisory Committees:

- Advisory Council member, School of Chemical and Biochemical Engineering, Cornell University (2002-2007)
- Member, Bourns College of Engineering Council of Advisors, University of California, Riverside (2003 – 2005)
- Chemical Engineering Department Advisory Committee member, Worcester Polytechnic Institute, Worcester, MA (2007- 2012)
- Member, Wanger Institute for Sustainable Energy Research (WISER) Board of Advisors, IIT Chicago (2009-)
- Member, Department of Chemical and Biomolecular Engineering Advisory Council, University of Delaware (2012-)
- Member, Department of Chemical and Biomolecular Engineering Advisory Council, Lehigh University (2016- 2020)
- Member, Penn State Chemical Engineering External Review Committee, University Park, PA, 2019.

National Lab Advisory Panel:

- Member, Technical Review Panel for the Materials and Chemicals Science & Technology Directorate, National Renewable Energy Lab (NREL), Golden, CO, (2019-Present)

U.S. National Academy of Engineering (NAE):

- Member, Peer Committee, Chemical Engineering Section (2004-2007)
- Member, Nominating Committee (2005)
- Vice Chair, Chemical Engineering Section, NAE (2011)
- Chair, Chemical Engineering Section, NAE (2012)
- Participant, National Academy of Engineering (NAE) workshop on ‘Educate to Innovate’, Washington DC, October 2013
- Member, Committee on Membership (CoM) (2017-2020)
- Member, NAE’s PBAC Energy Working Group, (2021-)
- Vice-chair, NAE’s PBAC Energy Working Group (2024-)
- National Research Council (NRC):
- Member, NRC Board on Energy and Environmental Sciences (BEES) (2005-11)
- Member, Committee on Alternatives and Strategies for Future Hydrogen Production and Use (2002-2004)
- Workshop participant, NRC Committee on Novel Approaches to the Management of Greenhouse Carbon (2003)
- Member, NRC Panel on Fuel Cell Research (2004)
- Member, NRC Panel on DOE’s Integrated Gasification Combined Cycle R&D Program (2005)
- Member, NRC Committee on Assessment of Resource Needs for Fuel Cell and Hydrogen Technologies (2006-2008)
- Member, National Academies’ Renewables Panel for the Committee on America's Energy Future (2007-2008)
- Participant, NRC planning meeting for a Carbon Summit (2009)
- Member, NRC Committee on Plug-in Hybrid Electric Vehicles (PHEV) (2009-2010)

American Institute of Chemical Engineers (AIChE):

- Member, AIChE Board of Directors (2006-2008)
- Chemical Engineering Technology Operating Council (CTOC): Member (1999-2007), Vice Chair, and then Chair (2001-2002)
- Member, AIChE Awards Committee (1999-2003)
- Member, Publications Quality Team (1995 - 1996)
- Member, AIChE Energy Commission (2005-2007)
- Member, Search Committee for AIChE Journal's Chief-Editor (2000)
- Participant, AIChE Board's Strategy Planning Meeting (2004)
- Member, AIChE Fellow Review Committee (2006 – 2008)
- Member, AIChE Board Award Committee (2008)
- Member, AIChE International Committee (2008 – 2009)
- Member, Board of Trustees AIChE Foundation (2011)
- Separations Division: Second Vice Chair to Chair and then Past Chair (1993-1995), Awards Committee Member (1992-1994), and Publications Committee Co-Chair (1992-1994).

Editorial Boards:

- Consulting Editor, Separations, AIChE Journal (1999 - 2008)
- Member, Editorial Advisory Board, Industrial & Engineering Chemistry Research (2010-2012)
- Member, Editorial Board, Current Opinion in Chemical Engineering (2011- 2021)
- Member, Editorial Advisory Board, Chemical Engineering Progress (2012- 2020)
- Member, Consulting Editors Board, AIChE Journal (2012-)
- Member, Editorial Board, Chemie Ingenieur Technik - Chemical Engineering and Technology – Energy Technology (2012- 2023)
- Editorial Board member, Journal of Advanced Manufacturing and Processing (2018-Present)
- Associate editor, Frontiers in Energy Research (2023-present)
- Member, Editorial Board, Transactions of the Indian National Academy of Engineering (2023-Present)

Industrial Consultancy: Air Products and Chemicals (2004- 2014)

Workshop and Conferences:

- Chair, AIChE's 2nd Topical Conference on Separations (1995)
- Organizing Committee Member, Fifth International Conference on Foundations of Computer-Aided Process Design (FOCAPD) (1999)
- Co-Chair, 12th Intersociety Cryogenic Symposium in Atlanta (2000)
- Chair, Gordon Research Conference on Separation and Purification (2000)
- Co-chair, Sixth FOCAPD Conference, Princeton (2004)
- Co-chair, National Science Foundation (NSF) Workshop on 'Separations Research Needs for the 21st Century', (2004)
- Participant, U.S. Department of Energy's workshop on Separations, Austin, TX (2005)
- Member, Technical Advisory Committee, FOCAPD (2009)
- Member, International Programming Committee, 8th International Conference on Foundations of Computer-Aided Process Design (FOCAPD 2014), Seattle, WA (2014)
- Member, International Program Committee, Process Systems Engineering, PSE 2018, San Diego, July 2018
- Member, International Programming Committee (IPC), Foundations of Computer Aided Process Design (FOCAPD) 2019
- Member, International Scientific Committee (ISC), Foundations of Computer Aided Process Design (FOCAPD) 2024, Breckenridge, Colorado

Miscellaneous:

- Trustee CACHE Corporation (1997 - 2005)
- Member, Department of Energy's (DOE) Hydrogen Merit Review Panel, NETL, Pittsburgh (2003, 2004, and 2007)
- Member, NSF Panel on Process Design and Control (2005)
- Panel member, The H-Prize, Panel chaired by the U.S. Representative Bob Inglis, Chairman of the Science Research Subcommittee, U.S. Congress (2005)
- Member, NSF Panel on Separations (2006)
- Team Member for the NSF international benchmarking study on Systems Engineering for Renewable and Clean Energy Manufacturing (SEEM), (2012)
- Panel Member, Workforce Discussion, Secretary of Energy Advisory Board Meeting, Princeton, July, 2023

2. International:

International Institute of Refrigeration (IIR):

- U.S. member, Commission A3 (1996-1999)
- U.S. member, Commission A2 (2000-2007)
- Vice President of Commission A2 (2003-2007)
- Review Committee Member, International Dictionary of Refrigeration, IIR (2001-2003)

Academic Advisory Boards:

- Member, Advisory Board, Department of Sustainable Engineering, IIT Kanpur, India (2021-Present)
- Member, Director's Council, IIT Kanpur, India (2025- Present)

Industrial Consultancy:

- Consultant for the project 'Establishment of an Integrated Model Farm Utilizing Modern Technologies for Local Agricultural Commodities in Kuwait', Kuwait Institute for Scientific Research (KISR), Kuwait, 2019

Workshop and Conferences:

- Technical Committee Member, IChemE's Distillation and Absorption '97 Conference (1995 - 1997)
- Member, International Advisory Committee, Joint IChE, and AIChE conference, Mumbai, India (2004)
- Co-chair, Energy Workshop at the Joint IChE and AIChE conference, Mumbai, India (2004)
- Member, Scientific Committee, Distillation & Absorption (2006)
- Member, International Scientific Committee, Distillation & Absorption (2010)
- Member, International Program Committee, ESCAPE-21, Greece (2011)
- Member, Scientific Committee, 10th International Symposium on Process Systems Engineering, PSE'09, Brazil (2009)
- Member, Scientific Committee, Distillation & Absorption-Conference 2014 in Friedrichshafen, Germany (2014)
- Member, Scientific Committee, 7th International Symposium on Feedstock Recycling of Polymeric Materials (7th ISFR), New Delhi, India, October 2013
- Member, International Advisory Committee, Second International Conference on Advanced Materials for Power Engineering (ICAMPE-2016), Kottayam, Kerala, India
- Member, International Conference on Sustainable Chemical Product and Process Engineering (SCPPE), International Academic Committee, Nanjing, China, June (2016)

- Member, International Advisory Team, International Conference on Emerging Materials and Applications (ICEMA), Allahabad, India, Feb. 2017
- Member, Scientific Advisory Committee, Separations Technology IX: New Frontiers in Media, Techniques, and Technologies, Engineering Conferences International (ECI), Albufeira, Portugal, March 2017
- Member, Scientific Committee, Distillation & Absorption conference, Florence, Italy, September 2018
- Member, International Advisory Committee, Third International Conference on Advanced Materials for Power Engineering (ICAMPE), Kottayam, Kerala, India, August 2019
- Committee Member, SCPPE 2019, 5th International Conference on Sustainable Chemical Product and Process Engineering, Tianjin, China, June – July 2019
- Member, International Program Committee (IPC), 14th International Symposium on Process Systems Engineering (PSE), Kyoto (Japan), July 2022
- Member, Scientific Committee of Distillation and Absorption, Toulouse, 2022;
- Member, International Advisory Board, IChE-CHEMCON 2023, December, Kolkata, India
- Member, International Scientific Committee, ESCAPE34/PSE24, Florence, Italy, June 2024
- Member, Scientific Committee, Distillation & Absorption conference, 13th International Conference on Distillation & Absorption, Salzburg, Austria, 2026

European Federation of Chemical Engineering (EFCE):

- Guest member, Working Party on Fluid Separations (2010 -)
- Member, European Federation of Chemical Engineering (EFCE) Excellence Award in Fluid Separations (2020- Present)

Miscellaneous:

- Panel Member, Role of Indian Diaspora in Capacity Building for Affordable Solar Power, Presentation of solar strategy to Indian Prime Minister Narendra Modi, External Affairs Minister Sushma Swaraj, and Energy Minister R. K. Singh, August 2018
- Panelist, Role of Indian Diaspora in Capacity Building for Affordable Solar Power, 15th Pravasi Bharatiya Divas (PBD) Convention, Varanasi, India, January 2019
- Panelist, Sustainable Fuels, Vaishvik Bhartiya Vaigyanik (VAIBHAV) Summit, October 2020
- Panelist, Advanced Materials, Vaishvik Bhartiya Vaigyanik (VAIBHAV) Summit, October 2020
- Member, Director's Advisory Council, Indian Institute of Technology, Kanpur, India, 2025-

Awards and Honors:

1. National:

- 2010 National Medal of Technology & Innovation from U.S. President Barack Obama [The highest honor given by the U.S. government for Technology and Innovation]

Honorary Memberships:

- Member, U.S. National Academy of Engineering (2002)
- Fellow, American Academy of Arts and Sciences, AAAS (2013)
- Member, U.S. National Academy of Inventors (2014)
- Fellow, American Institute of Chemical Engineers (AIChE) (2009)
- Institute for Advanced Study Faculty Fellow, Texas A&M University (2014)
- Distinguished Member, The National Society of Collegiate Scholars, NSCS (2014)
- Member, Sigma Xi (2017)

American Chemical Society:

- ACS Award in Separations Science and Technology (2017)

- E. V. Murphree Award in Industrial and Engineering Chemistry (2024)

American Institute of Chemical Engineers:

- Institute Award for Excellence in Industrial Gases Technology (1998)
- Clarence G. Gerhold Award, Separations Division (2001)
- AIChE Institute Lecturer (2005)
- Chemical Engineering Practice Award (2006)
- Fuels and Petrochemicals Division Award (2008)
- Founders Award (2011)
- AIChE Alpha Chi Sigma Award (2017)
- Panelist, Meet the Innovators, AIChE (2019)
- Computing in Chemical Engineering Award, Computing & Systems technology Division (CAST), (2024) (co-shared with Professor Mohit Tawarmalani).

Air Products and Chemicals:

- Youngest Ever Recipient of the Air Products' Most Prestigious Chairman's Award (1992)
- Extraordinary Quality Award from Air Products and Chemicals (1992)
- Diamond Award for Inventor on One Hundred United States Patents, Air Products and Chemicals (2001)
- Air Products' Equipment Innovation Award for the AP-X™ Hybrid LNG Process (2003)

Teaching and Service at Purdue University:

- Shreve Award for Excellence in Undergraduate Teaching, (2013)
- Morrill Award for excellence in research, teaching and service, Purdue University (2014)
- Philip C. Wankat Graduate Teaching Award in Chemical Engineering, (2019)

Named Lectures at Universities:

- BAYER Lecture, Carnegie Mellon University (April 2002)
- Regents' Lecturer, University of California, Los Angeles (2004)
- Distinguished Faculty Seminar: Advanced Power Sources, University of Michigan, Ann Arbor (2004)
- W.R. Marshall Founders' Lecture, University of Wisconsin (2008)
- Tis Lahiri Lecture, Vanderbilt University (2008)
- Pirkey Lecture, University of Texas, Austin (2010)
- Hugh M. Hulbert Memorial Lecture, Northwestern University, (2011)
- Hess Lecture, University of Virginia, (2011); Ken Nobe Founders Lecture, Univ. of California, Los Angeles (2012)
- Distinguished Lindsay Lecturer, Texas A&M University, (2014)
- TIAS Eminent Scholar Lecturer, Texas A&M University (2015)
- Berkeley Lectures, Univ. of California, Berkeley (2015)
- Shinnar Lecture, Chemical Engineering Department, City College of New York, (2016)
- Distinguished WISER lecture, IIT Chicago, Chicago, IL, (2018)
- EDEY (Energy doctoral school) Distinguished Lecture in Energy, EPFL, Lausanne, Switzerland (2018)
- Distinguished Lecture of the Missouri Science & Technology Academy of Chemical Engineers, Rolla, MO, (2019)
- RENEW Innovation Lecture, State University of New York (SUNY), Buffalo, NY, (2019)
- BASF Distinguished Lecture, Wayne State University, Detroit, MI, (2022)
- Inaugural Dan Luss Lecture, University of Houston, Houston, TX, (2025)

Miscellaneous:

- Presidential Citation for Outstanding Achievement from the University of Delaware (1995)
- Industrial Research Institute (IRI) Achievement Award (2007)
- Allan P. Colburn Honorary Lecturer, E. I. du Pont de Nemours and Company (2013)
- Inducted into Purdue Innovator Hall of Fame (2015)
- One of the Most Impactful Faculty Inventors of FY 2019 and 2023, Purdue University

Honorary Listings:

- Who's Who in the World, (Marquis, 18th Edition, 2001)
- Who's Who in America
- Who's Who in Science and Engineering
- Who's Who in Finance & Business

2. International:

- Foreign Fellow, Indian National Academy of Engineering (2011)
- J&E Hall Gold Medal, Institute of Refrigeration, UK (2004)
- Honorary Fellow, Indian Institute of Chemical Engineers (2001)
- Inaugural winner of Excellence in Gas Processing Award, Annual Gas Processing Symposium, Qatar (2009)
- Distinguished Alumnus Award, Indian Institute of Technology, Kanpur (2012)
- Peter V. Danckwerts Lecture at the 10th World Congress of Chemical Engineering, Barcelona, Spain (2017)
- James Y. Oldshue Lecture Award at the 11th World Congress of Chemical Engineering, Buenos Aires, Argentina (2023)

Named Lectures at Universities:

- Professor B. D. Tilak Visiting Fellowship Lecture, Institute of Chemical Technology, University of Mumbai, India (2004)
- Annual KAIST CBE Global Distinguished Lecturer, Korea, (2013)
- Prof. C.V. Seshadri Memorial Distinguished Lecture, IIT Bombay, Mumbai, India, (2014)
- Schlumberger Lecture, DB. Robinson lecture series, University of Alberta, Edmonton, Canada, (2015)
- Spinks lecture, University of Saskatchewan, Canada, (2022)
- Chandrakanta Kesavan Lecture, Indian Institute of Technology, Kanpur, India (2022)

Named Lectures at Conferences:

- Alkyl Amines Dr. B. D. Tilak Chemcon Distinguished Speaker, Indian Institute of Chemical Engineers (IChE) (2001)
- Chemical Weekly's Padmashri Dr. G. P. Kane CHEMCON Distinguished Speaker Award, IChE (2007)
- C. K. Murthy Memorial Lecture, IChE (2008)
- Padma Vibhushan Professor M. M. Sharma CHEMCON Distinguished Speaker Award, IChE (2012)
- Solenis Bharat Ratna Professor CNR Rao CHEMCON Distinguished Lecture, IChE (2018)

Honorary Professorships:

- V.V. Mariwala Visiting Professorship, UICT, Mumbai, India (2007)
- ExxonMobil Visiting Chair Professor, Department of Chemical and Biomolecular Engineering, National University of Singapore (2011-2014)
- Guest Professor, Tianjin University, Tianjin, China (2018-2020)
- Dr. Balwant S. Joshi Distinguished Visiting Professorship, Institute of Chemical Technology, Mumbai, India (2019-2020)

- Distinguished Visiting Professor, joint appointment in the Department of Sustainable Energy Engineering (SEE) & Chemical Engineering (ChE), Indian Institute of Technology, Kanpur, India (2025-)

Miscellaneous: Lecture on 'Energy Systems Analysis' voted as the best presentation at the Pan American Institute (PASI) workshop, Argentina (2008).

