



Sandia Academic Alliance Diversity Initiative Nanodevices & Microsystems Research Foundation (NMRF)

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NMRF LDRD Investment Area Objectives



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“*Discover and control* new phenomena at the **nanoscale and microscale**; and *create or prove* new concepts, devices, components, subsystems, and systems.”

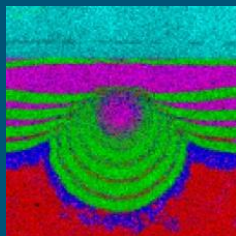
“Develop the critical and **differentiating** technical capabilities that will be needed in the future to support our **national security missions**”

- **Focus on low TRL.** Foundational to the future needs of the MAs/PMUs.
- Typically, enabling and cross-cut across MAs/PMUs.

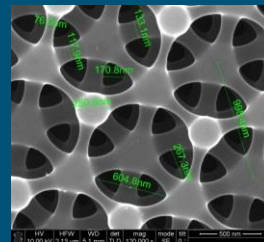
“Combine **theory, computation and experiment**, as appropriate, to achieve an **S&T foundation** for discovery and creation”

- Leverage appropriate expertise **across the lab.** Encourage inclusion of early career staff on team, as appropriate to meet LDRD objectives.

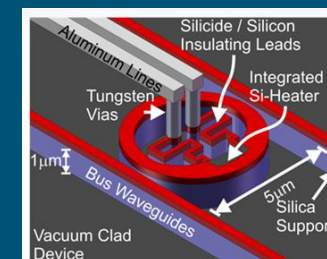
Physical phenomena



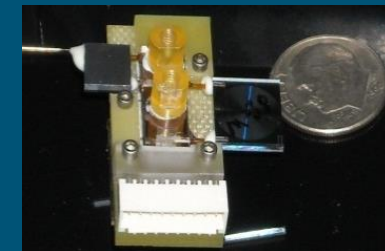
Nanoscale/
microscale devices



Integration



Complex microsystems



Five NMRF Thrusts

Trusted Radiation-Hardened Microsystems:

- The development of concepts, devices and tools that enable the understanding and creation of Strategically Radiation-Hardened (SRH) microelectronics and microsystems that are resistant to subversion.

Beyond Moore's Law Computing Technologies:

- The development of nanoscale and microscale concepts, devices, tools and systems that extend performance improvements beyond Moore's Law.

Optoelectronics of the Future:

- The discovery and creation of advanced optoelectronics, at the nanoscale and microscale, which provide new functionality.

Advanced Microsystem Sensor Technologies:

- The development of nanoscale and microscale concepts, devices and systems that enable physical (e.g.- accelerometers), chemical, biological, radiation (including non-ionizing, e.g.- optical focal plane arrays), nuclear materials, and explosives detection that exceed current limitations in selectivity, sensitivity, and/or robustness.

Nanoscale and Microscale Enabled Performance:

- The discovery and exploitation of new functionality that results from phenomena that are unique to the nanoscale and microscale. This thrust seeks to invest in enabling phenomena that result from scale-dependent effects such as non-continuum and quantum phenomena.

