

NIST

Working with Industry to Accelerate Innovation

Jason Boehm
Director Program Coordination Office
Office of the Director
National Institute of Standards and Technology
Department of Commerce

NIST
National Institute of
Standards and Technology
U.S. Department of Commerce

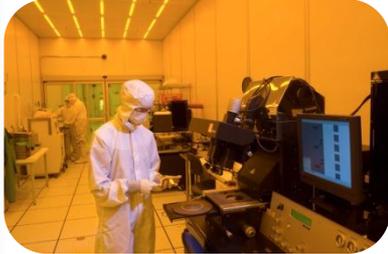


NIST's Mission

To promote U.S. innovation and industrial competitiveness by advancing **measurement science, standards, and technology** in ways that enhance economic security and improve our quality of life.



NIST Programs



NIST Laboratories

- Providing measurement solutions for industry and the nation



Hollings Manufacturing Extension Partnership

- Nationwide network helping smaller manufacturers compete globally



Baldrige Performance Excellence Program

- Strengthening performance excellence in U.S. business

NIST Laboratories

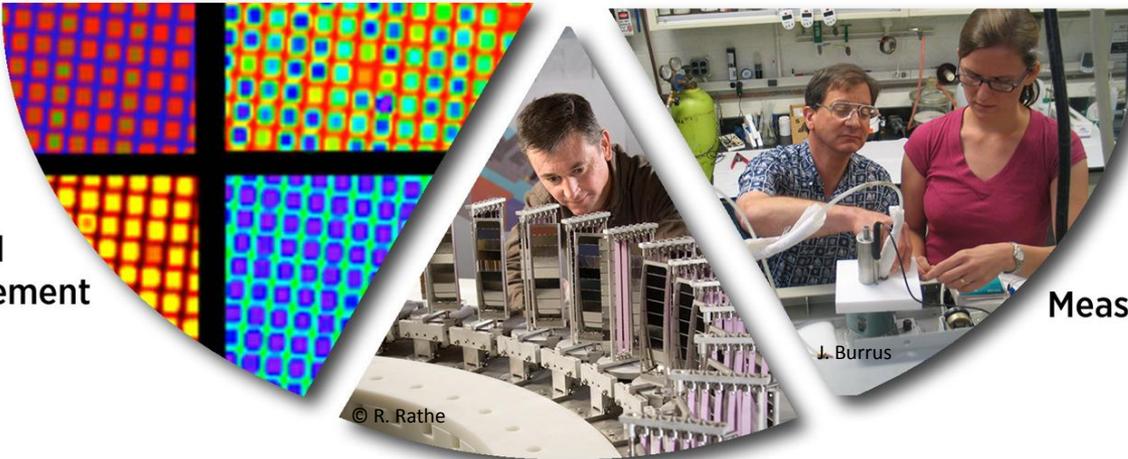
Engineering

Nanoscale Science
and Technology



Information
Technology

Physical
Measurement



Material
Measurement

Neutron Research

NIST Priority Research Areas



TebNad

Energy



S.Bonk

Environment



Fotocrisis

Manufacturing



Y. Arcurs

Healthcare



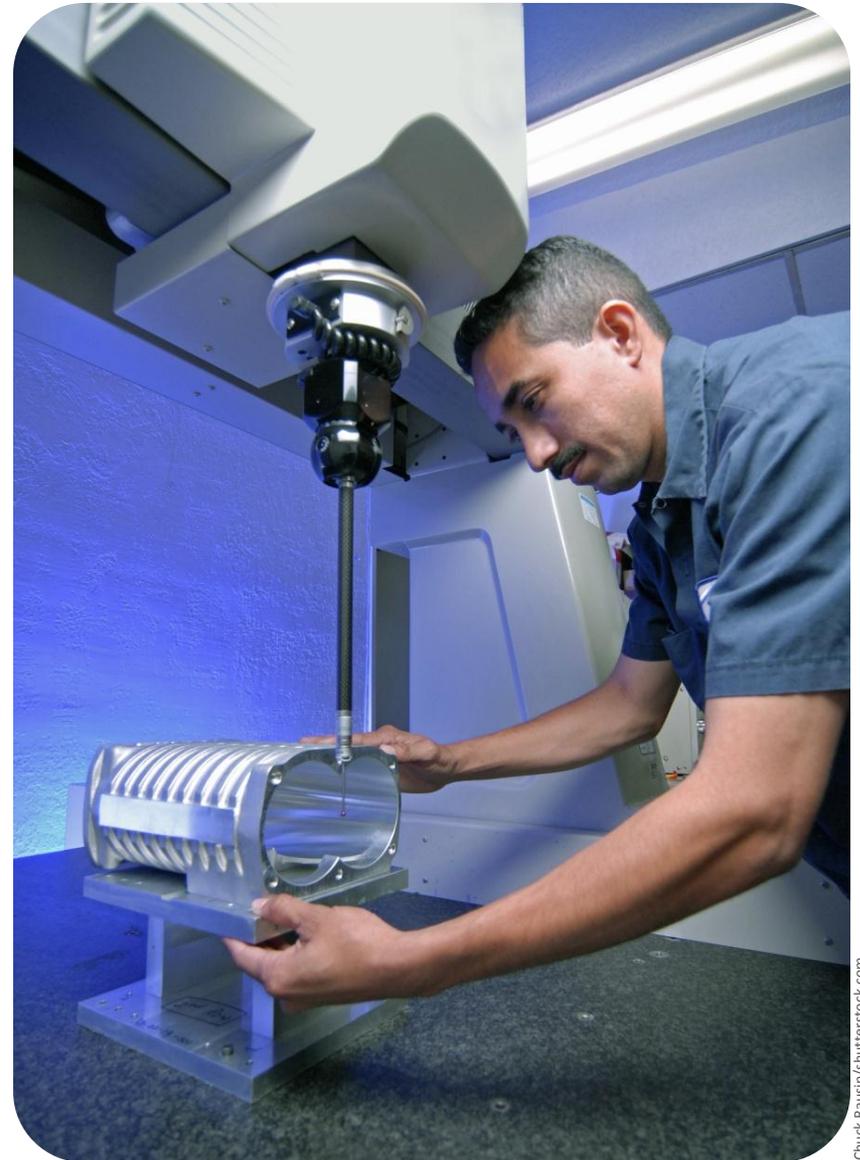
designersart