Former MS Students:

1. Ankita Jain	M.S. 2006
2. Jeff Chen	M.S. 2006
3. Chinmay Joglekar	M.S. 2014
4. Bethlehem Negash	M.S. 2014
5. Robert Boyne	M.S. 2016, (Micron)
6. Wasiu Peter Oladipupo	M.S. 2019, (Purdue)
7. Ryan Swope	M.S. 2024
8. Zirui Fan	M.S. 2025

Former Ph.D. Students (Total = 53):

1. Arun Girdihar	Ph.D. 2008, (Purdue)
2. Qijie Guo	Ph.D. 2009, (Solamet)
3. Mahaprasad Kar	Ph.D. 2010, (ExxonMobil)
4. Rugved Pathare	Ph.D. 2010, (ExxonMobil)
5. Navneet Singh	Ph.D. 2009, (Bayer)
6. Vishesh Shah	Ph.D. 2010, (Reliance, India)
7. Grayson Ford	Ph.D. 2011, (Lam Research)
8. Piotr Gawecki	Ph.D. 2012, (Shell)
9. Anirudh Shenvi	Ph.D. 2012, (Consultant, India)
10. Dharik Malapragada	Ph.D. 2013, (NYU)
11. Sarah Yohe	Ph.D. 2014, (ExxonMobil)
12. Essa Al-Musleh, Ph.D.	Ph.D. 2014, (ExxonMobil)
13. Josh Huff	Ph.D. 2014, (Marathon Petroleum)
14. Dhairya Mehta	Ph.D. 2014, (Shell)
15. Hye Yeon Park	Ph.D. 2014, (Samsung)
16. Vinod Venkatakrishnan	Ph.D. 2014, (Shell)
17. Bryce Walker	Ph.D. 2014, (Intel)
18. Harshavardhan Choudari	Ph.D. 2015, (Shell)
19. Wei Chang (David) Yang	Ph.D. 2015, (NIST)
20. Nathan Carter	Ph.D. 2015, (Monsanto)
21. Robert Balow	Ph.D. 2015, (NRL)
22. Kevin Brew	Ph.D. 2015, (IBM)
23. Chuck Hages	Ph.D. 2015, (ASM)
24. Erik Sheets	Ph.D. 2015, (Johnson Matthey)
25. Ruihong Zhang (co-advised)	Ph.D. 2015, (Intel)
26. John Degenstein (co-advised)	Ph.D. 2015, (Three Cities Research)
27. Caleb Miskin	Ph.D. 2016, (ASM)
28. Emre Gencer	Ph.D. 2016, (Entrepreneur)
29. Gautham Madenoor Rampapriya	Ph.D. 2016, (ABB Bangalore)
30. Brian Graeser	Ph.D. 2017
31. Steven McLeod	Ph.D. 2017
32. Mark Koeper	Ph.D. 2017, (Intel)

33. Xin Zhao	Ph.D. 2017, (Apple)
34. Zheyu Jiang (co-advised)	Ph.D. 2018, (Oklahoma State)
35. Taufik Ridha	Ph.D. 2018, (ExxonMobil)
36. Scott McClary	Ph.D. 2019, (Sandia National Lab)
37. Joseph Andler (Co-Advised)	Ph.D. 2020
38. Essam AlRuqobah,	Ph.D. 2020, (Kuwait University)
39. Ryan Ellis	Ph.D. 2020, (Abbvie)
40. Xianyi Hu (co-advised)	Ph.D. 2020, (Intel)
41. Yiru Li	Ph.D. 2020, (Sinopec)
42. Jose Chavez Velasco	Ph.D. 2020, (Hugh-Baker, Mexico)
43. Radhakrishna Tumbalam Gooty (co-advised)	Ph.D. 2020, (NETL)
44. Tony Mathew (co-advised)	Ph.D. 2021, (Curtin University)
45. Swapnil Deshmukh	Ph.D. 2021, (Lam Research)
46. David Rokke	Ph.D. 2022, (Advance Materials)
47. Zewei Chen	Ph.D. 2022, (ExxonMobil)
48. Kyle Weideman	Ph.D. 2022, (Aquatech International)
49. Jonathan Turnley	Ph.D. 2023, (Michigan State University)
50. Apurva Pradhan	Ph.D. 2023, (Lam Research)
51. Edwin Rodriguez	Ph.D. 2024, (UOP)
52. Daniel Hayes	Ph.D. 2024, (NRL)
53. Varsha, Varsha (co-advised)	Ph.D. 2024
54. Robert Spilker	Ph.D. 2025
55. Shubhanshu Agarwal	Ph.D. 2025 (Advanced Materials)
56. Akash Nogaja (co-advised)	PhD. 2025 (Dow Chemicals)

Current Ph.D. Students: Juan Alban Dominguez, Shuaikang Du, Parikshit S. Kadu, Jhoan Ruiz, Priyanshu Singh, Kiruba Catherine Vincent, James Zheng

Postdoctoral Associates:

1. J. H. Moon, 2007- 2008, S. Korea
2. Sarpangala Venkataprasad Bhat, 2010-2011, India
3. Ulaganathan Nallasivam, 2010-2011, India
4. A. Smeltz (United Technology),
5. Haibo Zhang, 2012-2013, ExxonMobil, Singapore
6. Parham Mobed, 2017-2018, Aspen Tech
7. Brian Graeser, 2018-2019
8. Caleb Miskin, 2018, ASM
9. Radhakrishna Tumbalam Gooty, 2020-2021
10. Shreyash Hadke, 2021-2022, Northwestern University

Visiting Scholars:

1. Kannan PK, 2019
2. Bibhudatta Sahoo, 2024-2025

PUBLICATIONS

1. Z. Jiang, M. Tawarmalani and R. Agrawal, "Minimum Reflux Calculation for Multicomponent Distillation in Multi-Feed, Multi-Product Columns", Accepted for publication by the AIChE Journal.
2. E. A. Rodriguez-Gil and R. Agrawal, "Electric Reaction-Towers: Integrating Variable Power and Feed Supply Rates with Endothermic Reactors", Accepted for Publication in Cell Reports Physical Science.
3. A. Nogaja, M. Tawarmalani, and R. Agrawal, "Comparing Exergy and Heat Pump Work in Distillation Systems", AIChE Journal, e18895 (2025). doi.org/10.1002/aic.18895 This article was highlighted on the cover of the AIChE Journal and featured in Chemical Engineering Progress (CEP) for wide dissemination by the Editor of the Journal.
4. R. Desai, S. Agarwal, K. C. Vincent, A. Strachan, R. Agrawal, A. Mannodi-Kanakkithodi, "Exploring the Defect Landscape and Dopability of Chalcogenide Perovskite BaZrS₃", The Journal of Physical Chemistry C, 129 (16), 7967 (2025). doi.org/10.1021/acs.jpcc.5c01597
5. S. Agarwal, K. C. Vincent, and R. Agrawal, "From Synthesis to Application: A Review of BaZrS₃ Chalcogenide Perovskites", Nanoscale, 17, 4250 (2025). DOI: 10.1039/D4NR03880K
6. S. Du, Z. Chen, and R. Agrawal, "Assessing Large Energy Storage Requirements for Chemical Plants Powered with Solar and/or Wind Electricity", Chemical Engineering Journal, 505, 158863 (2025). doi.org/10.1016/j.cej.2024.158863
7. D. C. Hayes, S. Agarwal, K. C. Vincent, I. M. Aimiwu, A. A. Pradhan, M. C. Uible, S. C. Bart, and R. Agrawal, "A Reliable, Colloidal Synthesis Method of the Orthorhombic Chalcogenide Perovskite, BaZrS₃, and Related ABS₃ Nanomaterials (A = Sr, Ba; B = Ti, Zr, Hf): A Step Forward for Earth-Abundant, Functional Materials", Chemical Science, 16, 1308 (2025), DOI: 10.1039/d4sc06116k
8. S. Agarwal, K. C. Vincent, and R. Agrawal, "Quantitative scales for halophilicity of metals: Tailoring the halide affinity of alkaline earth metals to synthesize chalcogenide perovskite BaMS₃ (M= Zr, and Hf) and Cu₂BaSnS₄ compounds", ACS Applied Energy Materials, 7, 10584 (2024). doi/10.1021/acs.aem.4c02205.
9. A. Nogaja, M. Tawarmalani, and R. Agrawal, "Cogeneration improves separation efficiency", Industrial & Engineering Chemistry Research, 63, 18564 (2024). doi.org/10.1021/acs.iecr.4c03190
10. S. Agarwal, K. C. Vincent, J.W. Turnley, D. C. Hayes, M. C. Uible, I. Durán, A. S. Mesa Canizales, S. Khandelwal, I. Panicker, Z. Andoh, R. M. Spilker, Q. Ma, L. Huang, S. Hwang, K. Kisslinger, S. Svatek, E. Antolin, S. C. Bart and R. Agrawal, "Breaking Barriers in Chalcogenide Perovskite Synthesis: A Generalized Framework for Fabrication of BaMS₃ (M = Ti, Zr, Hf) Materials", Advanced Functional Materials, 2405416 (2024). DOI: 10.1002/adfm.202405416
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INVITED TALKS

1. "Use of Exergy in Synthesis of Large Nitrogen Generators", Seminar at the University of California at Los Angeles, California (1991).
2. "Multi-component Separation by Heat Integrated Distillation Columns", Seminar at the University of California at Davis, California (1991).
3. "Influence of Chemical Engineering Education at Delaware on my Career", a talk at the College of Engineering Centennial Celebration, University of Delaware, February 1993.
4. "Separation Devices for Gas Mixing", Seminar at the West Virginia University, Morgantown, WV (1994).
5. "Membrane Cascades for Gas Separation", Seminar at the University of Massachusetts, Amherst, MA (1996).
6. "Membrane Cascades for Gas Separation", Paper at the 41st Gordon Research Conference on Separation and Purification, Colby-Sayer College, New London, New Hampshire, August 5, 1998.
7. "Efficiency and Operability of Complex Column Arrangements for Ternary Distillation", E. I. Du Pont de Nemours and Company, March 1999.
8. "Hybrid Separation Processes" NSF Workshop, July 1999, Breckenridge, Colorado.
9. "New Configurations for Multi-component Distillation" University of Pennsylvania, April 2000.
10. "New Distillation Column Arrangements for Multi-component Separation", Auburn University, May 2000.
11. "Synthesis of Useful Membrane Cascades for Gas Separation", University of Notre Dame, October 2000.
12. "Some Recent Developments in Multi-component Distillation", Georgia Institute of Technology, January, 2001.
13. "Double-effect Distillation for Ternary Separations", Carnegie-Mellon University, March 2001.
14. "New Configurations for Multi-component Distillation" Symposium in honor of Professor Stanley I. Sandler, University of Delaware, April 2001.
15. "New Distillation Configurations for Multi-component Separations", Alkyl Amines, Padma Bhushan Professor B. D. Tilak Chemcon Distinguished Speaker, Chemcon-2001, Indian Institute of Chemical Engineers, December 2001.
16. "Synthesis of Useful Membrane Cascades for Gas Separation", University of Delaware, February 2002.
17. "Membrane Cascades for Gas Separation", Lehigh University, February 2002.

18. "New Multi-component Distillation Column Arrangements", Plenary Lecture, Process Modeling Center, Lehigh University, March 2002.
19. "Some Recent Developments in Multi-component Distillation", *Bayer Lecture*, Carnegie-Mellon University, April 2002.
20. "Recent Developments in Multicomponent Distillation Configurations", Purdue University, April 2003.
21. "Membrane Cascades with Limited Number of Recycle Compressors," Sunoco, June, 2003
22. "Multicomponent Distillation Configurations," Sunoco, June, 2003.
23. "The Hydrogen Economy: Opportunities, Costs, Barriers, and R&D Needs", Regents Lecture, University of California, Los Angeles, CA, 2004.
24. "Hydrogen as an Energy Carrier – Its Promises and Challenges", FOAPD, Princeton, 2004.
25. "Hydrogen as an Energy Carrier – Its Promises and Challenges", Distinguished Faculty Seminar: Advanced Power Sources, University of Michigan, Ann Arbor, 2004.
26. "Synthesis of Multicomponent Distillation Column Configurations", City College, New York, 2004.
27. "Hydrogen As An Energy Carrier – Its Promises and Challenges", Inaugural address in the Hydrogen seminar series at Purdue University, 2004.
28. "Synthesis of Multicomponent Distillation Column Configurations", Keynote address at the joint IChE/AIChE conference in Mumbai, India 2004.
29. "Hydrogen As An Energy Carrier – Its Promises and Challenges", Keynote address at the joint IChE/AIChE conference in Mumbai, India 2004.
30. "Energy-Some Challenges and Research Opportunities", Invited talk in the Energy workshop at the joint IChE/AIChE conference in Mumbai, India 2004.
31. "Synthesis of Useful Membrane Cascades for Gas Separation", Professor B. D. Tilak Visiting Fellowship lecture, Institute of Chemical Technology, University of Mumbai, India, 2004.
32. "Hydrogen As an Energy Carrier – Its Promises and Challenges", Ohio State University, 2005.
33. "Hydrogen As an Energy Carrier – Its Promises and Challenges", Opening Plenary Lecture, International Chemical Engineering Conference – VI, Tec de Monterrey, Mexico, 2005.
34. "Separation: Perspective of a Process developer/Designer", Invited keynote lecture at the ACS Symposium, San Diego, CA, 2005.
35. "The Challenges in the Synthesis of Multicomponent Separation Configurations in Chemical Industry", Winthrop E. Stone Lecture, Purdue University, 2005.

36. "Hydrogen as an Energy Carrier – Its Promises and Challenges", Othmer Department of Chemical Sciences & Engineering, Polytechnic University, New York, 2005.
37. "Hydrogen as an Energy Carrier – Its Promises and Challenges", Clarkson University, Potsdam, NY, 2005.
38. "Synthesis of Multicomponent Distillation Column Configurations", Department of Chemical Engineering, Clarkson University, Potsdam, NY, 2005.
39. "Separation: Perspective of a Process developer/Designer", Invited keynote lecture at the China/USA/Japan Joint Chemical Engineering Conference, Beijing, China, October 2005.
40. "Energy Supply Challenges and Opportunities", Institute Lecture, AIChE Annual Meeting, Cincinnati, 2005.
41. "Hydrogen as an Energy Carrier – Its Promises and Challenges", Society of Automotive Engineers, Fort Wayne, IN, 2006.
42. "The Challenges in the Synthesis of Multicomponent Separation Configurations in Chemical Industry" University of Colorado, Boulder, Co., 2006
43. "Separation: Perspective of a Process developer/Designer", Department of Chemical Engineering, Tianjin University, Tianjin, China, May, 2006.
44. "Energy Supply Challenges and Opportunities", Peking University, Beijing, China, May 2006.
45. "Energy Supply Challenges and Opportunities", Department of Chemical Engineering, Tsinghua University, Beijing, China, May, 2006.
46. "Separation: Perspective of a Process developer/Designer", Department of Chemical Engineering, Tsinghua University, Beijing, China, May, 2006.
47. "Energy Supply Challenges and Opportunities for Chemical Engineers", Invited plenary lecture at the 4th Pacific Basin Conference on Adsorption Science and Technology, Tianjin, China, 2006.
48. "Energy Supply Challenges and Opportunities", Keynote lecture at Summit on Energy Sustainability, Texas Tech University, Lubbock, Tx, September, 2006.
49. "Environmentally Friendly Energy Solutions", Keynote lecture at Chemical Heritage Foundation Innovation Conference, Philadelphia, Pa, September, 2006.
50. "Environmentally Friendly Energy Solutions", Department of Chemical Engineering, Illinois Institute of Technology, Chicago, October, 2006.
51. "The Challenges in the Synthesis of Multicomponent Separation Configurations in Chemical Industry", Session in honor of Gerhold Award Winners, AIChE annual meeting, San Francisco, Nov. 2006.
52. "New Energy-Efficient and Low-Cost Multicomponent Distillation Configurations" Texas Technology Showcase, Galveston, TX, Dec. 2006.

53. "Environmentally Friendly Energy Solutions", NRC Board on Energy and Environmental Systems, Washington D.C., Dec. 2006.
54. "Separations: Perspective of a Process Developer/Designer", University Institute of Chemical Technology, Mumbai, India, Jan. 2007.
55. "The Challenges in the Synthesis of Multicomponent Separation Configurations in Chemical Industry", University Institute of Chemical Technology, Mumbai, India, Jan. 2007.
56. "Hydrogen as an Energy Carrier – Its promises and challenges", University Institute of Chemical Technology, Mumbai, India, Jan. 2007.
57. "Environmentally Friendly Energy Solutions", Shri M.V. Mariwala Visiting Professorship Lecture, University Institute of Chemical Technology, Mumbai, India, Jan. 2007.
58. "Use of Sustainable Hydrogen to Produce Liquid Biofuels", Keynote Lecture, Second Energy Center Hydrogen Initiative Symposium, Purdue University, April 2007.
59. "New Design Methods and Algorithms for Highly Energy-efficient and Low-cost Multicomponent Distillation Processes", Department of Energy, Houston, April, 2007.
60. "Environmentally Friendly Energy Solutions", Technology Day Lecture, Indian Institute of Petroleum, Dehradun, India, May 2007.
61. "The Challenges in the Synthesis of Multicomponent Separation Configurations in Chemical Industry", Dow Chemical Company, Midland, MI., May 2007.
62. "An Environmentally Friendly Novel Route for the Transportation Fuel", NETL, Pittsburgh, PA, May 2007.
63. "Environmentally Friendly Energy Solutions", Dow Chemical Company, Midland, MI., Sept. 2007.
64. "Environmentally Friendly Energy Solutions", Achievement Award Lecture, Industrial Research Institute, Lincolnshire, IL, Oct. 2007.
65. "Environmentally Friendly Energy Solutions", University of Southern California, Lyman Handy Colloquium Series Lecture, Los Angeles, CA, Dec. 2007.
66. "Development of Low-Cost CuInSe₂ Nanocrystal-Ink Based Solar Cells", Chemcon 2007, Kolkata, India, Dec. 2007.
67. "Environmentally Friendly Energy Solutions", Dept. of Chemical Engineering and Material Science, University of Minnesota, Minneapolis, MN, Jan. 2008.
68. "Energy Saving Opportunities in Multicomponent Distillation: Optimum configuration and Thermal Coupling between Distillation Columns", ExxonMobil, Annandale, NJ, Feb. 2008.
69. "Thermochemical Methods for Biofuel Production from Biomass", 2008 AAAS Annual Meeting, Boston, MA, Feb. 2008.

