

## ENGINEERING NEWS

### HONORS AND AWARDS

# Manijeh Razeghi Receives Jan Czochralski Gold Medal

Award recognizes her life achievements in the field of advanced materials science

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Northwestern Engineering's **Manijeh Razeghi**

(<http://www.mccormick.northwestern.edu/research-faculty/directory/profiles/razeghi-manijeh.html>) has received the Jan Czochralski Gold Medal from the European Materials Research Society. The award recognizes her life achievements in the field of advanced materials science.

An expert in quantum devices, Razeghi will be presented with the award and will deliver a plenary talk at the Society's fall meeting on Wednesday, September 21 in Warsaw, Poland.

This is a special year for the Jan Czochralski Award as it is the 100th anniversary of one of Czochralski's most important discoveries: the technology for growing single crystals from a liquid melt. Now called the Czochralski Method, the technique was discovered when Czochralski accidentally dipped a pen into molten zinc. When he withdrew the pen, a thread of single crystal zinc was left hanging from the pen's nib. This method is now used to grow high-quality single crystal wafers/substrates of many different materials, including germanium, silicon, indium phosphide, gallium arsenide, gallium antimonide, and many others. These crystals serve as the basis of most modern electronic and photonic devices.



Manijeh Razeghi

“It took decades for the scientific community to recognize the importance of Jan Czochralski’s work,” said Razeghi, Walter P. Murphy Professor of Electrical Engineering and Computer Science in Northwestern’s McCormick School of Engineering. “On the 100th anniversary of his discovery, I am particularly proud to receive this award for my contributions to semiconductor quantum materials and devices. We can see the results of Czochralski’s science in almost every electronic and photonic device that we encounter. Even the first light-emitting diode would not have been successful without the high-quality substrates produced with the Czochralski Method.”

Founding director of Northwestern’s **Center for Quantum Devices**

(<http://cqd.eecs.northwestern.edu>) , Razeghi is a leading scientist in the field of the science and technology of semiconductors. Her work is a multidisciplinary combination of solid-state physics, quantum mechanics, materials science, and electrical, mechanical, and chemical engineering. She has created a vertically integrated facility with tools for device design, material growth, material characterization, device fabrication, and system development.

Among her many projects, Razeghi develops advanced semiconductor devices, including lasers, optoelectronics, photodetectors, transistors, waveguides, and switches. As system-level extensions of this work, she has also created large-format night vision cameras and a tunable, monolithic, mid-infrared laser system.

“Since joining Northwestern and creating the Center 25 years ago, my laboratory has been at the forefront of innovations in this field,” Razeghi said. “With the support, interest, and encouragement of Northwestern administration and the help of our funding agencies, I intend to build upon such successes and bring new breakthroughs for the years to come.”

Razeghi has received numerous awards throughout her career, including IBM Europe’s Science and Technology Award, the Society of Women Engineer’s Achievement Award, and the IBM Faculty Award. She is also a fellow of the Materials Research Society, Institute of Electrical and Electronics Engineers, Institute of Physics, American Physical Society, Optical Society of America, Society of Women Engineers and Society of Photo-optical Instrumentation Engineers.

Razeghi is the author of 18 books, 31 book chapters, and author or co-author of more than 1,000 papers. She also holds 55 patents.

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**UNDERGRADUATE**

# The International Chapter of the Jan Czochralski Award

European Materials Research Society  
Polish Academy of Science  
Polish Materials Science Society  
Polish Society for Crystal Growth



**2016 E-MRS Jan Czochralski Award**

presented to

## Professor Manijeh Razeghi

Center for Quantum Devices,  
Northwestern University, Evanston, IL, USA

In recognition and acknowledgement of  
Lifetime Achievements in Material Science

Luisa **TORSI**  
President of the E-MRS

Jerzy **DUSZYŃSKI**  
President of PAS



Andrzej **MYCIELSKI**  
President of PMSC

Dorota **PAWLAK**  
President of PSCG

Warsaw, 21<sup>st</sup> September 2016




**Prof. Manijeh Razeghi**  
**"2016 Jan Czochralski Award"**  
**Laureate**



*For her pioneering and outstanding work in fields such as low-pressure metal-organic vapor-phase epitaxy of alloy semiconductors for optoelectronic devices from the ultraviolet to the far infrared spectral band. These materials and the relevant devices have been at the heart of the optical fiber telecommunication revolution of the late 20th Century and at the rise of the information age.*

Walter P. Murphy Professor and Director Center for Quantum Devices,  
Department of Electrical Engineering and Computer Science,  
Northwestern University



**E-MRS 2016 FALL MEETING**

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