



# **Dr. Andrew R Barnard, INCE Bd. Cert., CLD**

Assistant Professor, Mechanical Engineering (MEEM)

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## **My background**

B.S., M.S. ME - Michigan Tech, Ph.D. Acoustics - Penn State

Research Associate, Penn State Applied Research Lab (8 yrs)

## **Areas of research/expertise**

Acoustics and Vibrations

- ✓ Carbon Nanotube Thin-Film Loudspeakers
- ✓ Underwater Acoustics
- ✓ Structural Acoustics and Noise Control
- ✓ Crowd Noise

Signal Processing and Dynamic Data Acquisition

- ✓ LabVIEW Certified Developer

Andrew R Barnard, [drb@mtu.edu](mailto:drb@mtu.edu)

## Solid State Sound – A “Hot” Topic

Ultra-thin, flexible electronics

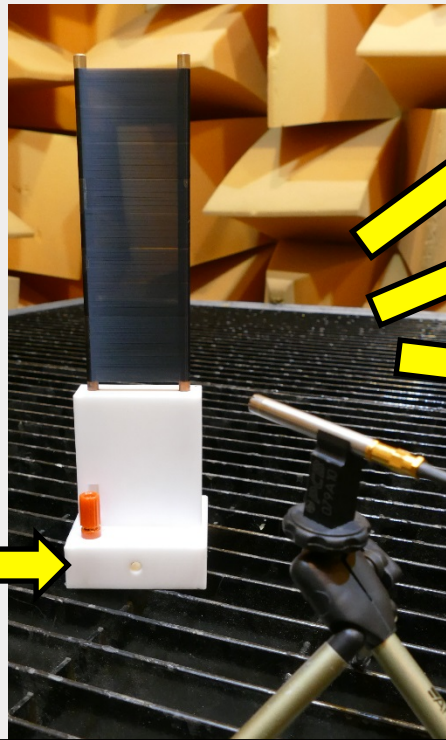


### Benefits

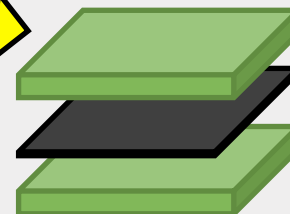
- Ultra-light weight
- Solid State
- No magnets
- Flexible/Stretchable



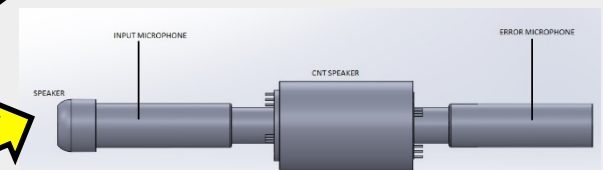
Carbon Nanotube Thermophone



Embedded CNT



Active Noise Control



Vibration & Sensing



### To Do List

- Efficiency
- Modeling
- Sensing