70. "Energy Saving Opportunities in Multicomponent Distillation: Optimum Configuration and Thermal Coupling Between Distillation Columns", Dow Chemical Company, Midland, MI, April 2008.
71. "Environmentally Friendly Transportation Fuels", AIChE Fuels and Petrochemicals Division Award Lecture, New Orleans, LA, April 2008.
72. "Environmentally Friendly Energy Solutions", Department of Chemical and Environmental Engineering, University of Arizona, Tucson, AZ, May 2008.
73. "Environmentally Friendly Energy Solutions", Department of Chemical and Environmental Engineering, University of California, Riverside, CA, May 2008.
74. "Transportation Fuel in a Fossil Fuel Deprived World", MPR Associates, Alexandria, VA, June 2008.
75. "Environmentally Friendly Energy Solutions", Foundations of Computer-Aided Process Operations (FOCAPO), Boston, MA, July 2008.
76. "Energy Systems Analysis", Pan American Institute (PASI) Workshop, Mar Del Plata, Argentina, August 2008. (*Voted as the best presentation by over 50 international graduate students attending the workshop*).
77. "Experimental Studies of Coal and Biomass Fuel Synthesis and Flame Characterization for Aircraft Engines", Multi Agency Coordination Committee for Combustion Research (MACCCR) Fuels Research Review, Gaithersburg, MD, September 2008.
78. "Energy Solutions for a Fossil Fuel Deprived Future", *Opening Plenary Lecture*, Schlenger Symposium, Chemical Heritage Foundation, Philadelphia, PA, September 2008.
79. "Energy Solutions for a Fossil Fuel Deprived Future", *W. R. Marshall Founders' Lecture*, Department of Chemical and Biological Engineering, University of Wisconsin, Madison, WI, September 2008.
80. "Energy Solutions for a Future Solar Economy" *Tis Lahiri Lecture*, Chemical and Biomolecular Engineering, Vanderbilt University, Nashville, TN, October 2008.
81. "Energy Solutions for a Fossil Fuel Deprived Future", National Science Foundation, Arlington, VA, October 2008.
82. "Synergistic Processes to Produce Biofuels from Biomass", C. Murthy Memorial Lecture, Indian Institute of Chemical Engineers, Chandigarh, India, Dec. 2008.
83. "Synergistic Processes to Produce Biofuels from Biomass", Indian Institute of Petroleum, Dehradun, India, January 2009.
84. "Energy Solutions for a Fossil Fuel Deprived Future", Andlinger Energy Lecture, Princeton University, Princeton, February, 2009.
85. "Transportation Fuel in a Fossil Fuel Free world", Renewable Energy World 2009, Las Vegas, March 2009.

86. "Sustainable Energy Utilization and Transformation", George W. Woodruff School of Mechanical Engineering's Sustainable Energy Pathways and Solutions Workshop, Georgia Tech., Atlanta, April 2009.
87. "Synergistic Processes for Biofuels", Purdue Biofuels Symposium, West Lafayette, In, May 2009.
88. "Transportation Fuel in a Solar Economy", Keynote Lecture, FOCAPD, Breckenridge, Co, June 2009.
89. "Synergistic Processes for Biofuels", Plenary Lunch Lecture, BioFuels Conference- The Next Generation of Biofuels, Mississippi State University, Jackson, Ms, August 2009.
90. "Energy Saving Opportunities in Distillation: Identification of Useful Configurations", Keynote Lecture, 10th International Symposium on Process Systems Engineering, PSE 2009, Salvador, Bahia, Brazil, August 2009.
91. "Energy Solutions for a Fossil Fuel Deprived Future", Pioneers in Energy Lecture, Purdue University, West Lafayette, IN, September 2009.
92. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Semiconductors", GE Global Research, Niskayuna, NY, September 2009.
93. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Semiconductors", Solar Workshop at CNM Users Meeting, Argonne National Laboratory, Chicago, IL, October 2009.
94. "More Liquid Fuel from Biomass", Indo-US Workshop on Climate and Energy Futures, Chennai, India, October 2009.
95. "Transportation Fuel Solutions Using Renewable Energy", RTI Fellows Symposium, RTI International, Research Triangle Park, NC, November 2009.
96. "A Future Solar Economy", Invited Session Honoring Professor James Wei, AIChE Annual Meeting, Nashville, TN, November 2009.
97. "*Solar Based Sustainable Energy Solutions*", Maddox Solar Energy Series, Whitacre College of Engineering at Texas Tech University, Lubbock, Tx, February, 2010.
98. "Role of Biomass to Liquid Fuel in a Solar Economy", C3Bio Meeting. Purdue University, West Lafayette, IN, May, 2010.
99. "Solar Based Sustainable Energy Solutions", Plenary Lecture, 2nd International Symposium on Sustainable Chemical Product and Process Design (ISSCPPE), Hangzhou, China, May, 2010
100. "Energy Savings in Distillation via Identification of Useful Configurations", V.H. Shah and R. Agrawal (given by VHS), A keynote lecture at Process Development Symposium (PDS), June 2010, Lake Ozark, MO
101. "Transportation Fuel Solutions using Renewable Energy", EPFL, Lausanne, Switzerland. Sept 2010
102. "Energy Saving Opportunities in Multicomponent Distillation: Optimum Configuration and Thermal Coupling between Distillation Columns", EPFL, Lausanne, Switzerland. Sept 2010

103. "Chemical Engineering in a Solar Energy Driven Sustainable Future", PPG Foundation Keynote Address, 32nd Annual Chemical Engineering Graduate Student Association Symposium, Carnegie Mellon University, Pittsburgh, PA, October, 2010
104. "Solar Based Sustainable Energy Solutions", Pirkey Lecture, University of Texas, Austin, Tx, Nov. 2010
105. "Solar Based Sustainable Energy Solutions", Invited keynote address, AIChE annual meeting, Salt Lake City, UT, Nov 2010.
106. "Energy Savings in Distillation via Identification of Useful Configurations", Invited talk in the Gerhold Award Plenary Session on Separations, AIChE Annual Meeting, Salt Lake City, UT, Nov. 2010
107. "Stan Sandler – A perfect Advisor and a Great Mentor", Invited talk in the Seventieth Birthday Session for Stan Sandler, AIChE Annual Meeting, Salt Lake City, UT, Nov 2010.
108. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Semiconductors", Helmholtz-Zentrum Berlin für Materialien und Energie, Berlin Nov. 2010
109. "Transportation Fuel Solutions Using Solar Energy" Helmholtz-Zentrum Berlin für Materialien und Energie, Berlin Feb. 2011
110. "Synthesis of Multicomponent Distillation Configurations and Solar Cells from Nanocrystal Inks of Quaternary Semiconductors", IIT Kanpur, India, March 2011
111. "Chemical Engineering in a Solar Energy Driven Sustainable Future", IIT Kanpur, March 2011
112. "Chemical Engineering in a Solar Energy Driven Sustainable Future", Hugh M. Hulburt Memorial Lecture, Northwestern University, Evanston, IL, April, 2011
113. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Semiconductors", Institute of Energy Conversion, University of Delaware, Newark, DE, May 2011
114. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Semiconductors", DuPont Experimental Station, Wilmington, DE, May 2011
115. "Energy Savings in Distillation via Identification of Useful Configurations", Technical Meeting of the European Federation of Chemical Engineering (EFCE) working party on Fluid Separations, Keble College, Oxford University, Oxford, UK, May 2011
116. "Chemical Engineering in a Solar Energy Driven Sustainable Future", Hess Lecture, Department of Chemical Engineering, University of Virginia, October 2011
117. "Novel Pathways for Biomass-to-Liquid Fuel Production", In session honoring Professor Santosh K. Gupta, AIChE annual meeting, Minneapolis, October 2011.
118. "Chemical Engineering Innovation Needs for a Future Solar Economy", Plenary Lecture, 61st Canadian Chemical Engineering Conference, London, Ontario, Canada, October 2011

119. "Novel Pathways for Biomass-to-Liquid Fuel Production", Plenary Lecture, 6th Sino/US joint conference, Beijing, China, Nov. 2011
120. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Semiconductors", Keynote Lecture, 6th Sino/US joint conference, Beijing, China, Nov. 2011
121. "Energy Savings in Distillation via Identification of Useful Configurations", Plenary Lecture, 6th Sino/US joint conference, Beijing, China, Nov. 2011
122. "Chemical Engineering Innovation Needs for a Future Solar Economy", National University of Singapore, Singapore, December 2011
123. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Semiconductors", National University of Singapore, Singapore, December 2011
124. "Energy Savings in Distillation via Identification of Useful Configurations", National University of Singapore, Singapore, December 2011
125. "Synthesis of Quaternary Semiconductor Nanocrystal Inks and Their Use for Fabrication of Solar Cells", Indo-US Workshop on photovoltaic science and technologies, IIT Bombay, India, January 2012
126. "Chemical Engineering in a Solar Driven Sustainable Future", Ken Nobe Founders Lecture in Chemical and Biomolecular Engineering, UCLA, February 2012
127. "A Systems Approach for The Use of Renewable Energy in Transportation", Pugwash, Purdue University, Feb. 2012
128. "Chemical Engineering in a Solar Driven Sustainable Future", Truth and Beauty Seminar Series, School of Chemical Engineering, Purdue University, March 2012
129. "Energy Savings in Distillation via Identification of Useful Configurations", E.V. Murphree Award in Industrial & Chemistry Symposium in honor of Michael F. Doherty, Session, ACS National Meeting, San Diego, March 2012.
130. "Solar Economy- Is It feasible", Indiana Academy of Science, West Lafayette, IN. March 2012.
131. "How Feasible is Renewable Energy", Callout Night Speaker, PugWash, Purdue University, August, 2012
132. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Chalcogenides", AVS Materials for Energy Meeting, University of Illinois at Urbana-Champaign, September, 2012
133. "Chemical Engineering in a Solar Energy Driven Sustainable Future", Department of Chemical Engineering, University of Pennsylvania, Sept., 2012
134. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Chalcogenides", Brookhaven National Lab, September, 2012
135. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Chalcogenides", Chemistry Department, University of Chicago, October 2012

136. "Thin Film Solar Cells from Nanocrystals of Quaternary Semiconductors", Joint symposium of Korean Institute of Chemical Engineering (KIChE) and AIChE to celebrate 50th anniversary of KIChE, AIChE Annual Meeting, Pittsburgh, October 2012.
137. "Sustainable Energy Research in Chemical Engineering", Joint US-India Symposium, AIChE Annual Meeting, Pittsburgh, October 2012.
138. "Nanocrystal Ink based route for Cu(In,Ga)Se₂ and Cu₂ZnSnS₄ Based Efficient Solar Cells", National University of Singapore, Singapore, December 2012.
139. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Chalcogenides", Plenary talk, 7th Singapore International Chemistry Conference (SICC-7), Singapore, December 2012.
140. "Energy Systems Analysis", Carbon Capture and Utilization Roadmap Agency of Singapore, Singapore, Dec. 2012.
141. "Novel Energy Efficient Distillation Configurations for Sustainable Era", Padmavibhushan Professor M. M. Sharma Lecture, Indian Institute of Chemical Engineers, Jalandhar, India, Dec. 2012.
142. "Direct Production of Molecules in the Fuel Range by Selective Tailoring of Biomass Fast" Indian Institute of Petroleum, Dehradun, January 2013.
143. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Chalcogenides", Indian Institute of Petroleum, Dehradun, January 2013.
144. "Thin Film Solar Cells from Nanoparticle Inks of Quaternary Chalcogenides", Inaugural lecture in the Photovoltaic Lecture series of the Birck Nanotechnology Center, Purdue University, January, 2013.
145. "CZTS and CZTGeS Solar Cells from Nanocrystal Inks", IBM/NREL CZTS meeting at IBM's Watson Research Center, Yorktown Heights, NY, Jan. 2013.
146. "Sustainable Energy Research in Chemical Engineering", Arizona State University, Phoenix, AZ, Feb. 2013.
147. "Thin Film Solar Cells from Nanocrystal Inks of Quaternary Chalcogenides", Keynote Lecture, Colombia-US Workshop on Nanotechnology in Energy and Medical Applications, Medellin, Colombia, March 2013.
148. "Solar Cells from Nanocrystal Inks of Quaternary Chalcogenides", Keynote Lecture, Renewable Energy & Energy Efficiency Workshop, Louisville, March 2013.
149. "Limiting Efficiencies for Solar Thermal Conversion to Fuels", Keynote Lecture in Session Solar Energy and Solar Fuels, ACS Meeting, April, 2013.
150. "Solar Economy - Is it Feasible?", Plenary Lecture, Purdue-Mexico Workshop on Sustainability, Purdue University, April, 2013.

151. "Nanocrystal Ink based route for Thin Film Solar Cells of Quaternary Chalcogenides", Plenary Lecture, International Conference on Energy and Sustainability, Hangzhou, China, May 2013.
152. "A Sustainable Future", Energy Academy, Purdue University, June 2013.
153. "A Sustainable Future", SURF Seminar Series, Purdue University, July 2013.
154. "Nanocrystal Ink Based Route for Thin Film Solar Cells of Quaternary Chalcogenides", Keynote lecture, 3rd International Congress on Sustainability Science and Engineering (ICOSSE'13), Cincinnati, August 2013.
155. "Nanocrystal Ink Based Route For Quaternary Chalcogenides Solar Cells", Invited opening lecture, The 16th International Conference on II-VI Compound and Related Materials (II-VI 2013), Nagahama, Japan, September, 2013.
156. "Chemical Engineering for a Sustainable Energy Future", Chemical Engineering, University of Michigan, Ann Arbor, September 2013.
157. "Process Synthesis for Sustainable Energy Future", WebCAST series, The Computing and Systems Technology Division (CAST) of AIChE, October 2013.
158. "Process Engineering in Renewable Energy", Conference Plenary Lecture, XIV Congr s SF P 2013, Lyon, France, October 2013.
159. "Energy Efficiency Improvement and Process Intensification for Multicomponent Distillation", DuPont Engineering, E. I. du Pont de Nemours and Company, Wilmington, DE, October 2013.
160. "Engineering a Sustainable Energy Future", Allan P. Colburn Honorary Lecture, DuPont Experimental Station, E. I. du Pont de Nemours and Company, Wilmington, DE, October 2013.
161. "Nanoparticle Ink based route for Efficient Thin Film Solar Cells", The 3rd Annual KAIST CBE Global Distinguished Lecture, Department of Chemical and Biomolecular Engineering, KAIST, Daejeon, Korea, Nov. 2013.
162. "Engineering a Sustainable Energy Future", The 3rd Annual KAIST CBE Global Distinguished Lecture, Department of Chemical and Biomolecular Engineering, KAIST, Daejeon, Korea, Nov. 2013.
163. "Energy Efficiency Improvement and Process Intensification for Multicomponent Distillation", ExxonMobil, Clinton, NJ, Nov. 2013.
164. "Engineering a Sustainable Energy Future", School of Chemical Engineering, Purdue University, West Lafayette, IN, Nov. 2013.
165. "Nanoparticle Ink based route for Efficient Thin Film Solar Cells", CHEMCON, Indian Institute of Chemical Engineers, Mumbai, India, Dec. 2013.
166. "Solar Energy- A key to a Sustainable Energy Future", Purdue President's Westwood Colloquia, West Lafayette, IN, Feb. 2014.
167. "Chemical Engineering for a Sustainable Energy Future", Opening Plenary Lecture, Midwest AIChE Meeting, Chicago, March 2014.

168. "Energy Efficiency Improvement and Process Intensification for Multicomponent Distillation", BP, Naperville, IL., March 2014.
169. "Engineering a Sustainable Energy Future - Biomass to Liquid Fuel", BP, Naperville, IL., March 2014.
170. "Nanoparticle Ink Based Route for Thin Film Solar Cells of Quaternary Chalcogenides", Center for Solar and Photovoltaic Engineering Research (SPERC) Workshop, King Abdullah University of Science and Technology (KAUST), Saudi Arabia, April, 2014
171. "Engineering a Sustainable Energy Future", US Patent and Trademark Office, Arlington, VA, May 2014.
172. "Engineering for a Sustainable Energy Future", Department of Chemical Engineering, University of California, Santa Barbara, CA, May, 2014.
173. "Welcome to SURF 2014", Lecture to Incoming SURF students at Purdue University, West Lafayette, IN, May 2014.
174. "Solar Energy: Some Challenges and Opportunities", Purdue Energy Academy, West Lafayette, IN, June, 2014.
175. "My Professional Journey as a Chemical Engineer", ExxonMobil, Clinton, NJ, August 2014.
176. "Energy Efficiency in Distillation", NRC Board on Chemical Science and Technology (BCST), Irvine, CA, August 2104.
177. "Nanoparticle Ink Based Route for Thin Film Solar Cells of Quaternary Chalcogenides", 19th International Conference on Ternary and Multinary Compounds, Nigata, Japan, September 2014.
178. "Engineering a Sustainable Energy Future", Agriculture and Biological Engineering, Purdue University, West Lafayette, IN, September, 2014
179. "Engineering A Sustainable Energy Future", Distinguished Lindsay Lecturer, Chemical Engineering, Texas A & M University, College Station, TX, September, 2014
180. "Engineering A Sustainable Energy Future", Professor C. V. Seshadri Memorial Distinguished Lecture, IIT Bombay, India, October, 2014
181. "Engineering A Sustainable Energy Future", Chemical Engineering, University of South Florida, Tampa, FL, October, 2014
182. "Chemical Engineering for Renewable Energy", Invited talk in the session honoring LS Fan for receiving Wilhelm Award, AIChE Annual Meeting, Atlanta, GA, November, 2014
183. "Engineering Solutions for Sustainable Energy: Photovoltaics", Sustainable Energy Plenary, AIChE Annual Meeting, Atlanta, GA, November, 2014
184. "Towards a Solar Economy", Texas Institute of Advanced Studies Eminent Scholar Lecture, Texas A&M, College Station, TX, December 2014.