**Information Technology and
Cybersecurity**



Jovan Nikolic

Physical Infrastructure



Chuck Rausin/Shutterstock.com

Manufacturing Extension Partnership

This Federal-state-industry partnership provides U.S. manufacturers with access to technologies, resources, and industry experts.

MEP Centers located in all 50 states and Puerto Rico work directly with local manufacturing communities, as a strategic advisor to connect manufacturers to public and private resources essential for competitiveness and profitability.

A strong domestic manufacturing base is essential to supporting the Nation's economy and national security.

In FY 2015, MEP will:

Expand efforts to help small manufacturers adopt emerging technologies, reduce costs, and develop strategies for market expansion.

Create tools, services and training to help firms innovate and enter into new markets.

Support critical national priorities such as sustainable manufacturing, export expansion, workforce development, and supply chain competitiveness.



E3: ECONOMY • ENERGY • ENVIRONMENT
A SUSTAINABLE GROWTH STRATEGY

NIST FY 2015 Budget Highlights

2015 Requested Funding -- \$900M (+\$50M over FY2014)

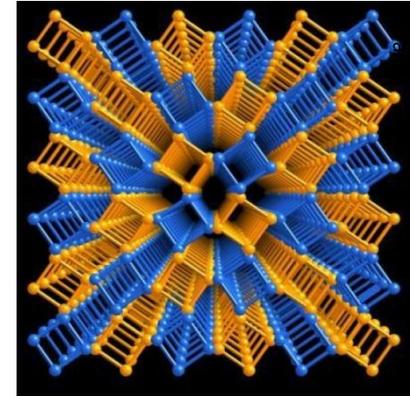
NIST Labs -- \$680M (+29M over FY2014)

