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• Research ID: http://www.researcherid.com/rid/P-7013-2018

• Google Scholar: https://scholar.google.com/citations?user=sEGtqzoAAAAJ&hl=en

Updated : May 1 2020

EDUCATION

Ph.D. in Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA *05/2017*
Minor: Materials & Chemistry
Supervisor: Professor Ahmed F. Ghoniem
Thesis: Membrane-Supported H_2/Syngas Production using Reactive H_2O/CO_2 Splitting for Energy Storage

M.S. in Thermal & Energy Engineering, Zhejiang University, China, *03/2012*
Thesis: Heat Transfer Characteristics of Nanofluids in Vertical Tube at Supercritical Pressure

B.S., Hons in Energy & Environment System Engineering (in Chemical and Energy Engineering), Zhejiang University, China *06/2009*
Chu Ko-Chen Honors Fellowship

CURRENT POSITION

Assistant Professor, Department of Mechanical and Mechatronics Engineering, University of Waterloo *5/2020-present*

RESEARCH INTERESTS

My research interests lie in the development and evaluation of smart and sustainable systems for energy conversion and chemical production, based on fundamental understandings of the kinetics, economics and social impacts of these processes. Both experimental and numerical methods will be applied, and thermo-electro-chemical processes are of particular interest due to their high efficiency and flexibility. I am also exploring the use of nanostructured metal oxides as oxygen carriers and catalysts to improve the conversions among heat, electricity and chemicals.

RESEARCH EXPERIENCES

Massachusetts Institute of Technology, Cambridge, MA

· POSTDOCTORAL ASSOCIATE, Mechanical Engineering *2017 – 2020*
PIs: *Professor Ahmed F. Ghoniem and Professor Bilge Yildiz*
- Member of a multidisciplinary team in Mechanical Engineering, Nuclear Engineering and Materials Science
- In charge of coordination with industry partner, Exelon Corporate for monthly updates and yearly reviews of the project
- Supervisor of two graduate students on their thesis
- Techno-economic analysis on three advanced hydrogen production technologies: fuel-assisted solid oxide electrolysis, membrane-supported water splitting, redox thermochemical water splitting to identify material development criteria and system integration insights
- Multi-scale investigation on water splitting processes (chemical and

electrochemical) to understand the reaction kinetics and transport phenomena
- New membrane concept development based on thermodynamics analysis and new manufacturing techniques

· RESEARCH ASSISTANT**,** Center for Energy Propulsion Research/Reacting Gas Dynamics Lab *2012 – 2017*

Advisor: Professor Ahmed F. Ghoniem

- Quantified kinetics and mechanisms for surface reactions experimentally
- Developed resistance-network kinetics model for oxygen permeation processes
- Synthesized Ni-based catalyst on perovskite for methane oxidation
- Characterized membranes and catalysts by SEM, XRD and Auger Scanning Spectroscopy
- Analyzed syngas production on MIEC membranes in multi-scales
- Supervised three undergraduate students to carry out research under my thesis

Zhejiang University, Hangzhou, China

· RESEARCH ASSISTANT, Institute of Thermal Science and Power System *2010 – 2012*

Advisor: Professor Wei Li

- Prepared Al_2O_3-kerosene and Fe_3O_4-kerosene nanofluids with two-step method
- Characterized particle sizes with Malvern Zetasizer Nano 590
- Fabricated electrical heating & temperature measurement devices
- Analyzed heat transfer coefficients and parameters effects
- Modified experimental setup to simulate cooling systems in automobile
- Tested the heat transfer characteristics of SiO_2-ethylene glycol (EG) nanofluid coolant

· RESEARCH ASSISTANT, Department of Energy Engineering *2008 - 2010*

Advisor: Professor Wei Li

- Analyzed heat transfer of wet and dry partings falling water film on different enhanced tubes
- Derived empirical and semi-theoretical correlations
- Developed enhancement mechanism for falling film evaporation tubes

State Key Laboratory of Silicon Materials, Hangzhou, China

· RESEARCH ASSISTANT *Summer 2008*

Advisor: Professor Fu Liu

- Synthesized CNTs on copper plates by chemical deposit method
- Prepared Fe^{3+} or Na^{+} catalysts and characterized with SEM

State Key Laboratory of Clean Energy Utilization, Hangzhou, China

· RESEARCH ASSISTANT *2007 - 2008*

Advisor: Professor Kun Luo

- Wrote research proposal for student project (received departmental funding)
- Investigated temperature distributions in a near-by river by warm condensing water in power plant using Fluent software