185. "Engineering a Sustainable Energy Future", Chemical Engineering, Drexel University, Philadelphia, PA, February 2015
186. "Engineering a Sustainable Energy Future", Chemical Engineering, Iowa State University, Ames, Iowa, March 2015
187. "A Journey from Distillation to Solar Cells", Berkeley Lecture, Chemical Engineering, University of California, Berkeley, CA, March 2015
188. "Towards a Solar Economy" Berkeley Lecture, Chemical Engineering, University of California, Berkeley, CA, March 2015
189. "Engineering a Sustainable Energy Future", Schlumberger lecture, DB. Robinson lecture series, University of Alberta, Edmonton, Canada, April, 2015
190. "Synthesis of Energy Efficient Separation Processes Using Distillation and Membranes", Chemical Engineering, Texas A & M University, College Station, TX, April 2015
191. "Solar Energy: Some Challenges and Opportunities", Purdue Energy Academy, West Lafayette, IN, June, 2015.
192. "Towards a Solar Economy" Mechanical Engineering Department, Purdue University, West Lafayette, IN, September, 2015.
193. "Towards a Solar Economy" Chemical and Biomolecular Engineering Department, Columbia University, New York, NY, September, 2105.
194. "Engineering for a Sustainable Energy Future", Plenary Lecture, ESCRE2015 – European Symposium on Chemical Reaction Engineering, Munich, October 2015.
195. "Solution Processed Inorganic Solar Cells", Solar Future Symposium 2015, Solar & Photovoltaics Engineering Research Center, King Abdullah University of Science & Technology, Thuwal, Saudi Arabia, November 2015.
196. "Solution Processed Inorganic Solar Cells", An invited talk in the plenary session of the Material Engineering and Sciences Division (MESD) of the AIChE, Salt Lake City, Nov. 2015.
197. "Synthesis of Energy Efficient Separation Processes Using Distillation and Membranes", International Forum on Mass Transfer and Separation Engineering (IFMS2015), Tianjin University, Tianjin, China, Nov. 2015.
198. "Modeling for a Sustainable Energy Future", Aspen Tech, Bradford, MA, Dec. 2015.
199. "Solution Processed Solar Cells", Plenary Lecture, First international Conference on Advanced Materials for Power Engineering, ICAMPE 2015, Kottayam, India, Dec. 2015
200. "Solution Processed Inorganic Solar Cells", Physics and Astronomy Department at the University of Texas at San Antonio (UTSA), San Antonio, TX, February, 2016
201. "Engineering a Solar Economy", Azeotropy Conference, IIT Bombay, Mumbai, India, March 2016.

202. "Solution Processed Solar Cells", IIT Bombay, Mumbai, India, March, 2016.
203. "Solar Energy to Fuels, Chemicals and Electricity", Keynote Lecture, CAPE Forum, EPFL Valais Wallis campus, Sion, March, 2016.
204. "Engineering For a Sustainable Energy Future", Chemical & Biological Engineering Department, State University of New York, Buffalo, NY, April 2016.
205. "Modelling for Power Cycles", Aspen Tech, Bradford, MA, May 2016.
206. "Solar Energy to Fuels, Chemicals and Electricity", Plenary Lecture, 4th International Conference on Sustainable Product and Process Engineering (SCPPE), Nanjing, China, June 2016.
207. "Solar Energy: Some Challenges and Opportunities", Purdue Energy Academy, West Lafayette, IN, June, 2016.
208. "Solar Energy: Some Challenges and Opportunities", Lecture to SURF students at Purdue University, West Lafayette, IN, May 2016.
209. "Desired Properties of New PV Materials and a Rational for Rapid Search of Promising Inorganic Materials", HOPE, NREL, Denver, CO, July 2016.
210. "Energy Efficiency improvements and Process Intensification for Multicomponent Distillations", Symposium on Translational Research for Global Competitiveness of Indian Hydrocarbon Industry, Indian Institute of Petroleum, Dehradun, India, August 2016.
211. "Solution Processed Inorganic Solar Cells", NEPTUNE class, Purdue University, September 2016.
212. "Engineering a Sustainable Energy Future", School of Chemical Engineering, Purdue University, September 2016.
213. "Unlocking the Chemistry of the Amine-thiol Universal Solvent System for Solution-processed, Flexible Electronic Devices", NEPTUNE meeting, UC Davis, Nov. 2016.
214. "Improving Energy Efficiency of Distillation", Plenary Talk, Gerhold and Kunesh Awards on Separations Session, AIChE Annual Meeting, San Francisco, CA, Nov. 2016.
215. "Solution Processed Inorganic Solar Cells", Plenary Talk, Emerging Energy Applications of Nanoscale Science and Engineering, AIChE Annual Meeting, San Francisco, CA, Nov. 2016.
216. "Solar Energy to Fuels, Chemicals and Electricity", Shinnar Lecture, City College New York, New York, Nov. 2016
217. "Solution Processed Inorganic Solar Cells", Keynote Lecture, the 2nd International Conference on Solar Energy PV, KIIT University, Bhubaneswar, India, Dec. 2016.
218. "Solution Processed Inorganic Solar Cells", Plenary Lecture, International conference on Emerging Materials & Applications (ICEMA-2017), Allahabad University, Allahabad, India, Feb. 2017.

219. "Synthesis of Energy Efficient Separation Processes Using Distillation and Membranes", Plenary Lecture, Separations Technology IX: New Frontiers in Media, Techniques, and Technologies, Engineering Conferences International (ECI), Albufeira, Portugal, March 2017
220. "Process Intensification in Multicomponent Distillation", Keynote lecture, AIChE Spring Meeting, San Antonio, TX, March 2017.
221. "Solar Energy to Fuels, Chemicals and Electricity", NICE, Beijing, China, April 2017.
222. "Process Intensification and Energy Savings in Multicomponent Distillations", EFCE Working Party on Fluid Separations, Liege, Belgium, May 2017.
223. "Finding Energy Efficient Distillation Configurations and Dividing Wall Columns", AIChE Academy Webinar, May 2017.
224. "Solar Energy: Some Challenges and Opportunities", Purdue Energy Academy, West Lafayette, IN, June 2017
225. "Solar Energy to Fuels, Chemicals and Electricity", Indian Institute of Petroleum, Dehradun, India, August 2017.
226. "Energy Challenge", NEPTUNE class, Purdue University, August 2017.
227. "Process Intensification In Multicomponent Distillation", Plenary Talk, Post PRES2017 conference workshop, Tianjin University, Tianjin, China, August 2017.
228. "Solar Energy to Fuels, Chemicals and Electricity", Keynote Lecture, Purdue-Mexico Center for Sustainability, Queretaro, Mexico, September, 2017
229. "Solution Processed Inorganic Solar Cells", IREC, Barcelona, Spain, October 2017.
230. "Challenges and Opportunities for Chemical Engineering in an Emerging Solar Economy", Danckwerts Lecture, 10th World Congress on Chemical Engineering (WCCE 10), Barcelona, Spain, October 2017.
231. "Challenges and Opportunities for Chemical Engineering in an Emerging Solar Economy", Symposium to honor 50 years of Professor Stan Sandler in academia, University of Delaware, Newark, DE, October 2017
232. "Solar Energy to Fuels, Chemicals and Electricity", EPIC (Enabling Process Innovation through Computation) Seminar Series, College of Engineering, Louisiana State University, Baton Rouge, LA, November, 2017
233. "Challenges and Opportunities for Chemical Engineering in an Emerging Solar Economy", Plenary Lecture, Fifth International Conference of Chemical Engineering: ICChE 2017, BUET, Dhaka, Bangladesh, December 2017.
234. "New Advances in a Mature Technology - Energy Efficiency and Process Intensification for Distillation" Department of Chemical Engineering, University of Melbourne, Feb. 2018.
235. "Solar Energy to Fuels and Chemicals", Peter Cook Centre Seminar, University of Melbourne, Feb. 2018.

236. "Towards A Solar Economy", Melbourne Energy Institute (MEI) –Melbourne School of Engineering (MSE) Public Seminar, University of Melbourne, Feb. 2018.
237. "Towards A Solar Economy", WA School of Mines: Minerals, Energy & Chemical Engineering, Curtin University, Perth, Australia, Feb. 2018.
238. "Challenges and Opportunities in an Emerging Solar Economy", 2018 Distinguished WISER lecture, IIT Chicago, Chicago, IL, April, 2018.
239. "Solution Processed Inorganic Solar Cells", NREL, Denver, Colorado, April, 2018.
240. "Solar Energy to Fuels, Chemicals and Electricity", EDEY (Energy doctoral school) Distinguished Lecture in Energy, EPFL, Lausanne, Switzerland, June, 2018.
241. "Solar Energy to Fuels, Chemicals and Electricity", EPFL, Valais Wallis, Sion, Switzerland, June, 2018.
242. "Energy Systems Engineering for an Emerging Solar Economy", Plenary Lecture, Process Systems Engineering, PSE 2018, San Diego, CA, July 2018.
243. "Innovation – What is it and What Does It Take to Innovate?", T-Summit, Aaruush, SRM IST, Chennai, India, July 2018.
244. "Solar Energy to Fuels and Chemicals", CSIRO, Clayton, Australia, August 2018.
245. "Challenges and Opportunities for Chemical Engineering in an Emerging Solar Economy", CSIRO, Clayton, Australia, August 2018.
246. "Towards a Solar Economy", School of Chemical Engineering, Oklahoma State University, Stillwater, OK, October 2018
247. "Overcoming Potential Land Constraint for Food, Energy and Water needs in a Solar Economy", Keynote Lecture, AIChE Annual Meeting, Pittsburgh, PA, October 2018
248. "Solution Phase Synthesis of Inorganic nanoparticles, Films, and Electronic Devices", Invited Lecture, AIChE Annual Meeting, Pittsburgh, PA, October 2018
249. "Energy Efficiency and Process Intensification in Multicomponent Distillations", Plenary Lecture, 5th National Conference for Mass Transfer and Separation Engineering (NCMS2018), Tianjin, China, Nov. 2018
250. "Towards A Solar Economy", Solenis Bharat Ratna Professor CNR Rao Chemcon Distinguished Lecture, Jalandhar, India, December, 2018
251. "Competition for Land in a Solar Economy", Presentation at the Purdue's College of Engineering Panel - How Will We Communicate, Work, travel, Play live in 2168, February, 2019
252. "Challenges and Opportunities in an Emerging Solar Economy", Distinguished Lecture of the Missouri S & T Academy of Chemical Engineers, Rolla, MO, April, 2019
253. "Grad School to Industry and Back to Academia – A Cycle of Education", Distinguished Lecture of the Missouri S & T Academy of Chemical Engineers, Rolla, MO, April, 2019

254. "Energy Systems Engineering for an Emerging Solar Economy", Ezra's Roundtable Seminar Series, Systems Engineering, Cornell Engineering, Cornell University, Ithaca, NY, May 2019
255. "Challenges and Opportunities in an Emerging Solar Economy", Patent Examiners Technical Training Program (PETTP), Washington DC, May 2019.
256. "Challenges and Opportunities in an Emerging Solar Economy", Plenary Lecture, 5th International Conference on Sustainable Chemical Product and Process Engineering (SCPPE), Tianjin, China, July, 2019
257. "Solution Phase Synthesis of Inorganic nanoparticles, Films, and Electronic Devices", Plenary Lecture, Third International Conference on Advanced Materials for Power Engineering (ICAMPE), Kottayam, Kerala, India, August, 2019
258. "Creating Energy Efficient Processes and Identifying Process Intensification Opportunities", ExxonMobil, Clinton, NJ, September 2019.
259. "Towards A Solar Economy", RENEW (Research and Education in eNergy, Environment and Water) Innovation Lecture, State University of New York, Buffalo, NY, October, 2019.
260. "Towards A Solar Economy", School of Chemical Engineering, Purdue University, Nov. 2019
261. "Chemical Engineering Innovations for Renewable Economy", Invited Panelist Talk, Meet the Innovators, AIChE annual meeting, Orlando, FL, November, 2019.
262. "Process Intensification in Multicomponent Distillation", R. Agrawal, Z. Jiang, R. Tumbalam Gooty, Invited Talk in the ExxonMobil session, AIChE annual meeting, Orlando, FL, November, 2019.
263. "Recent Progress in the Synthesis of Inorganic Solar Cells via Solution Route", Keynote Lecture, the 3rd International Conference on Solar Energy PV, KIIT University, Bhubaneswar, India, Dec. 2019.
264. "Chemical Engineering Innovations for a Renewable Economy", Advances in Chemical Engineering-2020, University of Petroleum and Energy Studies (UPES), Dehradun, India, February, 2020
265. "Solution Processing of Inorganic Semiconducting Materials for Scalable Fabrication of Photovoltaics", Panelist presentation in Advanced Material session of the Vaishwik Bharatiya Vaigyanik Summit (VAIBHAV), India, October 2020.
266. "Fuels for a Renewable Economy", Panelist presentation in the Sustainable Fuels and Next Generation Renewables session of the Vaishwik Bharatiya Vaigyanik Summit (VAIBHAV), India, October 2020.
267. "Chemical Engineering Research for A Renewable Economy", Big 10 Panel Presentation, Purdue University, October 2020.
268. "Towards A Solar Economy", Purdue Student Government, October, 2020.
269. "Photovoltaic Aglectric Farming for Meeting Local Food, Energy, Water and Chemical Needs", Invited Talk in the session Advances in Clean Energy R&D, AIChE Annual Meeting, Virtual Meeting, November, 2020.

270. "Towards a Solar economy", Keynote Lecture at the Seminario Internacional De Ingenieria Quimica Ciencia Y Tecnologia. Universidad Nacional de San Agustin de Arequipa (UNSA), Peru, 25th Nov. 2020.
271. "Paradigm Shift of Process Hierarchy for Enabling Natural Gas Liquids Valorization", Invited talk at Professor Arvind Varma's Memorial Session at the 2021 Boston AIChE Meeting, MA 2021
272. "INFEWS/T2: Solar Solutions for Food, Energy and Water Systems (S2FEWS)", 2022 INFEWS PI Workshop, Virtual NSF presentation, 2022
273. "PV-Aglectric Farming Study at Purdue University", Invited talk in the Department of Food, Agricultural and Biological Engineering (FABE), Ohio State University, Columbus, OH, March 2022.
274. "Innovations for a Solar Economy", Spinks lecture, Department of Chemical and Biological Engineering, University of Saskatchewan, Canada, April 2022.
275. "Solution Phase Synthesis of Inorganic Nanoparticles, Films and Solar Cells", Spinks lecture, Department of Chemical and Biological Engineering, University of Saskatchewan, Canada, April 2022.
276. "Chemical Engineering for a Solar Economy", BASF Distinguished Seminar, Wayne State University, Detroit, MI, April 2022.
277. "Engineering Solutions for a Solar Economy", Chandrakanta Kesavan Centre Lecture, Indian Institute of Technology, Kanpur, India, April, 2022.
278. "Improving Energy Efficiency of Chemical Systems Towards a Sustainable Future", Invited talk at Indian Institute of Petroleum, Dehradun, India, July 2022.
279. "Which separation method needs lower power: membrane or distillation?", Invited Division Plenary: Gerhold and Kunesh Awards on Separations, AIChE Annual Meeting, Phoenix, AZ, November 2022.
280. "Chemical Engineering for a Sustainable World", James Y. Oldshue Lecture, 11th World Congress of Chemical Engineering, Buenos Aires, Argentina, June 2023.
281. "Comparing Membrane and Distillation Separations for Energy Demand", European Federation of Chemical Engineers (EFCE) Working party Fluid Separations Meeting, Zagreb, Croatia, June 2023.
282. "Sustainable Energy Future (Case for a Solar Economy)", Keynote Speech, Faculty of Engineering Graduate Research Symposium (FEGRS), University of Alberta, Edmonton, Canada, August 2023
283. "Challenges and Opportunities for Chemical Engineers", Chemical and Biomolecular Engineering, Rice University, October, 2023
284. "Which Separation Process to Use: Membrane or Distillation or Both?", Honorary Session for Prof. Rich Noble, AIChE Annual Conference, Orlando, FL, Nov. 2023.