- Forensics + 3.5 M
- Cyber-Physical Systems + \$7.5 M
- Advanced Materials + 5 M
- Synthetic Biotechnology + \$ 7 M
- Lab-to-Market transformations + \$ 6M

NIST Innovation and Industry Services -- \$161M (+\$18M over FY2014)

- MEP +\$13M
- NNMI Coordination +\$5M

Construction -- \$59M (+\$3M over FY2014)



Credit: Penn State University,
Gopalan Lab, Ryan Haismaier
Courtesy: Science



Credit: IDG
Connect



Credit: NIST

Partnering with NIST

NIST seeks out high-quality partnerships, collaborations, and other interactions with U.S. companies, universities, and agencies at the federal, state, and local levels. Each year:

- NIST conducts cooperative research with industry, academic institutions, and other government agencies.
- NIST hosts about 2,700 associates and facility users who work with about 3,000 NIST staff members at two main campuses in Gaithersburg, Md., and Boulder, Colo.
- The Hollings Manufacturing Extension Partnership partners with over 1,300 manufacturing specialists and staff at more than 400 MEP service locations around the country.
- Hundreds of individuals from companies and other organizations participate in selecting award recipients for the Malcolm Baldrige National Quality Awards, which are managed by NIST.

Joint Research Collaboration

NIST jointly operates research organizations in four locations explicitly established to promote the kind of cross-disciplinary collaborations that accelerate research results:

- JILA, Boulder, Colo., a world-class physics research institute jointly operated by NIST and the University of Colorado at Boulder
- Institute for Bioscience and Biotechnology Research, Rockville, Md., an interdisciplinary partnership in cutting-edge biotechnology between NIST and the University of Maryland Biotechnology Institute
- Hollings Marine Laboratory, Charleston, S.C., a national center for coastal ocean science, in which NIST is one of five federal, state, and university partners
- Joint Quantum Institute, College Park, Md., a new institute for advancing quantum physics research that is jointly operated with the University of Maryland



NIST Partnerships

Industry



Agilent Technologies



Universities



Nonprofits



International Technology Roadmap
for Semiconductors



Government



Collaboration Mechanisms

- **Use of Designated Facilities.** NIST has several unique and valuable laboratory facilities available for use by U.S. organizations for both proprietary and non-proprietary research.
- **Grants Programs.** NIST has several grant-based funding mechanisms including laboratory grants programs.
- **Small Business Innovation Research Program.** The NIST SBIR Program awards cooperative agreements to small business scientific and engineering related R&D proposals that respond to specific technical needs described in the annual SBIR solicitation.
- **Associates Programs.** NIST has a variety of research appointments for undergraduates, graduates, and post-docs

National User Facilities

The NIST Center for Neutron Research (NCNR) is a national resource for researchers from industry, university and other government agencies.

<http://www.nist.gov/ncnr/index.cfm>

NIST NanoFab is a shared NIST resource which provides industry, academia, and other government agencies access to world-class nanoscale measurement and fabrication methods and technology on a fee-based, shared-use basis.

[http://www.nist.gov/cnst/nanofab/quickst
art.cfm](http://www.nist.gov/cnst/nanofab/quickstart.cfm)



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25 beam facilities



High performance cold neutron source and advanced thermal and cold neutron instrumentation

studying structure & dynamics of materials

talented instrument staff to help our users succeed

diverse sample environments

250 operating days/year

2300 research participants/year

2 proposal calls/year (merit-based access)

400 proposals/call

The CNST NanoFab

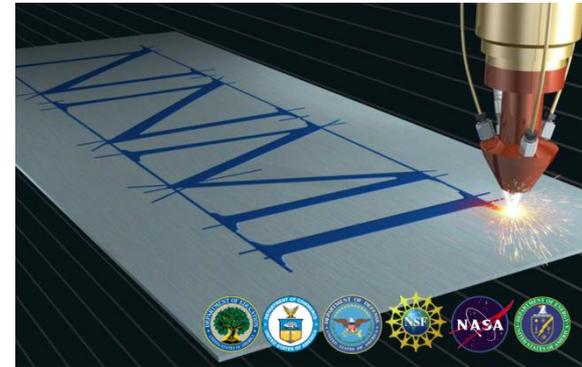
A national, state-of-the-art, shared resource for the fabrication and measurement of nanostructures:

