MIT Industrial Liaison Program Faculty Knowledgebase Report

Energy Innovation (Session 2: Innovations in Critical Low Carbon Technologies)

May 13, 2020 11:00 am - 1:00 pm

11:00am - 11:05pm

Introduction
CJ (Changjie) Guo
Program Director, MIT Corporate Relations

CJ (Changjie) Guo
Program Director
MIT Corporate Relations

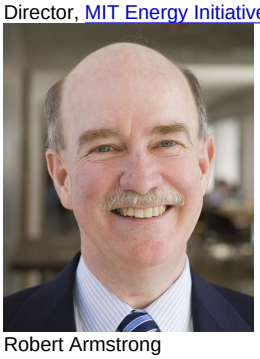
Dr. CJ Guo joined the Office of Corporate Relations as a Senior Industrial Liaison Officer in July, 2015. CJ comes to OCR with 25 years of extensive global experience in technology innovations, portfolio management and business development in emerging and conventional energy sectors with leading multinational corporations in the US, China and Canada.

CJ is a leading expert in emerging energy technologies and energy system transitions. With Shell, he was the Emerging Technology Theme Leader in China/Beijing (2011 to 2015), worked extensively with the Chinese energy communities on the country's future energy landscape, and the Senior Technology Advisor in alternative transportation fuels in the US / Houston (2006-2010), and served during 2010 as Chairman of the Fuel Operations Group for the US DOE FreedomCar Partnership. Prior to joining Shell, CJ has held technology development, commercialization and management positions with Air Liquide (2002-2006) and The BOC Group (1995-2001) after working as a research scientist in oil-sands upgrading with CANMET in Canada (1992-1994).

CJ earned his Ph.D., Chemical Engineering, at CSU, Ohio, his M.S. and B.S., Chemical Engineering at TYUT, China. He has earned various awards from Shell, Air Liquide, BOC, Shanxi Province (China). He holds many patents and has sat on the board of Shenzhen Sanmu Battery Technology Company as an independent board member during 2009-2010.

11:05am - 11:10am

Moderator
Robert Armstrong
Chevron Professor of Chemical Engineering
Director, MIT Energy Initiative (MITEI)



Robert Armstrong
Chevron Professor of Chemical Engineering
Director
MIT Energy Initiative (MITEI)

Professor Robert C. Armstrong directs the MIT Energy Initiative, an Institute-wide effort at MIT linking science, technology, and policy to transform the world's energy systems. A member of the MIT faculty since 1973, Armstrong served as head of the Department of Chemical Engineering from 1996 to 2007. His research interests include polymer fluid mechanics, rheology of complex materials, and energy.

Armstrong has been elected into the American Academy of Arts and Sciences (2020) and the National Academy of Engineering (2008). He received the Founders Award for Outstanding Contributions to the Field of Chemical Engineering (2020), Warren K. Lewis Award (2006), and the Professional Progress Award (1992), all from the American Institute of Chemical Engineers. He also received the 2006 Bingham Medal from the Society of Rheology, which is devoted to the study of the science of deformation and flow of matter,

Armstrong was a member of MIT's *Future of Natural Gas* and *Future of Solar Energy* study groups. He advised the teams that developed MITEI's most recent reports, *The Future of Nuclear Energy in a Carbon-Constrained World* (2018) and *Insights into Future Mobility* (2019), and is co-chairing the new MITEI study, *The Future of Storage*. He co-edited *Game Changers: Energy on the Move* with former U.S. Secretary of State George P. Shultz.

View full bio

11:10am - 11:45am

Accelerating fusion energy’s development through innovative technology transfer
Dennis G. Whyte
Director, MIT Plasma Science and Fusion Center
Hitachi America Professor of Engineering
Dennis G. Whyte
Director, MIT Plasma Science and Fusion Center
Hitachi America Professor of Engineering

A recognized leader in fusion research, Whyte's research in the magnetic confinement of plasmas sets us on an innovative and faster path to producing fusion energy. He is one of the leaders of the SPARC project, a collaboration between Commonwealth Fusion Systems and MIT, to design and build a high-field fusion device to demonstrate net energy production for the first time. Many of the technology approaches underpinning the high-field approach to fusion energy, including SPARC, were formed over the last decade in his MIT fusion design class: utilizing magnets from high-temperature superconductors, demountable magnets for modular assembly and maintenance, and liquid immersion blankets for robust energy removal. He is a fellow of the American Physical Society, has served on panels for the National Academies and Royal Society, and has won the Fusion Power Associates Leadership Award and the 2013 Nuclear Fusion Prize. His is a co-founder of Commonwealth Fusion Systems, whose goal is the rapid commercialization of fusion energy to tackle climate change. Whyte earned his BS and PhD in Canada.