285. "Some Recent Advances and Opportunities in Chemical Engineering", Reliance Industries Limited, Mumbai, India. March 2024.
286. "Advances in Distillation: Significant Reductions in Heat Duty and Carbon Dioxide Emissions for Crude Oil Separation", Reliance Industries Limited, Mumbai, India. March 2024.
287. "A Sustainable Energy Future – A Case for a Solar Economy", Azeotropy, IIT Bombay, Mumbai, India. March 2024.
288. "Challenges and Opportunities for Chemical Engineering vis-à-vis Renewable Electricity", Chemical Engineering, IIT Bombay, Mumbai, India. March 2024.
289. "A Synthesis Framework for Inorganic Chalcogenide Perovskites at Moderate Temperatures", E. V. Murphree Lecture, ACS Spring Meeting, New Orleans, LA. March 2024.
290. "Synthesis of Energy-Efficient Distillation Processes with and Without Heat Pumps", Invited talk at the European Federation of Chemical Engineers (EFCE) Webinar, March 2024.
291. "Process Systems Engineering for A Sustainable Chemical Engineering", Plenary Lecture, Foundations of Computer-Aided process Design, FOCAPD2024, Breckenridge, CO, July 2024.
292. "A Solution Based Synthesis Framework for Inorganic Chalcogenides and Their Characterization", Keynote lecture, NEXTGEN 2024, Next Generation High Efficiency Photovoltaics International School and Workshop, Palma de Mallorca, Spain, September 2024.
293. "Synthesis of Inorganic Chalcogenide Nanoparticles and Thin Films for Solar Cells", Chemistry Department, Purdue University, West Lafayette, IN, February 2025.
294. "Some Recent Challenges and Opportunities for Chemical Manufacturing", Inaugural Dan Luss Lecture, William A. Brookshire Department of Chemical and Biomolecular Engineering, University of Houston, Houston, TX, March 2025.
295. "Challenges and Opportunities for Chemical Engineering vis-à-vis Renewable Electricity", Chemical and Biomedical Engineering, West Virginia University, Morgantown, WV, March 2025.
296. "Challenges and Opportunities for Chemical Manufacturing vis-à-vis Renewable Electricity", Andlinger Center for Energy and the Environment, Princeton University, NJ, April, 2025.
297. "A Synthesis Framework for Chalcogenide Perovskites at Moderate Temperatures and Their Characterization" Invited Talk at the 12th International Conference on Materials For Advanced Technologies (ICMAT 2025), Singapore

TECHNICAL PRESENTATIONS

1. "Hydrodemetallation of Nickel and Vanadium Porphyrins", R. Agrawal and J. Wei, AIChE Meeting, Chicago (1980).
2. "Membrane/Cryogenic Hybrid Process for Hydrogen Purification", R. Agrawal, S. R. Auvil and J. S. Choe, AIChE Summer National Meeting, Minneapolis (1987).
3. "Membrane/Cryogenic Hybrid Systems for Helium Purification", J. S. Choe, R. Agrawal, S. R. Auvil and T. R. White, Annual Convention of the Sixty-Seventh Gas Processors Association, Dallas (1988).
4. "Membrane/Cryogenic Hybrid Scheme for Argon Production from Air", R. Agrawal, S. R. Auvil, J. S. Choe and D. W. Woodward, AIChE Summer National Meeting, Denver (1988).
5. "High Efficiency Processes for Cryogenic Air Separation", R. Agrawal, D. C. Erickson, and D. W. Woodward, The Seventh Intersociety Cryogenics Symposium, Houston (1989).
6. "Oxygen Plants for IGCC", J. M. Abrardo, R. Agrawal, A. R. Smith and D. W. Woodward, The Seventh Intersociety Cryogenics Symposium, Houston (1989).
7. "Efficient Cryogenic Nitrogen Generators - An Exergy Analysis", R. Agrawal and D. W. Woodward, AIChE Spring National Meeting, Orlando (1990).
8. "Efficient Processes to Produce Nitrogen by Cryogenic Air Separation", R. Agrawal, D. W. Woodward, W. T. Kleinberg and K. B. Wilson, Low Temperature and Cryogenic Conference 1990, Southampton, U.K. (1990).
9. "Membrane/Adsorption Hybrids for Gas Separation", J. S. Choe, R. Agrawal, S. R. Auvil, R. Srinivasan and R. M. Thorogood, International Congress on Membranes and Membrane Processes, ICOM'90 Chicago (1990).
10. "Production of Ultra-high Purity Oxygen for the Electronic Industry", R. Agrawal and W. T. Kleinberg, AIChE Spring National Meeting, Houston (1991).
11. "Membrane/Adsorption Hybrids for Gas Separation", J. S. Choe, R. Agrawal and S. R. Auvil, AIChE Spring National Meeting, Houston (1991).
12. "Production of Medium Pressure Nitrogen", R. Agrawal and R. M. Thorogood, Gas Separation International Meeting, Austin (1991).
13. "Impact of Low Pressure Drop Structure Packing on Argon Production and Purification from Air", R. Agrawal and D. W. Woodward, XVIIIth International Congress of Refrigeration, Montreal, Canada (1991).
14. "Efficient Processes to Produce Ultra-high Purity Nitrogen from Air", R. Agrawal and W. T. Kleinberg, XVIIIth International Congress of Refrigeration, Montreal, Canada (1991).
15. "Multi-component Distillation with Column Integration", R. Agrawal and D. W. Woodward, Annual AIChE Meeting, Los Angeles (1991).

16. "Production of Ultra-high Purity Nitrogen and Oxygen", R. Agrawal and W. T. Kleinberg, Annual AIChE Meeting, Los Angeles (1991).
17. "Recent Advances in Argon Production and Purification in Cryogenic Air Separation", R. Agrawal, D. W. Woodward, J. C. Peterson and K. W. Kovak, AIChE Spring Meeting, New Orleans, LA (1992).
18. "Impact of Low Pressure Drop Structure Packing on Air Distillation", R. Agrawal, D. W. Woodward, K. A. Ludwig, and D. L. Bennett, Fifth International Symposium on Distillation and Absorption, Institution of Chemical Engineers, Birmingham, September 1992.
19. "Argon Production from Elevated Pressure Air Distillation Processes", R. Agrawal and T. F. Yee, Intersociety Cryogenic Symposium, Houston, 31 January - 4 February 1993.
20. "Heat Pumps in Thermally Linked Distillation Columns", R. Agrawal and T. F. Yee, AIChE Spring Meeting, Houston, TX (1993).
21. "Nitrogen Generators", R. Agrawal, AIChE Spring Meeting, Houston, TX (1993).
22. "More Intercolumn Thermal Integration in Thermally Linked Columns", R. Agrawal, AIChE Annual Meeting, St. Louis, MI (1993).
23. "LNG Cold Recovery Air Separation Unit", R. Agrawal, M. R. Alvarez and R.M. McGuinness, AIChE Spring Meeting, Atlanta, GA (1994).
24. "Novel Membrane Schemes for Higher Purity/Recovery Separations", J. Xu and R. Agrawal, Sixth Annual Meeting of the North American Membrane Society, Breckenridge, CO (1994).
25. "Separation Devices for Gas Mixing", R. Agrawal and J. Xu, 1994, Gordon Research Conference on Separation and Purification, Colby-Sawyer College, New London, NH (1994).
26. "Analysis of Alternative Column Design Utilizing Waste Heat in Distillation", Z. T. Fidkowski and R. Agrawal, Paper # 30d, AIChE Spring National Meeting, Houston, TX (1995).
27. "Novel Membrane Cascades for Gas Separation and Their Thermodynamic Analysis", J. Xu and R. Agrawal, Seventh Annual Meeting of the North American Membrane Society, Portland, OR (1995).
28. "Efficient Process to Produce Tonnage Nitrogen", R. Agrawal and D. W. Woodward, 19th International Congress of Refrigeration, The Hague, The Netherlands, August 20-25, 1995.
29. "Local Thermodynamic Efficiency of Permeation and Membrane Separator Design", J. Xu and R. Agrawal, Paper # 23c, 1995 Annual AIChE Meeting, November 12-17, Miami Beach, FL.
30. "Synthesis of a Distillation Column Configuration for a Multi-component Separation", Paper # 187e, 1995 Annual AIChE Meeting, November 12-17, Miami Beach, FL.
31. "Energy Integrated Distillation Systems - Lower Energy Requirements without Changing Temperatures of Utilities", Paper # 189g, 1995 Annual AIChE Meeting, November 12-17, Miami Beach, FL.

32. "A Method to Draw Gas Separation Membrane Cascades with Limited Number of Compressors", R. Agrawal and J. Xu, Eighth Annual Meeting of the North American Membrane Society, Ottawa, Canada (1996).
33. "A Systematic Procedure for Drawing Gas Separation Membrane Cascades with Limited Number of Compressors", R. Agrawal and J. Xu, Paper # S-4-2-1, 1996 International Congress on Membranes and Membrane Processes, ICOM'96, August 18-23, Yokohama, Japan.
34. "Production of Ultra-high Purity Nitrogen Free of Light Impurities", R. Agrawal, D. W. Woodward and A. Modi, MUST'96, Munich Meeting on Air Separation Technology, October 10-11, 1996.
35. "Columns with Intermediate Heat Exchangers for Separation of a Tangent Pinch Mixture", R. Agrawal and Z. T. Fidkowski, Paper # 5b, 1996 Annual AIChE Meeting, November 10-15, Chicago, IL.
36. "A Method to Synthesize Gas Separation Membrane Cascade Structures with Small Number of Compressors", Paper # 25d, 1996 Annual AIChE Meeting, November 10-15, Chicago, IL.
37. "Study of Binary Distillation through Thermodynamic Efficiency," R. Agrawal and D. M. Herron, Eleventh Intersociety Cryogenic Symposium, Houston, January 28-30, 1997.
38. "Study of Binary Distillation through Thermodynamic Efficiency," R. Agrawal and D. M. Herron, 1997 Spring National AIChE Meeting, Houston, March 9-13, 1997.
39. "Coproduction of High Purity Products Using Thermally-Linked Columns," R. Agrawal, D. W. Woodward and A. K. Modi, International Symposium on Distillation and Absorption, Institution of Chemical Engineers, Maastricht, The Netherlands, September 8-10, 1997.
40. "Optimum Configuration for Addition or Removal of Heat from an Intermediate Location of a Binary Distillation Column," R. Agrawal and D. M. Herron, Paper #198e, 1997 Annual AIChE Meeting, November 16-21, Los Angeles, CA.
41. "Advanced Cryogenic Air Separation Plants for Carbonaceous Fuel-Based Ammonia Synthesis," J. Xu and R. Agrawal, Cryogenics and Refrigeration Conference, ICCR'98, Hangzhou, China, April 21-24, 1998.
42. "Thermally Coupled Columns: Are They Always Efficient?," R. Agrawal and Z. T. Fidkowski, Annual AIChE Meeting, November 16-20, 1998, Miami Beach, FL.
43. "More Operable Arrangements of Thermally Coupled Distillation Columns", R. Agrawal and Z. T. Fidkowski, AIChE Spring National Meeting, March 1999, Houston, TX.
44. "Improving Efficiency of Distillation with New Thermally Coupled Configurations and Columns", R. Agrawal and Z. T. Fidkowski, FOAPD '99 Computer-Aided Design in the 21st Century, July, 1999, Breckenridge, Colorado.
45. "Production of Low-Purity Oxygen in the Next Millennium", R. Agrawal and D. M. Herron, 20th International Congress of Refrigeration, September, 1999, Sydney, Australia.

46. "Simplified Thermally Coupled Arrangement for Ternary Distillation", R. Agrawal and Z. T. Fidkowski, Annual AIChE Meeting, November, 1999, Dallas, TX.
47. "Nitrogen Liquefaction Processes", R. Agrawal, D. M. Herron, A. A. Brostow and M. J. Roberts, International Cryogenic Engineering Conference (ICEC18), Mumbai, India, February, 2000.
48. "Multi-component Thermally Coupled Systems of Distillation Columns at Minimum Reflex", Z. T. Fidkowski and R. Agrawal, Paper #242C, AIChE Annual National Meeting, Nov. 2000, Los Angeles, CA.
49. "Further Reduction in Heat Demand of Thermally Coupled Configurations through Double-Effect Distillation", R. Agrawal, Paper #246a, AIChE Annual National Meeting, Nov. 2000, Los Angeles, CA.
50. "Column Configurations for Ternary Distillation with the Same Number of Reboilers – Condensers", Z. T. Fidkowski and R. Agrawal, Paper #1f, AIChE Spring Meeting, April 2000, Houston, TX.
51. "Reducing Heat Duty of Conventional Multi-component Distillation Columns with No Thermal Coupling", R. Agrawal, Paper 1b, AIChE Spring Meeting, April 2000, Houston, TX.
52. "Feed Pretreatment for Binary Distillation Efficiency Improvement", R. Agrawal and D. M. Herron, ESCAPE 11, May 2001, Kolding, Denmark.
53. "Hybrid Cryogenic Liquefaction Processes", R. Agrawal, A. A. Brostow, D. M. Herron and M. J. Roberts, XXI IIR International Congress of Refrigeration, August 2003, Washington, DC.
54. "Synthesis of Multicomponent Distillation Column Configurations", R. Agrawal, AIChE Annual National Meeting, Nov. 2003, San Francisco, CA.
55. "Partially Thermally Coupled Systems of Distillation Columns", R. Agrawal and Z. T. Fidkowski, AIChE Annual National Meeting, Nov. 2003, San Francisco, CA.
56. "Particle Swarm Optimization in Discontinuous Function Spaces", A. Giridhar, B. B. Krishnamurthy, R. Agrawal, V. Venkatasubramanian, AIChE Annual National Meeting, Nov. 2005, Cincinnati, OH.
57. "Formulation of Search Spaces for Separation Networks", A. Giridhar, V. Venkatasubramanian, R. Agrawal, AIChE Annual National Meeting, Nov. 2005, Cincinnati, OH.
58. "A Novel Search Space Formulation for the Synthesis of Separation Networks", A. Giridhar, R. Agrawal, V. Venkatasubramanian, AIChE Annual National Meeting, Nov. 2006, San Francisco, CA.
59. "New Energy-Efficient and Low-Cost Multicomponent Distillation Configurations", A. Giridhar and R. Agrawal, AIChE Spring National Meeting, April 2007, Houston, TX.
60. "Synthesis of Optimal Distillation Networks", A. Giridhar and R. Agrawal, AIChE Annual National Meeting, Nov. 2007, Salt Lake City, UT.

61. "Development of Low-Cost CuInSe₂ Nanocrystal-Ink Based Solar Cells", R. Agrawal, H. Hillhouse, Q. Guo, and M. Kar, AIChE Annual National Meeting, Nov. 2007, Salt Lake City, UT.
62. "New Insights into the Ideal Cascade Theory for Membrane Separation Processes", R. Pathare and R. Agrawal, AIChE Annual National Meeting, Nov. 2007, Salt Lake City, UT.
63. "An Environmentally Friendly Novel Route for the Transportation Fuel", R. Agrawal, N. Singh, F. Ribiero, and W. N. Delgass, AIChE Annual National Meeting, Nov. 2007, Salt Lake City, UT.
64. "New and Novel Batch Distillation Processes", R. Agrawal and G. S. Joglekar, AIChE Annual National Meeting, Nov. 2007, Salt Lake City, UT.
65. "Reducing Energy Consumption by New Distillation Configurations", L. Zhang, A. Linninger and R. Agrawal, 11th Topical on Refinery processing, AIChE Annual Spring Meeting, 9th April, 2008, New Orleans, LA.
66. "Developing Membrane Separation Process fundamentals for Energy Savings", R. Pathare and R. Agrawal, Gordon Research Conference on Membranes: Materials and Processes, August, 2008, New London, NH
67. "Membrane Cascade Design Fundamentals for Energy Savings", R. Pathare and R. Agrawal, AIChE Annual National Meeting, Nov. 2008, Philadelphia, PA
68. "A Computationally Efficient Method to Generate a Complete Search Space for Multicomponent Distillation Sequences", V. Shah, A. Giridhar and R. Agrawal, AIChE Annual National Meeting, Nov. 2008, Philadelphia, PA
69. "Dynamic Modeling and Optimization of Thermally Coupled Dual-Column Batch Distillation Processes", G. Joglekar and R. Agrawal, AIChE Annual National Meeting, Nov. 2008, Philadelphia, PA
70. "Synergistic Use of Solar Hydrogen with Biomass to Produce Biofuels", N. R. Singh, F.H. Ribeiro, W. N. Delgass and R. Agrawal, AIChE Annual National Meeting, Nov. 2008, Philadelphia, PA
71. "Efficiency comparison of distillation schemes: heat integrated distillation column (HIDiC) and heat pump systems" R. Agrawal, A. Shenvi and D. Michael Herron, AIChE Spring National Meeting, April 2009, Tampa, FL
72. "Synthesis and quick identification of low-energy sequences for multicomponent distillation", V. Shah and R. Agrawal, AIChE Spring National Meeting, April 2009, Tampa, FL
73. "Dynamic Modeling and Optimization of Thermally Coupled Dividing Wall Column Batch Distillation Processes", R. Agrawal and G. S. Joglekar, AIChE Spring National Meeting, April 2009, Tampa, FL

74. "Membrane Cascade Synthesis Fundamentals for Energy Savings", R. Pathare and R. Agrawal, NAMS 2009, June 2009, Charleston, SC
75. "Selenization of Copper Indium Gallium Disulfide Nanocrystal Films for Thin Film Solar Cells", Q.J. Guo, G. M. Ford, H. W. Hillhouse and R. Agrawal, PVSC 34, June 2009, Philadelphia, Pa
76. "Synergistic Routes to Liquid Fuel for a Petroleum Deprived Future", N.R. Singh and R. Agrawal, AIChE Annual Meeting, November 2009, Nashville, TN
77. "Reaction Mechanism for the Formation of CuInSe₂ Nanocrystals for Low-Cost Solar Cells", M. Kar, H. W. Hillhouse and R. Agrawal, AIChE Annual Meeting, November 2009, Nashville, TN
78. "Energy Efficient Membrane Cascade Design for Binary and Multicomponent Applications", R. Pathare and R. Agrawal, AIChE Annual Meeting, November 2009, Nashville, TN
79. "Thermal Coupling in Multicomponent Distillation Sequences", V.H. Shah and R. Agrawal, AIChE Annual Meeting, November 2009, Nashville, TN
80. "Heat Integrated Distillation Column (HIDiC) Versus Heat Pump Systems", A. A. Shenvi, D. M. Herron and R. Agrawal, AIChE Annual Meeting, November 2009, Nashville, TN
81. "CIGS Nanocrystal Inks for the Fabrication of Air Stable Thin Film Solar Cells", Q. J. Guo, H. W. Hillhouse and R. Agrawal, AIChE Annual Meeting, November 2009, Nashville, TN
82. "Systems Approach Toward Maximizing Liquid Fuel Yield from Biomass", D. S. Mallapragada, W. N. Delgass, F. H. Ribeiro, and R. Agrawal, Frontiers in Bioenergy Symposium, May 2010, Purdue University, IN.
83. "Solar Cells via Selenization of CuInS₂ Nanocrystals: Effect of Synthesis Precursor", G. M. Ford, Qijie Guo, R. Agrawal and H. W. Hillhouse, PVSC 35, June 2010, Honolulu, Hawaii
84. "Finding Globally Optimal Minimum Heat Duty for Multicomponent Distillation Sequences", Ulaganathan Nallasivam, Vishesh H. Shah, Mohit Tawarmalani, Rakesh Agrawal, AIChE Annual Meeting, November 2010, Salt Lake City, Utah.
85. "The Scope of Using Concentrated Solar Energy to Produce Liquid Fuels from Biomass", Dharik, Mallapragada, W. Nicholas Delgass, Fabio H. Ribeiro, Rakesh Agrawal, AIChE Annual Meeting, November 2010, Salt Lake City, Utah.
86. "A Method for Multicomponent Distillation Sequences with Fewer Columns", Anirudh A. Shenvi, Vishesh H. Shah, Jeremy Zeller, Rakesh Agrawal, AIChE Annual Meeting, November 2010, Salt Lake City, Utah.
87. "Energy Systems Analysis for a Renewable Transportation Sector", D. S. Mallapragada, N. R. Singh and R. Agrawal, Proceedings 21st European Symposium on Computer Aided Process Engineering- ESCAPE-21, May 2011, Porto Carras, Chalkidiki, Greece, 2011
88. "A Generalized and Robust Method for Efficient Photovoltaic Devices from Multinary Sulfide Nanocrystal Inks", Q. J. Guo, G. M. Ford, H. W. Hillhouse, and R. Agrawal, PVSC 37 Conference, June, 2011, Seattle, WA.