- 60,000 ft² (5600 m²) of labs and cleanroom
 - 19,000 ft² (1800 m²) cleanroom;
 - 8,000 ft² (750 m²) at class 100
 - Open (staffed) weekdays from 7 am to midnight
- Leverages the expensive tools needed for nanotechnology through cost sharing (charged “*a la carte*”)
 - About 100 major tools, including advanced lithography (e-beam, ASML stepper), microscopy (FE-SEMs, FIBs, TEMs)
- Staffed with talented technical team who train and assist users, operate and maintain the tools, and develop and control the processes
- Connects external researchers to extensive measurement resources in the NIST Laboratories and Centers



NIST Funding Opportunities -- The National Network for Manufacturing Innovation

- The NNMI will consist of linked Institutes for Manufacturing Innovation (IMIs) with common goals, but unique concentrations.
- In an IMI, industry, academia, and government partners leverage existing resources, collaborate, and co-invest to nurture manufacturing innovation and accelerate commercialization.
- The President has proposed building out the initial network to encompass 45 IMIs.
- DoD and DoE have awarded four institutes as part of the NNMI network
 - America Makes – Additive Manufacturing Innovation Institute
 - Digital Manufacturing & Design Innovation Institute
 - Lightweight & Modern Metals Manufacturing Innovation Institute
 - Next Generation Power Electronics Manufacturing Innovation Institute
- Four new IMI awards are planned for FY14
 - DOE call for proposals for institute on Advanced Composites closes April 22
http://www1.eere.energy.gov/manufacturing/financial/solicitations_detail.asp?sol_id=760



NIST Funding Opportunities -- Advanced Manufacturing Technology Consortia (AMTech)

- AMTech is a competitive grants program intended to establish industry-led consortia to plan research that addresses high-priority advanced manufacturing challenges
- The goal is to develop technology roadmaps of critical long-term industrial research challenges directly related to manufacturing-sector needs
- AMTech competition was held in FY13. Awards will be announced May 6, 2014
- A new AMTech competition will be announced later in FY14. The new competition will focus on technology implementations.
- <http://www.nist.gov/ampo/>



NIST Funding Opportunities -- Centers of Excellence

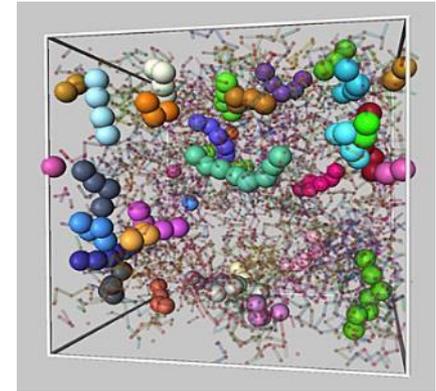
The NIST Centers of Excellence will provide an interdisciplinary environment where researchers from NIST, academia and industry will collaborate on emerging areas of basic and applied research and innovations in measurement science. These centers are meant to:

- Foster expanded development of expertise in measurement science and its role in innovation through the education and training of scientists and engineers
- Provide greater opportunities for NIST to engage with industry and entrepreneurs
- Enhance technical innovation through earlier alignment of measurement science with emerging and innovative fields of research
- NIST intends to launch a competition for a new Center of Excellence in FY2014
<http://www.nist.gov/coe/index.cfm>

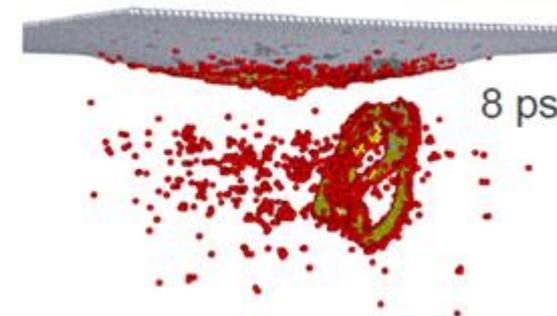
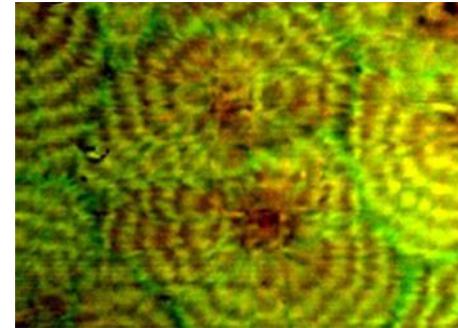