Brandon Sorbom

Chief Science Officer, Commonwealth Fusion Systems (CFS)
MIT, Ph.D., Nuclear Science and Engineering (2017)

Loyola Marymount University, B.S., Electrical Engineering, Engineering Physics (2010)

MIT PSFC researcher since 2010

Brandon Sorbom

Chief Science Officer, Commonwealth Fusion Systems (CFS)
MIT, Ph.D., Nuclear Science and Engineering (2017)

Loyola Marymount University, B.S., Electrical Engineering, Engineering Physics (2010)

MIT PSFC researcher since 2010

Brandon ’s expertise is in fusion energy, compact power plant design and high temperature superconductors. During his doctoral work at MIT’s Plasma Science and Fusion Center, Brandon was the leader of the ARC Reactor design study, a conceptual design for a small, modular fusion pilot plant that formed the basis for a comprehensive high-field pathway to commercial fusion energy. As CSO of CFS, Brandon leads the work in evaluating high temperature superconductor performance and prospects for scale-up, as well as leading the power plant design scoping efforts.

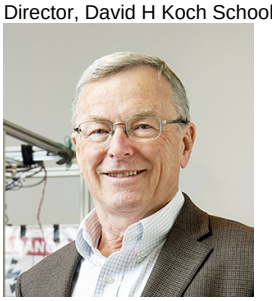
11:45am - 12:20pm

Drive energy efficiency improvements through the manufacturing value chain
Shreya Dave
CEO of Via Separations
Shreya Dave
CEO of Via Separations

Shreya Dave is the CEO of Via Separations, working to drive energy efficiency improvements through the manufacturing value chain. She worked with Professor Jeffrey Grossman at MIT for her PhD research on graphene oxide membranes, which ultimately led to the founding of Via. Via was recognized as one of C&EN’s 10 startups to watch in 2019. She is passionate about interdisciplinary creativity, building things, and educating people. She was awarded Technology Review’s 35 Innovators under 35 in 2018. Shreya holds Bachelors and Masters’ degrees from MIT in Mechanical Engineering and Technology & Policy. She also enjoys serving on MIT’s Corporate Development Committee, the board of directors for Greentown Labs, and mentoring in MIT’s product design and development course, 2.009.

12:20pm - 12:55pm

Electrification of Carbon Capture
T. Alan Hatton
Ralph Landau Professor of Chemical Engineering Practice
Director, David H Koch School of Chemical Engineering Practice



T. Alan Hatton
Ralph Landau Professor of Chemical Engineering Practice
Director, David H Koch School of Chemical Engineering Practice

Our research focuses primarily on the development of electrochemical processes to facilitate chemical separations and to mediate the transformation of captured waste to useful commodity chemicals. The electrochemically-mediated separation processes that are currently under development and investigation in our group can primarily be divided into two areas: (i) carbon capture from both point (power plants, industrial emissions) and distributed (ambient air, ocean waters) sources; and (ii) water purification (including decontamination of wastewater and desalination). These research projects are supported by both government agencies and industrial partners.

We also have experience in the synthesis, characterization, and application of stimuli-responsive materials, which include nanoparticles, nanofibers, surfactants, polymers, and gels; these materials have a wide variety of applications in, for example, drug delivery, protein, environmental separations, rheology, and surface tension modification. We have particular experience with redox-active polymers for selective separations, and on the use of superparamagnetic nanoparticles (e.g. magnetic fluids) in environmental, biological and chemical separations.

Research advances in our group have resulted in the formation of a start-up company, Verdox Inc., developing electro-swing adsorption processes for removal of CO_2 and other acid gases from process streams and the ambient environment. Other potential start-up ventures are currently under consideration.

View full bio
Sahag Voskian
CTO of Verdox
Sahag Voskian
CTO of Verdox

Sahag Voskian received his BS in Chemical Engineering and Chemistry from Worcester Polytechnic Institute. He spent a year at Dartmouth College doing post-bac research on molecular switches and machines. He joined the Hatton group at MIT for his PhD in 2014 where he worked on electrochemically mediated separations and catalysis projects. He has recently started a company, Verdox, where he is the CTO, to develop and commercialize the electro-swing adsorption system for carbon capture. A technology he developed with Prof. Hatton during his graduate work at MIT.

12:55pm - 1:00pm

Concluding Remarks