INDUSTRY EXPERIENCE

Bosch Thermotechnology, Stuttgart, Germany

· INTERN ENGINEER (MISTI-MITEI fellow award), Department of Engineering New Technology *June – August 2015*

Advisors: Axel Albers, Dr. Alessandro Pecenko, and Dr. Philipp Perrin

- Supported the development of a new heat pump project together with other engineers
- Developed a Simulink model for gas absorption heat pump
- Studied the heat pump system in both dynamic and static environment
- Verified the model with experimental data and drafted evaluation methods for the appliance

Wolverine Tube (Shanghai) CO. Ltd., China *March 2009*

· INTERN RESEARCHER, Department of Research & Development
- Carried out experiments on falling film evaporation on various enhanced tubes
- Compared heat transfer enhancements of three types of configured tubes

TEACHING

Massachusetts Institute of Technology, Cambridge, MA

· INSTRUCTOR, the United Nations Sustainable Development Goals and Challenges, (51 registered students, both undergraduate and graduate students) *January 2020, January 2019*
- Designed syllabus, gave lectures and organized in-class discussions

· TEACHING ASSISTANT, Thermal-Fluids Engineering II (undergrad core subject, 47 registered students, Professor Rohit Karnik and Professor Ahmed F. Ghoniem) *Fall 2016*
- Hosted office hours and exam review sessions, prepared psets and solutions
- Student rating: 5.7/7.0

· TEACHING ASSISTANT, Fund of Adv Energy Conversion (undergrad and grad, 20 registered students, Professor Ahmed F. Ghoniem) *Spring 2016*
- Hosted office hours and exam review sessions, prepared psets and solutions, supervised class projects
- Student rating: 6.5/7.0

· TEACHING ASSISTANT, Introduction to Heat Transfer (undergrad, 94 registered students, Professor Kripa Varanasi) *Fall 2015*
- Hosted office hours, weekly recitation classes and exam review sessions, prepared psets and solutions
- Student rating: 6.6/7.0

Zhejiang University, Hangzhou, China

· TEACHING ASSISTANT**,** Thermo-fluids Lab I & II (undergrad core subject, 60 registered students, Dr. Jie Wu) *2010 - 2011*
- Prepared experimental setups and graded experimental reports

· TEACHING ASSISTANT, Fluid Dynamics (undergrad core subject, 60 registered students. Dr. Jie Wu) *2009*
- Hosted office hours and exam review sessions, prepared psets and solutions

MENTORING

Massachusetts Institute of Technology, Cambridge, MA

· MENTOR, Department of Mechanical Engineering *2017 - present*
- Mentored one PhD student, two master students in their theses
- Hosted regular report meetings with them, taught them experimental and numerical

tools in the lab, and guided their research direction

· TUTOR, MIT-Egypt Exchange Fellowship Program *Summer 2014*
- Advised one senior from The American University in Cairo under my thesis work

· TUTOR, MIT Undergraduate Research Opportunities Program (UROP) *2015 - 2016 &*
- Advised two MIT undergraduates on research projects under my thesis work: 4 terms *2013 - 2014*
- Advised one MIT undergraduates on research proposal writing, and received MIT UROP funding for two terms

Zhejiang University, Hangzhou, China
· CO-ADVISOR, Undergraduate Research Thesis *Spring 2011*
- Co-supervised one ZJU undergraduate's Bachelor's Thesis: 1 term

· CLASS COORDINATOR & MENTOR, Crimson Summer Exchange Program *Summer 2009*
- Coordinated with international tutors for extracurricular classes for freshmen
- Advised 10 freshmen on community project

AWARDS AND HONORS

Postdoc
· Outstanding Event Award - Institute award for student group, MIT *2018*
· Honorable Mention in the 4th MIT Mechanical Engineering Research Exhibition Poster Session *2017*

Graduate
· NSF Travel Grant in the 13th International Conference On Catalysis in Membrane Reactors *2017*
· MIT-France Travel Fellowship *2017*
· Best paper in AIChE Journal *2016*
· NSF Travel Support Award in the 14th International Conference on Inorganic Membranes *2016*
· Golden Beaver Award - Institute award for excellence in leadership, MIT *2016*
· Best Presentation Award in the 2015 AIChE Annual Meeting *2015*
· Audience Award in the 2nd MIT Mechanical Engineering Research Exhibition Poster Session *2015*
· MISTI-MITEI fellow for internship in Germany *2015*
· Graduate Association of Mechanical Engineers Excellent Volunteer Service Award *2014*
· Chiang Chen Overseas Ph.D. Fellowship *2012*
· Second Prize of Cen Ke-Fa Scholarship *2011*
· Air Product Graduate Scholarship *2011*
· 'Can-Do Attitude' Award in Schaeffler Asia Pacific INNOVATION DAYS *2011*
· First Prize Graduate Award with Honors *2010, 2011*
· Outstanding Graduate Leader Award *2010*

