

What is NIST?

The National Institute of Standards and Technology (<http://www.nist.gov>) is a non-regulatory federal agency within the US Department of Commerce. NIST provides neutral ground for collaborations among industry, academia, and other government agencies with the goal of solving measurement problems and developing the necessary technology to provide across the board improvements to promote innovation and advance the commercialization of technology.

The Biochemical Science Division accelerates innovation in the biosciences and in related technologies

Biochemical Science Division Mission

The Biochemical Science Division provides biochemically based measurement methods, data, reference materials, and predictive models in support of the Chemical Sciences and Technology Laboratory's (CSTL) role to provide, as the US National Reference Laboratory, the national system of chemical, physical, and biochemical measurements for advancing the commercialization of biotechnology.

Personnel

- 54 staff members (biochemists, biomedical engineers, toxicologists, physicists, analytical chemists, molecular biologists, chemical engineers)
- 45 other guest scientists (students, postdocs, visiting scientists)

For more information contact Mary Satterfield, Ph.D. at mary.satterfield@nist.gov



Standard Reference Materials (SRMs) Developed by the Biochemical Science Division

- Human DNA Quantitation Standard: SRM 2372
- PCR-based DNA Profiling Standard: SRM 2391b
- Fluorescein Solution: SRM 1932
- Human Y-Chromosome DNA Profiling Std: SRM 2395
- Mitochondrial DNA Sequencing: SRM 2392
- Fragile X Human DNA Triplet Repeat: SRM 2399
- Heteroplasmic Mitochondrial DNA Mutation Detection: SRM 2394
- Optical and photometric standards for UV-Vis, NIR, Fluorescence, and Raman Spectroscopy: SRMs 2241-2243
- Liquid Absorbance Filters: SRM 931G

Available at <https://www-s.nist.gov/srmors/>

SRMs in the works . . .

Huntington's Disease – DNA standard for this inherited genetic neurological disorder

Cytomegalovirus – our first viral standard for a virus in the Herpes virus family

HER-2 – our first standard for the gene associated with aggressive breast cancer

External RNA Controls - DNA sequence library for improved confidence in gene expression profiling

Postdoctoral Fellowship Opportunities
at NIST and NIST/NIH
www.national-academies.org/rap

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

Biochemical Science Division



Laurie Locascio, Ph.D.
Division Chief

<http://www.nist.gov/cstl/biochemical>

Chemical Science and Technology Laboratory
National Institute of Standards and Technology
100 Bureau Drive, Mail Stop 8310
Gaithersburg, MD 20899

Groups in the Biochemical Science Division

Applied Genetics

Focuses on developing standards and technology to aid human, plant, and animal identification and to benefit agricultural, law enforcement, and clinical applications using genetic information

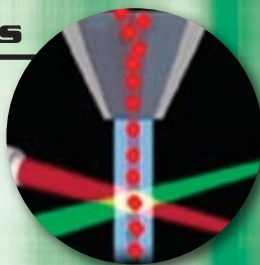
*Forensics and Human ID
Genetically Modified Organisms
Clinical DNA Standards*

Group Leader:
John Butler, Ph.D.
John.Butler@NIST.gov

Bioassay Methods

Pursues research into new bioassay formats and materials, promotes standardization and defensible measurement claims through methods optimization and validation, and provides relevant standard reference materials and reference data to support a broad range of health, defense, environmental, and energy research related customers

*Biosecurity
Pharmaceutical Standards
Biofuels
Human & Environmental Nanotoxicity*



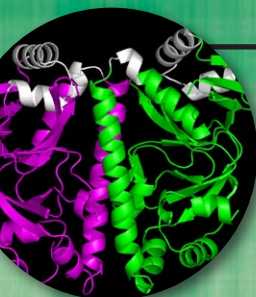
Group Leader:
Steve Choquette, Ph.D.
Steven.Choquette@NIST.gov

Macromolecular Structure & Function

Develops and applies new chemical and physical measurement methods that will enable a better understanding of how macromolecular structure, dynamics and interactions are related to fundamental biological processes

*Protein Structure and Function
Nucleic Acid Structure and Function
Macromolecular Interactions*

Group Leader:
John Marino, Ph.D.
John.Marino@NIST.gov

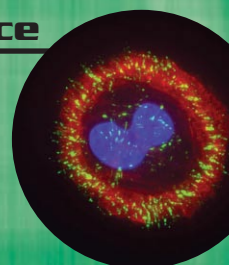


Cell Systems Science

Focuses on enabling quantification and predictive understanding of the complex biological responses of cells by developing the infrastructure for cell-based measurements, data organization, and models

*Evolutionary Genomics
Bioinformatics
Quantitative Cell Imaging*

Group Leader:
Anne Plant, Ph.D.
Anne.Plant@NIST.gov



DNA Science

Focuses on the measurement of DNA damage and repair in living organisms, on the development and evaluation of biomarkers for early detection of cancer, and on the toxicity of biomedically relevant nanomaterials in human cells

*Cancer Biomarkers
DNA Damage and Repair
Nanomaterial Genetic Toxicity*

Group Leader:
Miral Dizdar, Ph.D.
Miral.Dizdar@NIST.gov

Multiplexed Biomolecular Science

Addresses measurement science, technology development, and standards for measurements where biological state is related to levels of many biomolecules

*Transcriptomics
Multiplexed Methods Development
Novel Separations Methods*



Group Leader:
Marc Salit, Ph.D.
Marc.Salit@NIST.gov

Joint Institutes at NIST with Biochemical Science Division Activities

Center for Advanced Research in Biotechnology (CARB)

<http://www.umbi.umd.edu/carb/home.php>

A partnership between NIST and University of Maryland Biotechnology Institute

- Macromolecular Structure/Function
- Bioinformatics
- BioNanotechnology

Hollings Marine Laboratory (HML)

<http://www.hml.noaa.gov>

A partnership between NIST, NOAA's National Ocean Service, College of Charleston, Medical University of South Carolina, and South Carolina Department of Natural Resources

- Metabolomics, Metabonomics
- Structure/ Function Relationships
- Phenotype Anchoring

Reference Databases

- HIV Structural Reference Database (compounds targeting HIV protease)
<http://xpdb.nist.gov/hivpdb/hivpdb.html>
- Biofuels Database <http://bioinfo.nist.gov/biofuels/>
- Short Tandem Repeat DNA Database (STRBase)
<http://www.cstl.nist.gov/biotech/strbase/>
- Enzyme Thermodynamics Database
http://xpdb.nist.gov/enzyme_thermodynamics/
- Human Mitochondrial Protein Database
<http://bioinfo.nist.gov/hmpd/>
- Biological Macromolecule Crystallization Database
<http://xpdb.nist.gov:8060/BMCD4/index.faces>