Program Update: Center of Excellence on Advanced Materials

- RFP published June 27th, closed August 12th. NIST received many strong proposals
- Awarded to new Center for Hierarchical Materials Design (CHiMaD) Consortium lead by Northwestern
 - University of Chicago
 - Northwestern-Argonne Institute of Science and Engineering (partnership between Northwestern and DoE's Argonne National Lab)
 - The Computation Institute (partnership between University of Chicago and Argonne National Lab)
- \$5 million NIST award with \$4.65 million consortium contribution
- CHiMaD will focus on the discovery of novel hierarchical materials. Hierarchical materials exploit distinct structural details at various scales from the atomic on up to achieve special, enhanced properties.



Credit: Douglas/NIST



NIST Funding Opportunities - Grants

- Measurement, Science, and Engineering Research Grants Programs—Supports NIST laboratories with research in fields such as:
 - polymers, ceramics, metallurgy, neutron scattering, spectroscopy, mechanical metrology; semiconductors; ionizing radiation physics,
 - advanced manufacturing, construction technologies, and fire research,
 - information technology including advanced network technologies, big data, cloud computing, computer forensics, information access, and cybersecurity
 - greenhouse gas and climate science measurements
 - law enforcement standards and forensic sciences
- Precision Measurement Grants—Support researchers in U.S. colleges and universities for experimental and theoretical studies of fundamental physical phenomena

NIST Funding Opportunities - SBIR

- Small Business Innovation Research (SBIR) Program—Solicits research and development proposals from small businesses that respond to specific subtopics described in the annual solicitation.
- Eleven federal agencies set aside a portion of their extramural research and development budget each year to fund research proposals from small science and technology-based firms.
 - to increase private sector commercialization of innovations derived from federal R&D;
 - to use small business to meet federal research and development (R&D) needs;
 - to stimulate small business innovation in technology; and
 - to foster and encourage participation by minority and disadvantaged persons in technological innovation.
- SBIR supports creative advanced research in important scientific and engineering areas and is designed to encourage the conversion of government-funded R&D into technological innovation and commercial application.

NIST Associates Programs

- **The NIST-National Research Council (NRC) Postdoctoral Research Associateships Program**—Identifies and recruits world-class postdoctoral scientists and engineers to work at NIST on research in fields including chemistry, physics, materials science, mathematics, computer science, and engineering. A limited number of two-year term appointments are available. Applicants must be U.S. citizens.
- **National Institutes of Health (NIH)/ National Institute for Biomedical Imaging and Bioengineering (NIBIB)/NIST NRC Joint Postdoctoral Research Associateships Program**—Provides five two-year awards for postdoctoral researchers emphasizing research at the interface of the biological and physical sciences. Work is done both at NIST and at NIH. Non-U.S. citizens are eligible.
- **Professional Research Experience Program (PREP) (Boulder)**—Provides laboratory experience and financial assistance to qualified undergraduates, graduates, and postgraduates. Postdocs from any university are welcome to apply and are brought into the program through the University of Colorado.
- **Summer Undergraduate Research Fellowship (SURF) Program**—A NIST/National Science Foundation partnership that teams outstanding undergraduate students with NIST mentors on cutting-edge research projects.

SURF: Summer Undergraduate Research Fellowship Program

- Two locations - Gaithersburg, MD & Boulder, CO
- NIST & NSF (REU) collaboration
- 11-week program, includes:
 - Research
 - Seminars
 - Tours
 - Symposium
- ~150 students in Gaithersburg;
~20 in Boulder
- \$5500 stipend + housing + travel
- For more information:

www.nist.gov/surfgaithersburg
www.nist.gov/surfboulder