89. "Analyzing Phase Transformation in the Growth of CIGSe Films from Nanocrystals", Bryce C. Walker, Erik Sheets, Rakesh Agrawal, AIChE Annual Meeting, October 2011, Minneapolis, MN.
90. "Band Gap Tuning with CZTS- Based Nanocrystal-Ink Solar Cells", Grayson Ford, Rakesh Agrawal, Hugh W. Hillhouse, AIChE Annual Meeting, October 2011, Minneapolis, MN.
91. "High-Pressure Catalytic Hydrodeoxygenation of the Hydro-Pyrolysis Vapor Lignin Model Compounds", Sara L. Yohe, W. Nicholas Delgass, Fabio H. Ribeiro, Rakesh Agrawal, AIChE Annual Meeting, October 2011, Minneapolis, MN.
92. "High-Pressure Fast Pyrolysis and Fast Hydropyrolysis for Conversion of Biomass to Liquid Fuels", Vinod Kumar Venkatakrishnan, Andrew D. Smeltz, Sergey V. Semikolenov, Fabio H. Ribeiro, W. Nicholas Delgass, Rakesh Agrawal, AIChE Annual Meeting, October 2011, Minneapolis, MN.
93. "Direct Production of Molecules in the Fuel Range by Selective Tailoring of Biomass Fast Pyrolysis", Piotr Gawecki, Fabio Ribeiro, W. Nicholas Delgass, Rakesh Agrawal, Andrew Smeltz, Matthew R. Hurt, David J. Borton II, Nelson R. Vinueza, Hilkka I. Kenttamaa, Nicholas J. Nugent, William E. Anderson, AIChE Annual Meeting, October 2011, Minneapolis, MN.
94. "A Method for Novel Multicomponent Distillation Sequences with Fewer Columns", Anirudh A. Shenvi, Vishesh H. Shah, Rakesh Agrawal, AIChE Annual Meeting, October 2011, Minneapolis, MN.
95. "In-Situ Measurements of CZTSSe Film Formation from CZTS Nanoparticles". Bryce Walker, Rakesh Agrawal, Roland Mainz, Humberto Rodriguez-Alvarez, Alfons Weber, Ole Zander, Cornelia Streeck, Thomas Unold, Hans-Werner Schock, MRS Spring Conference, April, 2012,, San Francisco, CA.
96. "Low-cost and Earth-abundant Solar Cells Utilizing Nanoparticle Precursors", W.C. Yang, N. J. Carter, C. J. Hages, E. J. Sheets, K. W. brew, B. C. walker, H. Y. Park, J. M. Moore, and R. Agrawal, NSF IGERT Project Meeting, 2012, Washington DC,
97. "Band Alignment Limitations and Light-Soaking Effects in CZTSSe and CZTGeSSe", C. J. Hages, J. E. Moore, S. Dongaonkar, M. A. Alam, M. S. Lundstrom and R. Agrawal, PVSC 38 Conference June 2012, Austin,TX. (This paper won the best poster paper award)
98. "Influence of Ge Doping on the Defect Distributions of $\text{Cu}_2\text{Zn}(\text{Sn}_x\text{Ge}_{1-x})(\text{S}_y\text{Se}_{1-y})$ Fabricated by Nanocrystal Ink Deposition", J. E. Moore, C. J. Hages, M. S. Lundstrom and R. Agrawal, PVSC 38 Conference June 2012, Austin,TX. (This paper won the best oral presentation by a graduate student).
99. "Grain Growth Enhancement of Selenide CIGSe Nanoparticles to Densified Films Using Copper Selenides", B. Walker, and R. Agrawal, PVSC 38 Conference June 2012, Austin,TX.
100. "Reverse Stress Metastability of Shunt Current in CIGS Solar Cells", S. Dongaonkar, E. Sheets, R. Agrawal, and M. A Alam, PVSC 38 Conference June 2012, Austin,TX. (This paper was nominated for the best poster paper award).

101. "Synthesis Routes of Phosphorous-Free Semiconducting Selenide Nanoparticles for Photovoltaic Applications" B. C. Walker, S. M. Szecepaniak, B. Negash, S. M. McLeod, and R. Agrawal, AIChE Annual Meeting, October, 2012.
102. "Improved Performance of Earth-Abundant $\text{Cu}_2\text{ZnSn}(\text{S}_x\text{Se}_{1-x})_4$ Solar Cells Through Ge Incorporation", C. Hages and R. Agrawal, AIChE Annual Meeting, October, 2012.
103. "Systematic Synthesis of Augmented Biomass-to-Liquid Fuel Processes" D. Mallapragada, W. N. Delgass, F. H. Ribeiro and R. Agrawal, AIChE Annual Meeting, October, 2012.(This paper was judged as the Best Presentation in the session)
104. "Design of Efficient Systems for Multicomponent Distillation", G. Rampriya, M. Tawarmalani and R. Agrawal, AIChE Annual Meeting, October, 2012.
105. "Kinetics of High Pressure Catalytic Reaction Pathways for Dihydroeugenol Over Pt/ZrO_2 ", S. Yohe, R. Agrawal, W. N. Delgass, and F.H. Ribeiro, AIChE Annual Meeting, October, 2012.
106. "New Class of Thermal Coupling Links in Multicomponent Distillation", J. Huff, M. Tawarmalani, and R. Agrawal, AIChE Annual Meeting, October, 2012.
107. "Limiting Efficiencies for Solar Thermal Energy Conversion to Fuels", D. Mallapragada, and R. Agrawal, AIChE Annual Meeting, October, 2012.
108. "Copper-zinc-tin Chalcogenide Absorbers Derived from Controlled Sulfide Nanocrystals of Wurtzite and Kesterite Structures", W.-C. Yang, C. K. Miskin, C. J. Hages, E. A. Stach, and R. Agrawal, MRS Fall Meeting, November, 2012.
109. "Real-time Investigation of the Sintering Mechanism in Cu-Zn-Sn-S Nanocrystal Films for Photovoltaic Applications", N. J. Carter, R. Mainz, B. C. Walker, W.C. Yang, A. Weber, O. Zander, S. Schmidt, E. A. Stach, T. Unold, and R. Agrawal, MRS Spring Meeting, April, 2013.
110. "Analysis of Recombination in $\text{Cu}_2\text{ZnSn}_{1-x}\text{Ge}_x\text{S}_y\text{Se}_{4-y}$ thin films by Photoluminescence Spectroscopy", C. J. Hages, S.Levcenco, T. Unold, and R. Agrawal, MRS Spring Meeting, April, 2013.
111. "Novel Metal-selenide Nanoparticle Synthesis from Phosphorous-free Routes", B. C. Walker, and R. Agrawal, MRS Spring Meeting, April, 2013.
112. "Scalable Photovoltaics through Nanotechnology", B. C. Walker, and R. Agrawal, MRS Spring Meeting, April, 2013.
113. "GWh Level Renewable Energy Storage and Supply using Liquid CO_2 ", E Al-musleh, D.S. Mallapragada and R. Agrawal, 23rd European Symposium on Computer Aided Process Engineering –ESCAPE 23, June 9-12, Lappeenranta, Finland, 2013
114. "Analysis of Temperature-Dependent Current-Voltage Characteristics for CIGSSe and CZTSSe Thin Film Solar Cells from Nanocrystal Inks", N. J. Carter, C. J. Hages, J. E. Moore, S. M. McLeod, C. K. Miskin, C. Joglekar, M. S. Lundstrom, and R. Agrawal, 39th IEEE Photovoltaic Specialist Conference, Tampa, Fl, 2013.

115. "High Efficiency $\text{Cu}_2\text{ZnSnS}_4$ Nanocrystal Ink Solar Cells through Improved Nanoparticle Synthesis and Selenization," C. K. Miskin, N. J. Carter, W.C. Yang, C. J. Hages, E. Stach, and R. Agrawal, 39th IEEE Photovoltaic Specialist Conference, Tampa, FL, 2013.
116. "Device Comparison of Champion Nanocrystal-Ink based CZTSSe and CIGSSe Solar Cells: Capacitance Spectroscopy", C. J. Hages, N. J. Carter, S. M. McLeod[†], C. K. Miskin, C. Joglekar, and R. Agrawal, 39th IEEE Photovoltaic Specialist Conference, Tampa, FL, 2013.
117. "The Physics of V_{bi} -Related IV Crossover in Thin Film Solar Cells: Applications to Ink Deposited CZTSSe", J. Moore, C. J. Hages, N. Carter, R. Agrawal and M. Lundstrom, 39th IEEE Photovoltaic Specialist Conference, Tampa, FL, 2013.
118. "CZTSe Devices Fabricated From CZTSSe Nanoparticles", B. C. Walker, B. G. Negash, S. M. Szczepaniak, K. W. Brew and R. Agrawal, 39th IEEE Photovoltaic Specialist Conference, Tampa, FL, 2013.
119. "Fast Hydropyrolysis and Hydrodeoxygenation of Biomass Model Compounds", D. D. Mehta, A. D. Smeltz, N. J. Nugent, W. E. Anderson, W. N. Delgass, R. Agrawal and F. H. Ribeiro, AIChE Annual Meeting, San Francisco, 2013
120. "Fast Hydropyrolysis and Catalytic Hydrodeoxygenation of Cellulose in a Micro-Scale Batch Reactor", H. J. Choudhari, W. N. Delgass, F. H. Ribeiro and R. Agrawal, AIChE Annual Meeting, San Francisco, 2013.
121. "Fast-hydropyrolysis and Catalytic Hydrodeoxygenation for Conversion of Biomass to Liquid Fuel", V. K. Venkatakrishnan, J. Degenstein, W. N. Delgass, R. Agrawal and F. H. Ribeiro, AIChE Annual Meeting, San Francisco, 2013.
122. "Process Design of GWh Level Renewable Energy Storage and Supply Using Liquid CO_2 ", E. I., Al-musleh, D. S. Mallapragada and R. Agrawal, AIChE Annual Meeting, San Francisco, 2013.
123. "High Pressure Catalytic Reaction Pathways and Kinetics of the Lignin Model Compound Dihydroeugenol over 2%Pt/ZrO₂", S. L. Yohe, W. N. Delgass, F. H. Ribeiro and R. Agrawal, North American Catalysis Society, Louisville, 2013.
124. "A New Screening Tool for Designing Energy-Efficient Distillation Systems", J. Huff, M. Tawarmalani and R. Agrawal, AIChE Spring Meeting, New Orleans, LA, April, 2014.
125. "More Operable Dividing Wall Columns", G. M. Ramapriya and R. Agrawal, AIChE Spring Meeting, New Orleans, LA, April, 2014.
126. "The Potential of Nanocrystal Ink-based Processing for Chalcogenide Photovoltaics", C. J. Hages, C. K. Miskin, W.-C. Yang, S. M. McLeod, N. J. Carter, and R. Agrawal, 40th IEEE Photovoltaic Specialist Conference, Denver, CO, June, 2014.
127. "Characterization of Nanocrystal-Ink Based CZTSSe and CIGSSe Solar Cells Using Voltage-Dependent Admittance Spectroscopy", X. Sun, C. J. Hages, N. J. Carter, J. E. Moore, R. Agrawal and M. Lundstrom, 40th IEEE Photovoltaic Specialist Conference, Denver, CO, June, 2014.
128. "Synergistic Biomass and Natural gas Conversion to Liquid Fuel With Reduced CO_2 Emissions", E. Gençer, D. S. Mallapragada, M. Tawarmalani and R. Agrawal, FOCAPD 2014, Cle Elum, WA, July 2014.

129. "New, Useful Dividing Wall Columns for Sustainable Distillation", G. Madenoor Ramapriya, M. Tawarmalani and R. Agrawal, 10th International Conference on Distillation & Absorption", Friedrichshafen, Germany, September 2014.
130. "Synergistic Biomass and Natural Gas Process Design for Liquid Fuel Production with Reduced CO₂ Emissions", E. Gençer, D. S. Mallapragada, M. Tawarmalani, R. Agrawal, AIChE Annual Meeting, Atlanta, GA, November, 2014
131. "Dimethyl Ether Chemical Storage Cycle for Uninterrupted Renewable Power Supply", E. Gençer, E. I. Al-musleh, D. S. Mallapragada, R. Agrawal, AIChE Annual Meeting, Atlanta, GA, November, 2014
132. "High Efficiency Solar Thermal Power and Integrated Hydrogen Storage Cycles for Continuous Grid Power Supply", E. Gençer, D. S. Mallapragada, F. Maréchal, M. Tawarmalani, R. Agrawal, AIChE Annual Meeting, Atlanta, GA, November, 2014
133. "The Development of CZTS_{Se} and CZTGeS_{Se} Solar Cells, C. J. Hages, R. Agrawal, AIChE Annual Meeting, Atlanta, GA, November, 2014 (This talk was presented by C. J. Hages as Graduate Student Award Finalists)
134. "Plethora of Dividing Wall Columns for Fully Thermally Coupled Distillation", G. Madenoor. Ramapriya, M. Tawarmalani, R. Agrawal, AIChE Annual Meeting, Atlanta, GA, November, 2014
135. "Nanoparticle-based Earth-Abundant CZTS_{Se} and CZTGeS_{Se} Solar Cells: Current Progress and Efficiency Limitations, C. J. Hages, W. -C. Yang, N. J. Carter, E. A. Stach, T. Unold and R. Agrawal, AIChE Annual Meeting, Atlanta, GA, November, 2014.
136. "The Role of Potential Fluctuations in Voltage Limitations for CZTS_{Se} Solar Cells', C. J. Hages, W. -C. Yang, N. J. Carter, E. A. Stach, T. Unold and R. Agrawal, World Conference on Photovoltaic Energy Conversion (WCPEC), 2014 IEEE conference, Kyoto, Japan, Nov. 2014
137. "Efficient Solar Thermal Integrated Power and Chemical Production Cycles for Uninterrupted Power', E. Gençer, M. Tawarmalani R. Agrawal, 7th Annual AIChE Midwest Regional Conference, Chicago, IL, March 2015.
138. "A versatile Solution Route to Efficient Cu₂ZnSn(S,Se)₄ Thin Film Solar Cells", R. Zhang, S. Szczepaniak, R. Agrawal, C. A. Handwerker, MRS Spring Meeting, San Francisco, CA., April, 2015.
139. "Synthesis of New Dividing Wall Columns for Thermally Coupled Distillation", G. Madenoor. Ramapriya, M. Tawarmalani, R. Agrawal, AIChE Spring Meeting, Austin, TX, April, 2015
140. "Integrated Solar Thermal Hydrogen and Power Coproduction Process for Continuous Power Supply and Production of Chemicals", E. Gençer, M. Tawarmalani and R. Agrawal, Proceedings of the 12th International Symposium on Process Systems Engineering and 25th European Symposium on Computer Aided Process Engineering. 31 May – 4 June 2015, Copenhagen, Denmark.

