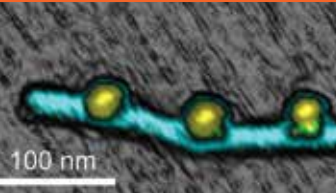


BOISE STATE UNIVERSITY

RESEARCH  
STRENGTHS



# MATERIALS SCIENCE

From nylon to silicon chips to DNA strands, new materials are the sparks that fire technological revolutions. Boise State is Idaho's leader in developing and testing advanced materials for a broad range of applications.

- Bachelor's, master's and Ph.D. programs in Materials Science and Engineering
- Partner in the statewide Center for Advanced Energy Studies at the Idaho National Laboratory
- Internationally recognized faculty who collaborate with top research institutions in the U.S. and around the world
- Boise State Center for Materials Characterization, the CAES Microscopy and Characterization Suite and other state-of-the-art facilities support research programs and are utilized by private and public sector clients

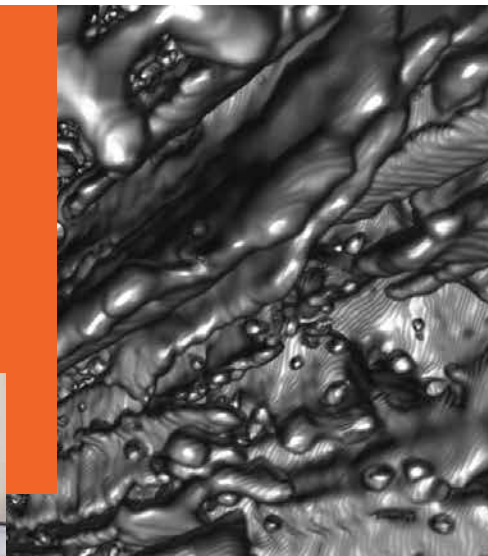
## BOISE STATE RESEARCHERS ARE:

> **DEVELOPING** advanced materials for memory device fabrication > **USING** strands of DNA that self-assemble into nanomachines > **FABRICATING** materials capable of withstanding extreme environments > **BUILDING** powerful sensors that integrate advanced materials into their design > **DEVELOPING** magnetic materials that "remember" their original shape > **STUDYING** environmental degradation of materials and sustainability > **RESEARCHING** nanophotonic devices that could lay the groundwork for miniaturizing optical devices > **CONDUCTING** nanoscale tests and synthesis of new materials > **RESEARCHING** transformative materials, intelligent materials and evolutionary materials > **EXPANDING** the realm of what's possible for energy systems, space exploration and microelectronics



# MATERIALS SCIENCE

Materials Science draws on all branches of science and combines them with manufacturing technology and design to solve engineering problems.



## RESEARCH PROGRAMS

- Materials for Energy Applications
- Materials for Extreme Environments
- Nanomaterials Synthesis and Development
- Advanced Functional Nanomaterials
- Electronic Memory Materials
- DNA Nanotechnology
- Semiconductor Processes and Materials
- Ferromagnetic Shape Memory Alloys
- Computational Materials
- Nanobioscience
- Photonics
- Battery Materials and Construction
- Materials Modeling
- Nuclear Materials
- Membranes for Energy Applications
- Chalcogenide Memristors

## GRANTS AND AWARDS

- National Institutes of Health
- National Science Foundation
- U.S. Department of Energy
- U.S. Department of Education
- U.S. Department of Defense
- Keck Foundation
- State of Idaho
- Idaho National Laboratory
- Business and Industry
- National Institute of Standards and Technology
- NASA

## RESEARCH FACILITIES

- Structural Characterization
- Thin Film Materials Deposition and Characterization
- Mechanical Testing
- Thermo-physical Property Measurement
- Electrical and Magnetic Characterization
- Materials Processing
- Materials Characterization
- Membranes for Energy Efficiency

## ISSUED AND PENDING PATENTS

- Enhanced DNA Sensing Via Catalytic Aggregation of Gold Nanoparticles by DNA Hybridization Chain Reaction
- Structured Chalcogenide Glass Films for Redox Conductive Bridge Nonvolatile Memristors
- Actuation Method and Apparatus, Micropump, and PCR Enhancement Method
- Imaging Device for Biomedical Use
- Multi-state Memory and Multi-functional Devices Comprising Magnetoplastic or Magnetoelastic Materials
- Magnetic Material with Large Magnetic-Field-Induced Deformation
- Transition Metal-doped Oxide Semiconductor Exhibiting Room-temperature Ferromagnetism and Method of Sensing a Gas by Detecting Change in Magnetic Properties
- Electrochemical Deposition Method Utilizing Microdroplets of Solution
- Device with Magnetoplastic and/or Magnetoelastic Thin-Film Transducer and Pick-up Coil for Harvesting Energy
- Polycrystalline Foams Exhibiting Giant Magnetic Field-Induced Deformation and Methods of Making and Using Same
- Forced Ion Migration for Chalcogenide Phase Change Memory Device
- Magnetic Shape Memory Materials with Stabilized Twin Boundaries and Method

*(Note: Boise State's patent portfolio continues to grow and new applications are in process.)*



**BOISE STATE UNIVERSITY**

**RESEARCH AND ECONOMIC DEVELOPMENT**

1910 University Drive, Boise, Idaho 83725-1135  
Phone (208) 426-5732 [research.boisestate.edu](http://research.boisestate.edu)