Undergraduate
· 100 Best Undergraduate Theses Award, Zhejiang University *2009*
· Chu Ko-Chen Honor Scholarship (**Highest honor in Zhejiang University**, 12 top undergraduates out of 10,000 are awarded annually) *2008*
· National Undergraduate Fellowship of P.R. China *2007*
· Excellent Undergraduate Leader Award *2007*
· Excellent All-round Student Honor, First Prize of Excellent Undergraduate Scholarship *2006 – 2008*

PROFESSIONAL SERVICE

Guest Associate Editor for

- Frontiers in Energy Research (theme collection of "*Sustainable Hydrogen for Energy, Fuel and Commodity Applications*") — *2019 - present*

Steering Committee

- The Engineering Sustainable Development 2019 Conference by (AIChE and APRU) — *2019*

Journal Reviewer for — *2014 - present*

- Angewandte Chemie International Edition, Applied Energy, Sustainable Energy & Fuels, Chemical Engineering Journal, AIChE Journal, International Journal of Refrigeration, Desalination and Water Treatment, International Journal of Hydrogen Energy, Applied Thermal Engineering, Energy Technology,

Review Editor for

- Frontiers in Chemistry — *2018 – present*

Consultant for MIT Climate CoLab — *2015 – 2018*

- Assess the CO_2 reduction potential for different proposals in building technology, energy sectors.
- Analyze various solutions to prepare for climate extremes and decrease potential climate hazards

Grant reviewer — *2019*

- German Research Foundation (DFG) Grants in *Chemistry and Engineering Sciences*

PROPOSALS WRITING

1. US Department of Energy, H_2@Scale proposals, March 2019
2. Fraunhofer USA, H_2 Refuel Accelerator application, March 2019
3. MIT Energy Initiative, Eni pre-proposals, September 2018
4. Beijing Municipal Science & Technology Commission, International collaboration funding proposal (with Tsinghua University), June 2018
5. MIT Undergraduate Research Opportunity Program, Funding proposal, June 2016

PUBLICATIONS

Journal Papers

1. **X.Y. Wu***, L. Cai*, X. Zhu, A.F. Ghoniem, W. Yang, "A high-efficiency novel IGCC-OTM carbon capture power plant design", 2020, *Journal of Advanced Manufacturing and Processing*, under review (*equal contributions)
2. L. Cai*, **X.Y. Wu***, X. Zhu, A.F. Ghoniem, W. Yang, "High-performance oxygen transport membrane reactors integrated with IGCC for carbon capture", *AIChE Journal*, 2020, in press (*equal contributions)
3. Y Ma,Y Ma, J Li, Q Li, X. Hu, Z. Ye, **X.Y. Wu**, C.E. Buckley, D. Dong, "CeO_2-promotion of $NiAl_2O_4$ reduction via $CeAlO_3$ formation for efficient methane reforming," *Journal of the Energy Institute*, 93 (3) 2020 991 - 999
4. **X.Y. Wu**, A.F. Ghoniem, "Mixed ionic-electronic conductive (MIEC) membrane for thermochemical reduction of CO_2: A review," *Progress in Energy and Combustion Science*, 74 2019 1 - 30
5. **X.Y. Wu**, A.F. Ghoniem, "CO_2 reduction and methane partial oxidation on surface catalyzed $La_{0.9}Ca_{0.1}FeO_{3-\delta}$ oxygen transport membranes," *the Proceedings of the Combustion Institute*, 37 (4) 2019 5517 - 5524

