

# ***Energy Conversion, Storage and Transfer in 2D Material Based Systems***

By Prof. Amin Salehi-Khojin  
University of Illinois at Chicago

## **ABSTRACT**

World energy consumption is projected to more than double by 2050 and to more than triple by the end of the century. Incremental improvements in existing energy networks will not be adequate to supply this demand in a sustainable and affordable way. Finding sufficient supplies of clean energy for the future is one of world's most daunting challenges. In this talk, I will overview my recent research focusing on structure-property-processing correlations in two dimensional (2D) materials leading to several breakthroughs in the field of energy conversion and storage systems. Specifically, I will discuss (i) our recently discovered transition metal dichalcogenide (TMDC) based artificial leaf platform that exhibits 1000 times higher catalytic activity compared to state-of-the-art catalysts for carbon dioxide (CO<sub>2</sub>) conversion to fuel, (ii) first demonstration of a Li-air battery system that operates in the presence of actual air components (a mixture of nitrogen, O<sub>2</sub>, CO<sub>2</sub> and moisture) rather than pure oxygen and exhibits excellent stability tested up to 550 cycles, and (iii) our recent progress on thermal transport in 2D material based nano-electronics supported by the NSF-EFRI program.

## **BIOSKETCH**

Dr. Amin Salehi-Khojin is an assistant professor in the department of mechanical and industrial engineering at University of Illinois at Chicago. He is co-author of more than 55 journal publications, including three papers in Science, one in Nature, one in Nature Nanotechnology, and three in Nature Communications. He is also co-inventor of more than 10 patents/patent application. His research has been featured in more than 2000 news releases including Science, Times, Guardian, New York Post, Huffington Post, Daily Mail, Forbes, Christian Science Monitor, MIT Technology Review, Midwest Energy News, Chicago Tribune. He has been cited as one of 100 leading global thinkers in 2016 by Foreign Policy Magazine. He is also listed among "Illinois Researchers Who Wowed Us in 2016".