141. "Current-Voltage Analysis of Band Tail Effects in CZTSSe through Numerical Simulation", J. E. Moore, C. J. Hages, N. J. Carter, R. Agrawal, J. L. Gray, M. S. Lundstrom, 42nd IEEE Photovoltaic Specialist Conference, New Orleans, LA (2015).
142. "Non-ideal diode Response in CZTSe from Admittance Spectroscopy", M. J. Koeper, C. J. Hages, C. K. Miskin, S. M. McLeod, X. Zhao, R. Zhang, J. V. Li, S. G. Choi, D. Levi, and R. Agrawal, Solar Future Symposium 2015, Solar & Photovoltaics Engineering Research Center, King Abdullah University of Science & Technology, Thuwal, Saudi Arabia, November 2015.
143. "Applying the Chemistry of Amine-Thiol Mixtures for Solution-Processed CdTe Thin Films", [C. Miskin](#), R. W. Boyne and R. Agrawal, AIChE Annual Meeting, Salt Lake City, UT, November, 2015.
144. "Solution-Processed Energy Harvesting Electronic Devices Using Amine-Thiol Solvent Media", [C. Miskin](#), K. Bock, R. W. Boyne and R. Agrawal, AIChE Annual Meeting, Salt Lake City, UT, November, 2015.
145. "Efficient Separation-Process Synthesis", G. Madenoor Ramapriya, Z. Jiang, M. Tawarmalani and R. Agrawal, AIChE Annual Meeting, Salt Lake City, UT, November, 2015.
146. "A Heat & Mass Integration Approach to Reduce Capital and Operating Costs of a Distillation Configuration", G. Madenoor Ramapriya, Z. Jiang, M. Tawarmalani and R. Agrawal, AIChE Annual Meeting, Salt Lake City, UT, November, 2015.
147. "Efficient Hydrogen Power Plant Design for Continuous Power Supply from Renewable Hydrogen", E. Gençer and R. Agrawal, AIChE Annual Meeting, Salt Lake City, UT, November, 2015.
148. "Integrated Process Design for Efficient Solar Thermal Hydrogen and Power Production", E. Gençer, M. Tawarmalani and R. Agrawal, AIChE Annual Meeting, Salt Lake City, UT, November, 2015.
149. "'Novel Dividing Wall Columns for Ternary and Quaternary Distillation", AIChE Spring Meeting, Houston, TX, April, 2016.
150. "The Potential of Amine-thiol based Solution Processing for Chalcogenide Photovoltaics", X. Zhao, R.– H. Zhang, C. Handwerker, R. Agrawal, 43rd IEEE Photovoltaic Specialist Conference, Port Land, WA (2016).
151. "Admittance Spectroscopy in CZTSSe: Metastability behavior and voltage dependent defect study", M.J. Koeper, C. J. Hages, J. V. Li, S. Choi, D. Levi, R. Agrawal, 43rd IEEE Photovoltaic Specialist Conference, Port Land, WA (2016).
152. "Minority Carrier Defects in CZTSSe Solar Cells Characterized by DLTS", V. Kheraj, E.A. Lund, A.E. Caruso, K. Al-Ajmi, D. Pruzan, C. Miskin, R. Agrawal, C. Beall, I. Repins, and M.A. Scarpulla, 43rd IEEE Photovoltaic Specialist Conference, Port Land, WA (2016).
153. "Systematic Process Design Strategies for Efficient and Synergistic Integration of Solar Thermal Hydrogen, Electricity and Fresh Water Production Processes", Z. Jiang, M. Tawarmalani, R. Agrawal, AIChE Annual Meeting, San Francisco, CA, Nov. 2016.

154. "Process Intensification of Multicomponent Distillation Configurations Using Minimum Additional Number of Heat and Mass Integration Sections", Z. Jiang, M. Tawarmalani, R. Agrawal, AIChE Annual Meeting, San Francisco, CA, Nov. 2016.
155. "A Method for Minimization of Total Exergy Loss over the Complete Search Space of Regular Distillation Configurations", Z. Jiang, M. Tawarmalani, R. Agrawal, AIChE Annual Meeting, San Francisco, CA, Nov. 2016.
156. "Efficient Solar Thermal Hydrogen, Electricity and Fresh Water Coproduction Process Synthesis", E. Gencer, R. Agrawal, AIChE Annual Meeting, San Francisco, CA, Nov. 2016.
157. "Integration of Solar Thermal Hydrogen, Electricity and Fresh Water Production Processes, hydrogen, Electricity and Fresh Water Coproduction Process Synthesis", E. Gencer, M. Tawarmalani, R. Agrawal, AIChE Annual Meeting, San Francisco, CA, Nov. 2016.
158. "Fabrication of Copper Arsenic Sulfide Thin Films from Nanoparticles for Application in Solar Cells", S. A McClary, J. Andler, C. A Handwerker and R. Agrawal, 44th IEEE Photovoltaic Specialist Conference, Washington DC, June 2017.
159. "Novel Solutions For Solar Energy Driven Food, Energy & Water System", E. Gencer, C. Miskin, R. Agrawal, 10th World Congress on Chemical Engineering (WCCE10), ICCOSE 2017, Barcelona, Spain, October 2017.
160. "Synthesis of Energy Efficient Distillation Configurations and New Dividing Wall Columns", Z. Jiang, M. Tawarmalani and R. Agrawal, 10th World Congress on Chemical Engineering (WCCE10), Barcelona, Spain, October 2017.
161. "Amine-Thiol Solutions: Versatile Solvents for Solution-Processed Thin Film Semiconductors", S. Deshmukh, C. Miskin and R. Agrawal, AIChE Annual Meeting, Minneapolis, MN, Nov. 2017.
162. "Solution Processed Thin Film Photovoltaics Using Amine-Thiol Chemistry" S. Deshmukh, and R. Agrawal, AIChE Annual Meeting, Minneapolis, MN, Nov. 2017.
163. "An Easy-to-Use Rule Synthesizes Numerous New Dividing Wall Columns for Thermally Coupled Distillations", G. Madenoor Ramapriya and R. Agrawal, AIChE Annual Meeting, Minneapolis, MN, Nov. 2017.
164. "An MINLP Formulation for the Identification of Energy Efficient Distillation Configurations", R. Tumbalam Gooty, P. Mobed, M. Tawarmalani and R. Agrawal, AIChE Annual Meeting, Minneapolis, MN, Oct. 2017.
165. "On the Likely Competition for Land between Food and Energy in a Solar Economy", C. Caleb, Y. Li and R. Agrawal, AIChE Annual Meeting, Minneapolis, MN, Oct. 2017.
166. "Co-Production of Energy and Food Using Photovoltaic Systems over Farmland", C. Caleb, E. Gençer, X. Sun, M. R. Khan, Y. Li, M. A. Alam, P. Bermel and R. Agrawal, AIChE Annual Meeting, Minneapolis, MN, Oct. 2017.
167. "Valorization of Natural Gas Liquids from Shale Gas", T. Ridha, Y. Li, E. Gencer, F. H. Ribeiro, J. T. Miller and R. Agrawal, AIChE Annual Meeting, Minneapolis, MN, Oct. 2017.

168. "Global Minimization of Multicomponent Distillation Configurations' Total Cost", AIChE Annual Meeting, Minneapolis, MN, Nov. 2017.
169. "Upgrading Fast-Hydropyrolysis Products of Cellulose to Higher Molecular Weight Products Using Systems-Level Molecular Mapping", T. Ridha, R. Caulkins, A. Talpade, Y. Li, F. H. Ribeiro, W. N. Delgass, M. Tawarmalani and R. Agrawal, A poster paper presented at the AIChE Annual Meeting, Minneapolis, MN, Nov. 2017.
170. "Process Intensification in Multicomponent Distillation", Z. Jiang, M. Tawarmalani and R. Agrawal, AIChE Annual Meeting, Minneapolis, MN, Oct. 2017.
171. "A New Minimum Reflux Calculation Method for Ideal Multicomponent Mixture Separation Using Multi-Feed Distillation Columns", Z. Jiang, M. Tawarmalani and R. Agrawal, AIChE Annual Meeting, Minneapolis, MN, Nov. 2017.
172. "Novel approach to utilize amine-thiol chemistry for synthesis of conventional as well as novel thin film photovoltaic semiconductors", Swapnil Deshmukh, David Rokke, Caleb Miskin and Rakesh Agrawal, MRS Spring Conference, Phoenix, AZ, April, 2018.
173. "Synthesis of colloidal semiconducting nanoparticles for photovoltaic and thermoelectric applications using amine-thiol chemistry", Swapnil Deshmukh, Caleb Miskin and Rakesh Agrawal, MRS Spring Conference, Phoenix, AZ, April, 2018.
174. "Modulation spectroscopy characterization of Cu based chalcopyrites and kesterites", Sergiu Levchenko, Charles J. Hages, Shreyash H. Hadke, Helena Stange, Roland Mainz, Lydia H. Wong, Rakesh Agrawal and Thomas Unold, 45th IEEE Photovoltaic Specialist and WCPEC-7 Conference, Waikoloa, Hawaii, June, 2018.
175. "Optimal Multicomponent Distillation Column Sequencing: DSoftware and Case Studies", Radhakrishna Tumbalam Gooty, Mohit Tawarmalani and Rakesh Agrawal, Process Systems Engineering, PSE 2018, San Diego, CA, July 2018.
176. "Land Availability, Utilization, and Intensification for a Solar Economy", Yiru Li, Caleb Miskin and Rakesh Agrawal, Process Systems Engineering, PDSE 2018, San Diego, CA, July 2018.
177. "Process Intensification in Multicomponent Distillation", Z. Jiang, G. Madenoor Ramapriya, M. Tawarmalani and R. Agrawal, Distillation & Absorption Conference, Florence, Italy, September 2018.
178. "Land Availability, Utilization, and Intensification for a Solar Powered Economy", Yiru Li and Rakesh Agrawal, AIChE Annual Meeting, Pittsburgh, PA, October 2018.
179. "Efficient Hydrogen Production from Solar Thermal Energy Via High Temperature Water Electrolysis", Yiru Li and Rakesh Agrawal, AIChE Annual Meeting, Pittsburgh, PA, October 2018.
180. "On Piecewise Under- and over-Estimators of Fractional Terms", Radhakrishna Tumbalam Gooty, Rakesh Agrawal and Mohit Tawarmalani, AIChE Annual Meeting, Pittsburgh, PA, October 2018.

181. "An MINLP Formulation for the Optimization of Heat-Pump Assisted Distillation Configurations", Radhakrishna Tumbalam Gooty, Tony Joseph Mathew, Mohit Tawarmalani and Rakesh Agrawal, AIChE Annual Meeting, Pittsburgh, PA, October 2018.
182. "Evaluating Novel Semiconducting Materials for Photovoltaic Applications: A Case Study of Copper Arsenic Sulfide (Cu_3AsS_4)", Scott McClary Weiwei Meng, Xinxing Yin, Joseph Andler, Siming Li, Louis Schroeder, Jason B. Baxter, Carol Handwerker, Yanfa Yan and Rakesh Agrawal, AIChE Annual Meeting, Pittsburgh, PA, October 2018.
183. "Minimum Reflux Behavior of Multicomponent Mixture Separation Using Complex Distillation Columns", Zheyu Jiang, Mohit Tawarmalani and Rakesh Agrawal, AIChE Annual Meeting, Pittsburgh, PA, October 2018.
184. "Optimization of Heat-Integrated Multicomponent Distillation Sequences", Tony Joseph Mathew, Radhakrishna Tumbalam Gooty, Mohit Tawarmalani and Rakesh Agrawal, AIChE Annual Meeting, Pittsburgh, PA, October 2018.
185. "Origins of Char during Fast-Hydropyrolysis of Biomass to Fuels", Abhijit Talpade, Richard Caulkins, Lan Xu, Yuan Jiang, Taufik Ridha, Nathan S. Mosier, Hilkka Kenttamaa, Rakesh Agrawal, W. Nicholas Delgass and Fabio H. Ribeiro, AIChE Annual Meeting, Pittsburgh, PA, October 2018.
186. "Understanding the Formation and Pyrolysis of Metal Thiolate Complexes for Solution-Processed Thin Film Photovoltaics", David Rokke, Swapnil Dattatray Deshmukh, Xin Zhao and Rakesh Agrawal, AIChE Annual Meeting, Pittsburgh, PA, October 2018.
187. "Ligand Exchange of $\text{Cu}(\text{In,Ga})\text{S}_2$ Nanoparticles or Minimization of Carbonaceous Impurities in High Efficiency Solution Processed Photovoltaics", R. Ellis, J. Fields and R. Agrawal, MRS Fall Meeting, Boston, MA, November 2018.
188. "Investigation into the Selenization for Solution Processed Silver Zinc Tin Selenide ($\text{Ag}_2\text{ZnSnSe}_4$) Thin Film Solar Cells", X. Hu, R. Agrawal and C. Handwerker, MRS Fall Meeting, Boston, MA, November 2018.
189. "Comparing Membrane & Distillation on an Equivalent Basis", J. A. Chavez Velasco, M. A. Tawarmalani and R. Agrawal, AIChE Spring Meeting, New Orleans, LA, April 2019.
190. "Innovative Processes Design for Value-added Products from Natural Gas Liquids in Shale Gas", Y. Li, W. P. Oladipupo, Z. Chen, E. A. Rodriguez Gil, J. Sirola, F. Ribeiro, R. Agrawal, 12th Natural Gas Conversion Symposium, San Antonio, TX, June 2019.
191. "Design Considerations for Agrophotovoltaic Systems: Maintaining PV Area with Increased Crop Yield, A. Perna, E. K. Grubbs, R. Agrawal, P. Bermel, 46th IEEE Photovoltaic Specialist Conference, Chicago, IL, June 2019.
192. "Optoelectronic Characterization of Emerging Solar Absorber Cu_3AsS_4 ", S. A. McClary, S. Li, X. Yin, P. Dippo, D. Kuciauskas, Y. Yan, J. B. Baxter, R. Agrawal, 46th IEEE Photovoltaic Specialist Conference, Chicago, IL, June 2019.
193. "Slot Die Coating of CIGS Nanoparticle Inks for Scalable Solution Processed Photovoltaics R. G. Ellis, D. Vak, A. SR Chesman, and R. Agrawal, 46th IEEE Photovoltaic Specialist Conference, Chicago, IL, June 2019.

194. "A Novel Approach to Amine Thiol Molecular Precursors for Fabrication of High Efficiency Thin Film CISSe /CIGSSe Devices", D. Rokke, S. D. Deshmukh, and R. Agrawal, 46th IEEE Photovoltaic Specialist Conference, Chicago, IL, June 2019.
195. "Innovative Process Design for Converting Natural Gas Liquids In Shale Gas Into Liquid Hydrocarbons", Y. Li, Z. Chen and R. Agrawal, FOAPD, Cooper Mountain, CO, July, 2019
196. "Optimization of Heat-Integrated Multicomponent Distillation Configurations", T. J. Mathew, R. Tumbalam Gooty, M. Tawarmalani, and R. Agrawal, FOAPD, Cooper Mountain, CO, July, 2019.
197. "Process Conceptualization in a Carbon-Constrained World: Leveraging Optimization and Systems Engineering to Balance Multiple Objectives", C. Goheen, G. Kocis, S. Narayanan, L. Yang, M. Tawarmalani, R. Agrawal, AIChE Annual Meeting, Orlando, FL, Nov. 2019.
198. "Replacing Steam with Methane in Thermal Cracking Processes", P. Oladipupo, F. H. Ribeiro, J. J. Sirola, R. Agrawal, AIChE Annual Meeting, Orlando, FL, Nov. 2019.
199. "A Novel Methodology to Correctly Compare the Energy Efficiency between Membranes and Distillation", A. Chavez, M. Tawarmalani, R. Agrawal, AIChE Annual Meeting, Orlando, FL, Nov. 2019.
200. "Innovative Processes Design for Value-added Products from Natural Gas Liquids in Shale Gas", Y. Li, Z. Chen, W. P. Oladipupo, E. A. Rodriguez Gil, R. Agrawal, AIChE Annual Meeting, Orlando, FL, Nov. 2019.
201. "Synthesis and Ligand Engineering of Impurity Free Cu(In,Ga)S₂ Nanoparticles for Slot-Die Coated Photovoltaics", R. Ellis, R. Agrawal, R. Agrawal, AIChE Annual Meeting, Orlando, FL, Nov. 2019.(Graduate student Ryan Ellis received first prize for this presentation).
202. "Facile Fabrication of Lead Chalcogenide Thin Films with Controlled Structure and Composition", K. Weideman, S. Deshmukh, Y. Feng, N. Lu, R. Agrawal, AIChE Annual Meeting, Orlando, FL, Nov. 2019.
203. "Room Temperature Synthesis, Self-assembly and Anion Exchanges for Nano to Micron Scale Lead Chalcogenide Particles", S. D. Deshmukh, K. Weideman, R. Agrawal, MRS Fall Meeting, Boston, MA, Dec. 2019.
204. "Potassium Treatments for Solution-Processed Cu(In,Ga)(S,Se)₂ Solar Cells", E. AlRuqobah, R. Agrawal, MRS Fall Meeting, Boston, MA, Dec. 2019.
205. "Improving Solution Processed CIGSSe Devices Through Colloidal Nanoparticle Ligand Exchange", R. G. Ellis, E. H. AlRuqobah, J. W. Turnley, R. Agrawal, 47th IEEE Photovoltaic Specialist Conference, Virtual Meeting, June 2019.
206. "Investigating the Potential of Amine-Thiol Solvent System for High-Efficiency CuInSe₂ Devices", S. D. Deshmukh, D. J. Rokke, K. Kisslinger, R. Agrawal, 47th IEEE Photovoltaic Specialist Conference, Virtual Meeting, June 2019.
207. "Coproduction of solar energy on maize farms – experimental validation of recent experiments", E. K. Grubbs, H. Imran, R. Agrawal, P. A. Bermel, 47th IEEE Photovoltaic Specialist Conference, Virtual Meeting, June 2019.