6. **X.Y. Wu**, A.F. Ghoniem, "Hydrogen-assisted Carbon Dioxide Thermochemical Reduction on $La_{0.9}Ca_{0.1}FeO_{3-\delta}$ Membranes: A Kinetics Study," *ChemSusChem*, 11 2018 483 - 493 (featured at **MIT News**, and picked up by other media)
7. Y. Luo**, X.Y. Wu**, Y. Shi, A.F. Ghoniem, N. Cai, "Exergy Analysis of an Integrated Solid Oxide Electrolysis Cell-Methanation Reactor for Renewable Energy Storage," *Applied Energy*, 215 2018 371 - 383
8. **X.Y. Wu**, M. Uddi, A.F. Ghoniem, "Enhancing co-production of H_2 and syngas via water splitting and POM on surface-modified oxygen permeable membranes," *AIChE Journal*, 62 (12) 2016, 4427 - 4435, (invited contribution to AIChE Journal as "**Best paper**" initiative)
9. **X.Y. Wu**, L. Chang, M. Uddi, P. Kirchen, A.F. Ghoniem, "Toward enhanced hydrogen generation from water using oxygen permeating LCF membranes," *Physical Chemistry Chemical Physics*, 17 2015 10093-10107
10. D. Huang, **X. Y. Wu**, Z. Wu, W. Li, H. T. Zhu, B. Sunden, "Experimental Study on Heat Transfer of Nanofluids in a Vertical tube at Supercritical Pressures," *International Communications in Heat and Mass Transfer*, 63 2015 54-61
11. D. Huang, B. Ruan, **X.Y. Wu,** W. Zhang, G.Q. Xu, Z. Tao, P.X. Jiang, L.X. Ma, W. Li, "Experimental Study on Heat Transfer of Aviation Kerosene in a Vertical Upward Tube at Supercritical Pressure," *Chinese Journal of Chemical Engineering*, 23 (2) 2015 425 – 434
12. W. Zhang, D. Huang, **X.Y. Wu**, Y.C. Song, S.Z. Chen, W. Li, H. Zhu, "Convection heat transfer of Fe_3O_4-kerosene in a vertical tube at supercritical pressures", *CIESC Journal*, 66(4) 2015, 1265 - 1271
13. W. Li, **X.Y. Wu**, Z. Luo, R.L. Webb, "Falling Water Film Evaporation on Newly-Designed Enhanced Tube Bundles," *International Journal of Heat and Mass Transfer*, 54 (13-14) 2011 2990-2997
14. W. Li, **X.Y. Wu**, Z. Luo, S.C. Yao, J.L. Xu, "Heat Transfer Characteristics of Falling Film Evaporation on Horizontal Tube Arrays," *International Journal of Heat and Mass Transfer*, 54 (9-10) 2011 1986-1993
15. Z. Luo, **X.Y. Wu**, W. Li, "Experimental Study on Water Falling Film Evaporation on Enhanced Tubes," *Journal of Engineering Thermodynamics,* 31 (11) 2010 1893-1896

Commentary

16. T. Oehmke, **X.Y. Wu**, J.T. Johnston, C. Gutierrez, D. Patel, et al., "Unique Identities," *Science*, 364(6435) 2019, 22 – 24 (an essay on how being a first-generation college student inspires me to work on research topics that benefit humankind)

Peer-Reviewed Conference Papers

17. Y. Luo, **X.Y. Wu**, Y. Shi, A.F. Ghoniem, N. Cai, "Exergy Efficiency Analysis of a Power-to-Methane System Coupling Water Electrolysis and Sabatier Reaction," *ECS Transactions*, 78(1) 2017 2965-2973
18. **X.Y. Wu**, D. Huang, W. Li, G.Q. Xu, Z. Tao, P.X. Jiang, "Experimental Study on Heat Transfer of Fuel-Particle Mixtures in Vertical Tube at Supercritical Pressure," *Proceedings of the ASME 2013 Summer Heat Transfer Conference*, Minneapolis, 2013
19. **X.Y. Wu**, W. Li, Z. Luo, "Falling Water Film Evaporation on Horizontal Finned Tube Arrays at Low Pressure," *Proceedings of the ASME/JSME 2011 8th Thermal Engineering Joint Conference*, Honolulu, 2011
20. W. Li, **X.Y. Wu**, Z. Luo, "Falling Film Evaporation of Water on Horizontal Configured Tube Bundles," *Proceedings of the 14th International Heat Transfer Conference*, Washington, DC, 2010
21. Z. Luo, **X.Y. Wu**, W. Li, "Experimental Study on Water Falling Film Evaporation on Enhanced Tubes,**"** *Proceedings of Annual Chinese Conference on Engineering Thermophysics, Heat & Mass Transfer,* Qingdao, China, 2009

Conference Presentations

1. Y. Chen, **X.Y. Wu***, G. Dimitrakopoulos*, A.F. Ghoniem, "Fabrication of novel Janus membrane for high temperature oxygen separation and water thermochemical reduction," *2019 MRS Fall Meeting & Exhibit*, Boston, 2019 (*equal contributions)

