What is NIST?

The National Institute of Standards and Technology (NIST) is a non-regulatory federal agency within the Department of Commerce. NIST’s mission is 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.

Sensor Science Division

The Sensor Science Division develops and provides national measurement standards and services to advance physical sensor science and technology in optical radiation, temperature, pressure, vacuum, and flow, and related physical phenomena.

Sensor Science Division
Gerald Fraser, Ph.D.
Division Chief
http://www.nist.gov/pml/div685/

Physical Measurement Laboratory
National Institute of Standards and Technology
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Gaithersburg, MD 20899-8440
## Research Projects with Points of Contact

### Optical properties of materials
**Advocate**
- Scattering
- Diffraction
- X-ray absorption

**Contact**
- Joseph Rice
  - jrice@nist.gov

### Computational modeling of light-matter interactions
**Advocate**
- Scattering
- Diffraction
- X-ray absorption

**Contact**
- Eric Shirley
  - esh Shirley@nist.gov

### Ground and space-based remote sensing
**Advocate**
- Sensor calibration
- Climate science
- Ocean color

**Contact**
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### Synchrotron Radiation Applications
**Advocate**
- Soft x-ray
- Radiation damage
- VUV and EUV metrology

**Contact**
- Uwe Arp
  - uarp@nist.gov

### Measurement science for astronomy
**Advocate**
- Dark energy
- Stellar photometry
- Atmospheric transmittance

**Contact**
- Keith Lykke
  - lykke@nist.gov

### Measurement of greenhouse gas emissions
**Advocate**
- LI DAR and DIAL
- Climate change
- Air monitoring
- Gas sensors

**Contact**
- Michael Moldover
  - mmoldover@nist.gov

### Fluid Measurement and applications
**Advocate**
- Acoustic thermometry
- Radiation thermometry
- Noise thermometry

**Contact**
- Gregory Strouse
  - gstrouse@nist.gov

### Metrology for semiconductor manufacturing
**Advocate**
- Lithographic techniques
- Optical properties of materials
- Holographic microscopy
- Optical scatterometry
- Extreme UV radiation

**Contact**
- Thomas Germer
  - tgermer@nist.gov

### Pressure and vacuum measurement and applications
**Advocate**
- Outgassing
- Vacuum sensors
- Process gases
- Vapor pressure measurement

**Contact**
- Douglas Olson
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### Research Opportunities

- **Postdoctoral fellowships** are available at NIST and NIST/NIH through the National Research Council. [www.national-academies.org/rap](http://www.national-academies.org/rap)

- **International candidates** may collaborate with NIST scientists through the guest researcher program.

- **Undergraduates** may participate in the Summer Undergraduate Research Fellowship (SURF) program. [www.surf.nist.gov/surf2.htm](http://www.surf.nist.gov/surf2.htm)

- **Flux Measurement** and applications
- Develop methods for fluid flow, airspeed, liquid density and volume; advance measurements and calculation of thermodynamic properties of gases.

**Contact**
- Michael Moldover
  - mmoldover@nist.gov

- **Temperature measurement and applications**
  - Develop contact and non-contact temperature standards; improve ITS-90 scale; realize thermodynamic temperature; advance thermometry applications.

**Contact**
- Boltzmann constant
  - gstrouse@nist.gov

- **Optical properties of materials**
  - Advance measurement of optical properties from terahertz to extreme ultraviolet for applications in remote sensing, color, appearance, medical imaging, nano- and microscale science, security, and defense.

**Contact**
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  - esh Shirley@nist.gov

- **Infrared Technology**
  - Advance measurement of infrared radiation for applications in remote sensing, process monitoring, biomedical imaging, security, and defense.

**Contact**
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  - jrice@nist.gov

- **Synchrotron ultraviolet radiation facility**
- **Low background infrared facility**
- **Greenhouse gas emissions test bed**
- **Contact thermometry laboratory**
- **Absolute humidity standards**
- **Hyperspectral imagers and projectors**
- **Spectral responsivity measurement facilities**
- **Spectrally tunable lighting facility**
- **Aperture area measurement facility**

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**Capabilities**

- Synchrotron ultraviolet radiation facility
- Low background infrared facility
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- Aperture area measurement facility

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**Reduction**

- Improve in-situ and standoff methods for CO₂ emissions; develop sensors; improve satellite measurement of emissions and ocean carbon levels.

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- Michael Moldover
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- Develop contact and non-contact temperature standards; improve ITS-90 scale; realize thermodynamic temperature; advance thermometry applications.

**Contact**
- Boltzmann constant
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- Develop methods for defect inspection and optical critical dimension metrology; characterize EUV sources and optics; characterize optical properties of materials for next-generation lithographic techniques.

**Contact**
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- Develop methods and standards to support new lighting technology; quantify performance of reflective materials; quantify color and appearance.

**Contact**
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- **Light-emitting diodes (LEDs)**
- Vision science