208. "Classification and Comparison of Dividing Wall Columns", Z. Chen, R. Agrawal, AIChE Spring Meeting, Virtual Meeting, August, 2020.
209. "Solution Phase Fabrication of Cu(In,Ga)(S,Se)₂ Thin-Films Using Amine-Thiol Solvent System", S. D. Deshmukh, X. Zhao, R. Ellis, D. Rokke and R. Agrawal, AIChE Annual Meeting, Virtual Meeting, November, 2020.
210. "Synthesis of Metal Chalcogenide Nanoparticles and Micro-Assemblies Using Facile Solvent Chemistry", S. D. Deshmukh, R. Ellis, C. Miskin, K. Weideman and R. Agrawal, AIChE Annual Meeting, Virtual Meeting, November, 2020.
211. "Energy-Efficient Distillation Configurations: Novel Formulation, Relaxations and Discretizations", R. Tumbalam Gooty, R. Agrawal and M. Tawarmalani, CAST Director's Student Presentation Award Finalist, AIChE Annual Meeting, Virtual Meeting, November, 2020.
212. "Synthesis and Characterization of Solution-Processed AgInSe₂ Thin Films As a Candidate for Low-Cost, High Efficiency Printable Photovoltaics", D. Rokke and R. Agrawal, AIChE Annual Meeting, Virtual Meeting, November, 2020.
213. "Global Optimization of Multicomponent Membrane Cascade", Z. Chen, R. Tumbalam Gooty, J. A. Chavez Velasco, M. Tawarmalani and R. Agrawal, AIChE Annual Meeting, Virtual Meeting, November, 2020.
214. "Process Synthesis and Intensification for Upgrading Natural Gas Liquids in Shale Gas", Z. Chen, Y. Li, E. A. Rodriguez Gil and R. Agrawal, AIChE Annual Meeting, Virtual Meeting, November, 2020.
215. "A NOVEL Configuration for Multicomponent Batch Distillation". U. Diwekar and R. Agrawal, AIChE Spring Meeting, Virtual Meeting, April 2021.
216. "Improved Estimation of Constant Relative Volatilities to Identify Energy-Efficient Heat-Integrated Distillation Configurations", T. J. Mathew, R. Tumbalam Gooty, M. Tawarmalani and R. Agrawal, AIChE Spring Meeting, Virtual Meeting, April 2021.
217. "Paradigm Shift of Process Framework for Light Olefin Production from Shale Gas", Z. Chen, and R. Agrawal, AIChE Spring Meeting, Virtual Meeting, April 2021.
218. "Tailoring the Amine-Thiol Solvent System for the Deposition of High Quality Metal Selenide Films to fabricate Cu(In,Ga)(S,Se)₂ Solar Cells", J. W. Turnley, S. D. Deshmukh, and R. Agrawal, MRS Spring Meeting, Virtual Meeting, April 2021.
219. "Silver Doping of Enargite (Cu₃AsS₄) Absorbers Using Amine-thiol Chemistry for the Fabrication of Solar Cells", A. Pradhan, J. Andler, S. A. McClary and R. Agrawal, MRS Spring Meeting, Virtual Meeting, April 2021.
220. "Silver Indium Diselenide: A high mobility, low-defect chalcopyrite material with potential for thin-film photovoltaics", D. Rokke, K. Weideman, A. Murray and R. Agrawal, MRS Spring Meeting, Virtual Meeting, April 2021.
221. "Synthesis and Characterization of Solution Processed Silver Indium Diselenide Thin Films", D.J. Rokke, K. G. Weideman, A. Murray, R. Agrawal, 48th IEEE Photovoltaic Specialist Conference (PVSC), Virtual Meeting, June 2021.

222. "Hall Effect Measurements to Characterize the Effect of Precursor Composition and Annealing Atmosphere on Solution-Processed CuInSe₂ Absorbers", K.G. Weideman, S. D. Deshmukh, and R. Agrawal, 48th IEEE Photovoltaic Specialist Conference (PVSC), Virtual Meeting, June 2021.
223. "Optoelectronic Characterization of Silver-Doped Cu₃AsS₄ for Photovoltaic Applications", A. A. Pradhan, K. Weideman and R. Agrawal, AIChE Annual Meeting, Boston, MA 2021
224. "The Potential of Solution Processed Silver Indium Diselenide for Photovoltaic Devices", D. Rokke, K. Weideman, A. Murray and R. Agrawal, AIChE Annual Meeting, Boston, MA 2021
225. "Process Synthesis and Intensification for Shale Resources Valorization", Z. Chen, E. A. Rodriguez Gil, and R. Agrawal, AIChE Annual Meeting, Boston, MA 2021
226. "Direct Solution Deposition of Metal Selenide Semiconductors Using Novel Metal-Selenium Complexes", J. W. Turnley, S. D. Deshmukh, and R. Agrawal, AIChE Annual Meeting, Boston, MA 2021
227. "Silver Doping of Enargite (Cu₃AsS₄) Absorbers Using Amine-Thiol Chemistry for the Fabrication of Solar Cells", A. Pradhan, J. Andler, S. A. McClary and R. Agrawal, MRS Fall Meeting, Virtual Meeting, Dec. 2021.
228. "Identifying Energy-Efficient and Heat-Integrated Configurations for Multicomponent Distillation", A. S. Nogaja, T. J. Mathew, M. Tawarmalani and R. Agrawal, 2022 AIChE Spring Meeting, San Antonio, TX, April 2022.
229. "A Facile Pathway for Colloidal Nanoparticle Synthesis and Thin-Film Cu(In,Ga)(S,Se)₂ Devices Thereof for Reduction in Carbon Impurities", D. C. Hayes, S. A. Langdon and R. Agrawal, European Materials Research Society, Spring 2022 Meeting (virtual), May 2022.
230. "Scalable Solution Processing of Cu(In,Ga)(S,Se)₂ Solar Cells Via Slot Die Coating", J. W. Turnley, R. Ellis, D. Hayes, D. Vak, A. S. R. Chesman and R. Agrawal, Materials Research Society (MRS) Spring Meeting, Honolulu, Hawaii, May 2022.
231. "Solution-Processing of Chalcogenide Perovskites", J. W. Turnley, A. Pradhan, R. Swope, M. Uible, S. C. Bart and R. Agrawal, MRS Spring Meeting, Honolulu, Hawaii, May 2022.
232. "The Role of Transient Heat and Mass transfer in Controlling the Photovoltaic Properties of Solution-Processed Cu(In,Ga)Se₂", K. G. Weideman and R. Agrawal, Materials Research Society (MRS) Spring Meeting, Honolulu, Hawaii, May 2022.
233. "The Profound Influence of Substrate Thermal Resistance on the Photovoltaic Properties of Solution-Processed Cu(In,Ga)Se₂", K. G. Weideman and R. Agrawal, 49th IEEE Photovoltaic Specialist Conference, Philadelphia, June 2022
234. "Solution-Processed Thin Films of Earth-Abundant Chalcogenides for Solar Cells", J. W. Turnley, D. J. Rokke, A. A. Pradhan, S. Agarwal and R. Agrawal, SeeFuturePV conference, EPFL, Lausanne, Switzerland, June 2022.
235. "Systematically Identifying Energy-Efficient and Attractive Multicomponent Distillation Configurations", T. J. Mathew, M. Tawarmalani and R. Agrawal, 14th International Symposium on Process Systems Engineering (PSE 2021+), Kyoto, Japan, June, 2022.
236. "Process Synthesis and Intensification for Upgrading Natural Gas Liquids in Shale Gas", Z. Chen, E. A. Rodriguez Gil and R. Agrawal, 14th International Symposium on Process Systems Engineering (PSE 2021+), Kyoto, Japan, June, 2022.

237. "Global Optimization of Heat Integrated Multicomponent Distillation Trains: A Novel Shortcut Screening Strategy!", A. S. Nogaja, M. Tawarmalani and R. Agrawal, Gordon Research Conference on Chemical Separations, Ventura, CA, October 2022.
238. "Relaxing the Constant Relative Volatilities and Constant Molar Overflow Assumptions in Distillation While Retaining Their Benefits", T. Joseph Mathew, M. Tawarmalani and R. Agrawal, AIChE Annual Meeting, Phoenix, AZ, November 2022.
239. "Solution Processed Synthesis of Chalcogenide Perovskites Using Organometallic Precursors at Low Temperatures", A. A. Pradhan, J. W. Turnley, S. Agarwal, M. C. Uible, S. C. Bart and R. Agrawal", AIChE Annual Meeting, Phoenix, AZ, November 2022.
240. "Fabrication of high-performance solution-processed AgInSe₂ semiconductor thin-films", S. Agarwal, D. Rokke, K. Weidemann and R. Agrawal, AIChE Annual Meeting, Phoenix, AZ, November 2022.
241. "Low-Temperature Synthesis Approaches for BaZrS₃", J. W. Turnley, K. C. Vincent, A. Pradhan, D. Hayes, M. Uible, S. C. Bart and R. Agrawal, AIChE Annual Meeting, Phoenix, AZ, November 2022.
242. "A Facile, Catchall Pathway for Carbon Impurity Minimization via Ligand Engineering of Colloidal Cu(In_xGa_{1-x})S₂ Nanoparticles for Thin-Film Photovoltaics", D. C. Hayes, S. A. Langdon and R. Agrawal, AIChE Annual Meeting, Phoenix, AZ, November 2022.
243. "The Chemistry of Chalcogenide Perovskites (Low Temperature Synthesis of BaZrS₃)", S. Khandelwal, A. Pradhan, M. Uible, S. C. Bart and R. Agrawal, AIChE Annual Meeting, Phoenix, AZ, November 2022.
244. "Solution Phase Synthesis of Earth Abundant Chalcogenides for Photovoltaic Applications", A. Pradhan, M. Uible, S. Agarwal, J. W. Turnley and R. Agrawal, AIChE Annual Meeting, Phoenix, AZ, November 2022.
245. "Developing Optimization Framework for Sustainable Co-Production of Food and Energy", Varsha, R. Agrawal, M. Tawarmalani and M. W. Gitau, AIChE Annual Meeting, Phoenix, AZ, November 2022.
246. "Low Temperature Solution Deposited Synthesis of Chalcogenide Perovskite Materials BaZrS₃, BaHfS₃, and BaTiS₃ Using Organometallic and Metal Organic Precursors", A. Pradhan, S. Agarwal, M. Uible, J. W. Turnley, S. C. Bart and R. Agrawal, MRS Fall Meeting, Boston, MA, December 2022.
247. "Solution-Processing of BaMS₃ (M = Ti, Zr, Hf) Materials: A Low-Temperature Route to Chalcogenide Perovskites", J. W. Turnley, K. C. Vincent, A. Pradhan, M. Uible, S. C. Bart and R. Agrawal, MRS Fall Meeting, Boston, MA, December 2022.
248. "Solution-Processed Photovoltaics: Metal-Thiolate and Metal-Polyselenide Chemistry for the Synthesis of Nanoparticles and Thin Films", J. W. Turnley and R. Agrawal, Gordon Research Conference on Nanomaterials for Applications in Energy Technology, Ventura, CA, Feb-March 2023,
249. "A Molecular Precursor Approach to Synthesize Chalcogenide Perovskites", J. W. Turnley, K. C. Vincent, A. A. Pradhan, S. Agarwal, M. C. Uible, S. C. Bart, and R. Agrawal, ACS Spring Meet, Indianapolis, IN, April 2023.
250. "Liquid flux assisted growth mechanism for the chalcogenide perovskite – BaZrS₃", K. C. Vincent, S. Agarwal, J. W. Turnley and R. Agrawal, MRS Spring Conference, San Francisco, CA, April 2023.
251. "Optoelectronic Characterization of Solution-Processed BaZrS₃, BaHfS₃, and Ruddlesden-Popper Phases Synthesized Using Dithiocarbamates and Dithiocarboxylates", A. A. Pradhan, M. C. Uible, Daniel C. Hayes, S. Agarwal, J. W. Turnley, S. C. Bart, and R. Agrawal, MRS Spring Conference, San Francisco, CA, April 2023.

252. "Solution-based Synthesis of Narrow Bandgap Anti-perovskite Ag-based Chalcogenides for Energy Applications", I. Cano Prades, J. Turnley, J. M. Asensi, M. Placidi, C. Lopez Álvarez, C. Cazorla, J. Puigdollers, R. Agrawal, E. Saucedo, 11th International Conference on Materials for Advanced Technologies (ICMAT 2023), Singapore, June 2023.
253. "Global Minimization of Power Consumptions for Multicomponent Gas Membrane Cascades", Z. Chen, and R. Agrawal, AIChE Annual Conference, Orlando, FL, Nov. 2023.
254. "Potential Benefits of Electrified Membrane-Distillation Hybrids over Individual Electrified Processes", R. Tumbalam Gooty, J. A. Chavez Velasco, R. Agrawal, AIChE Annual Conference, Orlando, FL, Nov. 2023.
255. "Comparing Capital Cost and Power Consumption between Cryogenic Distillation and Membrane Cascades for Ethane/Ethylene Separation", S. Du, G. Sawyer, and R. Agrawal, AIChE Annual Conference, Orlando, FL, Nov. 2023.
256. "Rethinking the Synthesis of Chalcogenide Perovskites for Moderate Temperature Processing", J. Turnley and R. Agrawal, AIChE Annual Conference, Orlando, FL, Nov. 2023.
257. "Heat Pumps for Electrification of Multicomponent Distillation Trains: An MINLP Formulation", A. Nogaja, M. Tawarmalani, and R. Agrawal, AIChE Annual Conference, Orlando, FL, Nov. 2023.
258. "Breaking Barriers in Chalcogenide Perovskite Synthesis", K. C. Vincent, S. Agarwal, J. W. Turnley, R. Agrawal, MRS Spring Conference, Seattle, WA, April 2024.
259. "Versatile thiol-amine chemistry for the synthesis of complex chalcogenides and chalcogen-halides: new opportunities to develop earth-abundant materials for energy applications", I. Caño, D. Rovira, J. Turnley, M. Placidi, R. Agrawal, E. Saucedo, MRS Spring Conference, Seattle, WA, April 2024.
260. "Generalizing Synthesis Approaches for BaMS₃ Chalcogenide Perovskites and Related Materials", S. Agarwal, K. C. Vincent, J. Turnley, A. S. Mesa Canizales and R. Agrawal, MRS Spring Conference, Seattle, WA, April 2024.
261. "Solution Processed Chalcogenide Perovskite Thin Films Utilizing Amine Thiol Chemistry", K. C. Vincent, J. W. Turnley, S. Agarwal, and R. Agrawal, MRS Spring Conference, Seattle, WA, April 2024.
262. "Low-Temperature Solution Phase Synthesis of Inorganic Chalcogenide Perovskites Nanoparticles and Thin Films and Their Characterization", S. Agarwal, K. C. Vincent, D. Hayes, M. C. Uible, S. C. Bart and R. Agrawal, European MRS conference, Strasbourg, France, May 2024.
263. "Distillation Electrification Through Optimal Use of Heat Pumps", A. Nogaja, M. Tawarmalani, and R. Agrawal, ESCAPE 34 – PSE 24, June 2024, Florence, Italy.
264. "Tackling the Film Processing Inhomogeneities of Cu(In,Ga)(S,Se)₂ (CIGSSe) Solution-Processed Solar", J. S. Alban, D. A. Mora, K. G. Weideman, D. C. Hayes, R. Spilker, K. C. Vincent, F. Camino, K. Kisslinger, and R. Agrawal, 52nd IEEE photovoltaic Specialist Conference (PVSC), Seattle, WA, June 2024.
265. "A Synthesis Framework for Inorganic Chalcogenide Perovskites at Moderate Temperatures and Their Characterization", S. Agarwal, K. C. Vincent, D. C. Hayes, Z. Fan, M. C. Uible, S. C. Bart and R. Agrawal, ReNew PV, 14th European Kesterite+ and 2nd RENEWPV workshop, Università di Verona, Verona, Italy, June 2024.

266. “An MINLP Formulation for Global Optimization of Heat Integration-Heat Pump Assisted Distillations”, A. Nogaja, M. Tawarmalani, and R. Agrawal, Foundations of Computer-Aided process Design, FOCAPD2024, Breckenridge, CO, July 2024.
267. “Internally Heated Crackers for Decarbonization and Optimization of Ethylene Production”, E. A. Rodriguez-Gil, R. Agrawal, Foundations of Computer-Aided process Design, FOCAPD2024, Breckenridge, CO, July 2024.
268. “Unraveling the Low-Temperature Solution-Deposited Synthesis of BaMS_3 (M=Zr, Hf) Chalcogenide Perovskites”, S. Agarwal, and R. Agrawal, AIChE Annual Conference, San Diego, Oct. 2024
269. “Electric Cracking Towers for Ethylene Production”, E. A. Rodriguez-Gil, and R. Agrawal, AIChE Annual Conference, San Diego, Oct. 2024
270. “Energy Storage Strategies for Integrating Chemical Plants with on-Site Renewable Electricity Generation”, S. Du, and R. Agrawal, AIChE Annual Conference, San Diego, Oct. 2024
271. “Shaping the Future: Progress in Emerging BaZrS_3 Chalcogenide Perovskite Synthesis”, S. Agarwal, K. C. Vincent, J. Turnley, and R. Agrawal, AIChE Annual Conference, San Diego, Oct. 2024
272. “Barium Polysulfide Breakthrough: The Key to Moderate Temperature Chalcogenide Perovskite Fabrication”, K. C. Vincent, S. Agarwal, J. Turnley, and R. Agrawal, AIChE Annual Conference, San Diego, Oct. 2024
273. “Rebirth of Amine Thiol Chemistry: A Strategy for Moderate Temperature Processing of BaMS_3 (M=Ti, Zr, Hf) Chalcogenide Perovskites”, K. C. Vincent, S. Agarwal, J. Turnley, and R. Agrawal, AIChE Annual Conference, San Diego, Oct. 2024
274. “Decarbonization of Chemical Manufacturing”, R. Agrawal, 13th International Congress on Sustainability Science & Engineering (ICOSSE), Auckland, New Zealand, February, 2025.
275. “Progress in Solution-Processed Chalcogenide Perovskite Synthesis and Application”, S. Agarwal, K. C. Vincent, D. C. Hayes, M. C. Uible, S. C. Bart, R. Agrawal, MRS Spring Meeting, Seattle, WA, April 2025.
276. “Progress in Solution-Processed Chalcogenide Perovskite Synthesis and Application”, S. Agarwal, K. C. Vincent, D. C. Hayes, J. Turnley, and R. Agrawal, MRS Spring Meeting, Seattle, WA, April 2025.