**Bioscience**

A deep understanding of biological systems and behaviors will play a key role in energy security and our ability to defend against biothreats. In response, the two principal areas of focus for the Bioscience Research Foundation are:

- *Biothreats* - an approach that integrates advanced technology with a deep understanding of human health and the immune response.
- *Bioenergy* - new systems biology understandings for biomass structure and decomposition, enzymatic breakdown of molecular components, and conversion of biomolecules to biofuels.

**Computer and Information Sciences**

The Computer and Information Science Research Foundation develops and maintains computational and informational science tools and platforms essential to solving the most difficult problems for the Labs' science and engineering missions. This mission is accomplished through research in:

- Advanced computer architectures and systems (including software),
- Algorithms and solvers for MPP computing,
- Enabling technologies including meshing, simulation frameworks, and visualization, and
- Key applications areas such as electrical and device modeling and shock physics.

**Engineering Sciences**

Engineering Sciences develops foundational knowledge in the areas of:

- Thermal transport
- Fluid mechanics
- Aero-sciences
- Solid mechanics
- Structural dynamics
- Material mechanics
- Electromagnetics
- Electrical science

Foundational knowledge in material sciences, nano-sciences, and micro-sciences developed within the broader Sandia research community is also leveraged. We capture this foundational knowledge in our science-based computational capabilities, validated through high-fidelity experiments with quantified uncertainties, and applied by discipline experts to provide solutions to meet the needs of our diverse national security customers.

**Materials Science and Technology**

The primary product of the Materials Science and Technology Foundation is knowledge of materials structure, properties and performance and the processes to produce, transform, and analyze materials. The main research activities fall into three theme areas:

- Scientifically Engineered Materials – new materials to replace obsolete or unavailable technologies, meet new system requirements, or provide new functional capabilities.

- Materials Processing - providing the knowledge base needed to understand, characterize, model, and ultimately control the materials fabrication technologies critical to component development and production.

- Materials Aging and Reliability - understanding the chemical and physical mechanisms that cause materials properties to change.

**Microelectronics and Microsystems**

The Microelectronics and Microsystems Research Foundation conducts research and develops beyond-leading-edge trusted microsystems technologies to enable new and increasingly powerful macro-system capability and functionality for critical national security platforms. Research activities exist in the areas of:

- ASIC Design and Test
- MEMS Design and Test
- Optoelectronics and Photonics
- Semiconductor Fabrication

**Pulsed Power**

The Pulsed Power Research Foundation focuses on creating, diagnosing, and modeling pulsed power drivers and experimental platforms and analyzing the extreme environments that are created in order to solve critical problems for national security. Research and development is conducted in:

- Magnetically-driven plasma implosions,
- Magnetically-driven compression waves and flyer plate acceleration,
- Intense particle beam generation, transport, and focusing,
- High-voltage breakdown phenomenology, and
- High-current and high-voltage pulsed power technology development and testing.