

# MAE Seminar Series

THURSDAY,  
OCTOBER 29  
4:00 PM  
Zoom Link:

<https://virginia.zoom.us/j/96046562519?pwd=TDUzcjRXZ5qNVY4T0c2cXJPZnhOQT09>

## Multifunctional Structural Materials (Without Device Incorporation) Capable of Self-Sensing and Revolutionary Self-Powering

Distinguished Lecture at University of Virginia

Dedicated to the memory of Professor M.S. Dresselhaus\*

### ABSTRACT

Professor Chung will share the journey, breakthroughs and passion associated with her 45-year materials research with focus on multifunctional structural materials. Instead of using embedded or attached devices, she has achieved self-sensing (sensing strain, damage and temperature) and self-powering (electricity generation) by exploiting the electrical and dielectric behavior (i.e., conduction and polarization behavior) of structural materials. The behavior enables self-sensing by measurement of the resistance or capacitance. The dielectric behavior of conductive structural materials that are electrets (permanent electric dipoles present without poling) enables revolutionary self-powering (patent pending). The structural materials include carbon fiber composites, metals (e.g., steel), and cement-based materials. The composites are important for lightweight structures, e.g., airframe and wind turbines. Steel and cement-based materials are important for the civil infrastructure. Professor Chung is the inventor of smart concrete and is the foremost international leader in the field of multifunctional structural materials. In this seminar, she will also share about the keys to scientific success.

### BIO SKETCH

Professor Chung received her Ph.D. degree in Materials Science from Massachusetts Institute of Technology (under the tutelage of Prof. M.S. Dresselhaus). She is an international leader in the fields of multifunctional structural materials, electromagnetic shielding materials, thermal interface materials (for microelectronic cooling), interface-derived viscoelasticity (for vibration damping), and carbon materials. She has authored or co-authored over 600 archival peer-reviewed international journal papers, in addition to authoring 9 books. Her Google Scholar h-index is  $\geq 98$ , with  $\geq 34442$  citations. Chung is Fellow of ASM International and American Carbon Society. The honors that she has received include the Pettinos Award from the American Carbon Society, the Top Reviewer Award from the Carbon journal, the Niagara Mohawk Power Corporation Endowed Chair Professorship and the Chancellor's Award for Excellence in Scholarship from the State University of New York, the Honorary Doctorate degree from University of Alicante, Spain, and the Hardy Gold Medal from the American Institute of Mining, Metallurgical, and Petroleum Engineers.

\* D.D.L. Chung, "Mildred S. Dresselhaus (1930-2017)", Nature 543, 316 (2017)



In memory of Professor M.S. Dresselhaus

### Professor D.D.L. Chung

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[http://en.wikipedia.org/wiki/Deborah\\_Chung](http://en.wikipedia.org/wiki/Deborah_Chung)



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