2. **X.Y. Wu**, A.F. Ghoniem, "Techno-economic study of H_2 production from membrane-supported H_2O splitting and fuel-assisted H_2O electrolysis," *2019 World Fuel Cell Conference*, Shanghai, 2019 **(Invited Speaker)**
3. **X.Y. Wu**, A.F. Ghoniem, "Techno-economic study of H_2 production from membrane-supported H_2O splitting and fuel-assisted H_2O electrolysis," *the 14th International Conference on Catalysis in Membrane Reactor*, Eindhoven, 2019 **(Keynote Speaker)**
4. **X.Y. Wu**, Y.D. Chen, A.F. Ghoniem, "Design and cost analysis of perovskite oxygen permeable membrane reactors for hydrogen and syngas co-production", Applied Energy Symposium, AEAB2019, Boston, 2019 **(Recommended to the special issue in *Applied Energy*)**
5. **X.Y. Wu**, Y.D. Chen, A.F. Ghoniem, "Techno-Economic Analysis of Membrane-Supported H_2O Splitting with CO_2 capture," *2018 MRS Fall Meeting & Exhibit*, Boston, 2018
6. **X.Y. Wu**, A.F. Ghoniem, "Technoeconomic study of advanced H_2 production technologies: membrane-supported H_2O splitting, thermochemical redox H_2O splitting and fuel-assisted H_2O electrolysis," *2018 AIChE Annual Meeting*, Pittsburgh, 2018
7. **X.Y. Wu**, A.F. Ghoniem, "CO_2 reduction and methane partial oxidation on surface catalyzed $La_{0.9}Ca_{0.1}FeO_{3-\delta}$ oxygen transport membranes," *37th International Symposium on Combustion*, Dublin, 2018,
8. **X.Y. Wu** and A.F. Ghoniem, "Co-splitting H_2O and CO_2 on a surface catalyzed oxygen permeable membrane reactor," *the 15th International Conference on Inorganic Membranes*, Dresden, 2018
9. **X.Y. Wu** and A.F. Ghoniem, "Kinetics and Material Stabilities for Membrane-Supported H_2O/CO_2 Splitting," *2017 MRS Fall Meeting & Exhibit,* Boston, 2017
10. **X.Y. Wu** and A.F. Ghoniem, " CO_2 Splitting Using MIEC Membranes," *2017 AIChE Annual Meeting*, Minneapolis, 2017
11. **X.Y. Wu**, "Investigating Kinetics Under Extremely-Harsh Conditions for Energy and Food Processing," *2017 AIChE Annual Meeting*, Minneapolis, 2017
12. Y. Luo, **X.Y. Wu**, Y.X. Shi, A.F. Ghoniem, "Exergy efficiency analysis of a power-to-methane system coupling water electrolysis and Sabatier reaction," *15th International Symposium on Solid Oxide Fuel Cells,* Hollywood, 2017
13. **X.Y. Wu** and A.F. Ghoniem, "Enhanced CO_2 dissociation on surface Catalyzed oxygen permeable membranes," *13th International Conference On Catalysis in Membrane Reactors*, Houston, 2017 **(NSF Travel Award)**
14. **X.Y. Wu**, Y. Luo, Y.X. Shi, A.F. Ghoniem, "Thermodynamic Analysis of Oxygen Permeable Membrane Reactor for Hydrogen Production from Water," *13th International Conference On Catalysis in Membrane Reactors*, Houston, 2017
15. **X.Y. Wu** and A.F. Ghoniem, "Perovskite as Oxygen Permeable Membrane and Catalyst for Fuel Production from H_2O/CO_2 Thermolysis," *2016 MRS Fall Meeting & Exhibit,* Boston, 2016
16. **X.Y. Wu** and A.F. Ghoniem, "Thermodynamic Analysis of Oxygen Permeable Membrane Reactor for Hydrogen Production from Water," *2016 MRS Fall Meeting & Exhibit,* Boston, 2016
17. G. Dimitrakopoulos, **X.Y. Wu**, A.F. Ghoniem, "Enhancing Syngas Production during Methane Reforming Using a $La_{0.9}Ca_{0.1}FeO_{3-\delta}$ Ion Transport Membrane," *2016 MRS Fall Meeting & Exhibit,* Boston, 2016
18. **X.Y. Wu,** "Semi-Permeable Membrane Reactor for Catalysis, Hydrocarbon Processing and CO_2 Reuse," *2016 AIChE Annual Meeting*, San Francisco, 2016
19. **X.Y. Wu** and A.F. Ghoniem, "Water Splitting and Partial Oxidation of Methane Using an Oxygen Permeable Membrane with Ni Catalyst," *2016 AIChE Annual Meeting*, San Francisco, 2016
20. **X.Y. Wu** and A.F. Ghoniem, "Enhanced hydrogen production from water thermolysis on an oxygen permeable membrane: The role of sweep surface reactions," *the 14th International Conference on Inorganic Membranes*, Atlanta, 2016 **(NSF travel support award)**
21. **X.Y. Wu**, M. Uddi, A.F. Ghoniem, "Hydrogen Production Using MIEC Membranes for Water Thermolysis with Partial Oxidation of Methane," *2015 AIChE Annual Meeting*, Salt Lake City, 2015 **(Best Presentation Award)**

Other Presentations

22. **"Membrane-Supported H2/Syngas Production using Reactive H_2O/CO_2 Splitting for Energy Storage,"** *IPREM, CNRS/UPPA*, Pau, France, June 25, 2018 **(invited talk)**
23. "**Syngas production from water/carbon dioxide reduction on oxygen permeable membranes,**" *Sun Yat-Sen University*, Zhuhai, China, December 26, 2017 **(invited talk)**
24. "**Toward rational design of membrane reactors for fuel production from CO_2 thermochemical reduction,**" *CEPR/RGD Seminar Series,* MIT, October 25, 2017
25. "**Advanced syngas production technologies for energy storage and chemical production**," 4th *MIT Mechanical Engineering Research Exhibition (MERE)*, September 19, 2017 **(Honorable Mention Award)**
26. "**Enhanced CO_2 Dissociation on Surface Catalyzed Oxygen Permeable Membranes**," Zhejiang University, Hangzhou, September 6, 2017 **(invited seminar)**
27. **"A Hot Plant that Converts Sunlight to Fuels,"** *MIT Energy Club Seminar Series*, November 29, 2016 **(invited seminar)**
28. **"Solar to chemical: chemical energy storage facilitated by an oxygen permeable membrane reactor,"** 2nd *MIT Mechanical Engineering Research Exhibition (MERE)*, September 16, 2016
29. **"Solar-fuel production on MIEC oxygen permeable membrane reactor,"** *seminar series,* University of Shanghai for Science and Technology, July 29, 2016
30. **"Solar-Fuels from Water: Dream or Reality,"** *CEPR/RGD Seminar Series,* MIT, May 4, 2016
31. "**Water to Fuel: Using Sun and Ceramics,**" MIT2016 Frontiers Symposium, Boston, April 12, 2016
32. "**Solar-fuel production facilitated by an oxygen permeable membrane,**" *Energy Efficiency and Renewable Energy Day (DOE) at MIT*, Boston, March 17, 2016
33. **"Solar to Hydrogen: How does a membrane reactor enhance hydrogen production from water?"** *MIT Energy Night,* Boston, October 16, 2015
34. **"Oxygen permeable membrane reactor: an efficient way to produce hydrogen,"** *MIT Mechanical Engineering Research Exhibition (MERE)*, September 18, 2015 **(Audience Award)**
35. **"How can MIEC Membranes Facilitate Hydrogen Production from Water Thermolysis?"** *CEPR/RGD Seminar Series*, MIT, April 29, 2015
36. **"Perovskite Membranes for Water Splitting and Oxy-Fuel Combustion,**" *MIT Energy Night,* Boston, October 17, 2014
37. **"Perovskite Membranes for CO_2 Reduction,**" *MIT Alumni Leadership Conference*, Boston, September 19, 2014
38. "**Hydrogen Production from Water Splitting on Ion Transport Membrane (ITM),**" *MIT Energy Night*, Boston, October 18, 2013
39. "**Syngas production from H_2O/CO_2 splitting at elevated temperatures on MIEC membranes,**" *CEPR/RGD Seminar Series*, MIT, November 25, 2013
40. "**Ion Transport Membranes for H_2O Splitting and Syngas Production at High Temperature,**" *GAME Lunch Seminar*, MIT, May 9, 2013

LEADERSHIP

- **MIT European Club,** *Treasurer* **(Golden Beaver Award - Institute award)** *2015 - 2017*
- **Graduate Association of Mechanical Engineering, MIT,** *Volunteer Service Chair* *2015 - 2016*
- **MIT Tang Hall Residence Association,** *Social Chair* *2013 - 2015*