



National Institute of
General Medical Sciences

INVESTING IN DISCOVERY

National Institute of General Medical Sciences

Strategic Plan 2008-2012

Progress Report

January 2013

Overview

In January 2008, NIGMS published its 2008-2012 strategic plan, [Investing in Discovery](#), which describes the Institute's core principles and how it would make strategic investments to ensure a stable basic research environment through both existing programs and new initiatives.

Developed through consultations with stakeholders—scientists, policymakers, scientific and professional societies, the general public and Institute staff—the plan articulates the NIGMS mission and its vision for the future.

The plan outlined four strategic goals:

- Enhance the basic biomedical research enterprise through grant support for competitive, investigator-initiated research.
- Address selected scientific needs and opportunities through coordinated research programs.
- Identify innovative approaches among individuals and institutions to foster training and the development of an inclusive and effective scientific workforce.
- Advance awareness and understanding of the basic biomedical research enterprise, including its value, requirements and potential impact.

This update provides an overview of progress—accomplishments, strategic decisions and selected outcomes.

Implementation Highlights

Between 2008 and 2012,¹ the Institute:²

- Maintained a funding success rate of approximately 24 percent and funded about 200 new/early-stage investigators each year.
- Maintained peer review excellence through the implementation and evaluation of innovative review practices.
- Continued its support of key large-scale science initiatives and ensured that the resulting knowledge and resources were made widely available to the broader scientific community.
- Published [Investing in the Future](#), the NIGMS strategic plan for biomedical and behavioral research training, which articulates a clear, multiyear approach and strategy to ensure that future NIGMS-supported training reflects scientific and workforce needs and contributes to the development of a strong and diverse biomedical research workforce.

¹ All year designations represent fiscal years (2008 = FY 2008).

² Unless noted otherwise, numbers represent approximate averages for the FY 2008-FY 2012 period.

- Established a new Division of Training, Workforce Development, and Diversity, which merges NIGMS research training programs with activities that were previously in the Institute’s Division of Minority Opportunities in Research.
- Launched a blog, the [NIGMS Feedback Loop](#), designed to serve Institute grantees, applicants and others in the scientific community, and worked diligently to encourage electronic access to and use of informational materials.

Goal 1: Enhance the basic biomedical research enterprise through grant support for competitive, investigator-initiated research.

NIGMS recognizes the need to provide scientists with sufficient latitude to explore biomedicine in order to improve health. Although many important advances have occurred in a manner that could not have been anticipated, most scientific advances are more deliberate and require years of persistent work. While good research depends on a balance of ingredients, among the most important are adequate financial support and access to state-of-the-art resources and equipment.

Goal 1 Objectives

- Maintain a balanced research portfolio that reflects scientific excellence and variety.
- Facilitate career stability in the biomedical workforce.
- Provide support for innovative, high-risk biomedical research initiatives with the potential for achieving significant health impact.
- At the Institute level, initiate enhancements to the peer review process.
- Support research that analyzes fundamental mechanisms that traverse multiple organ systems.

Goal 1 Progress

Supporting Discovery Research

Between 2008 and 2012, NIGMS continued to fund discovery research and to provide career stability to investigators doing that research. During this period, the Institute:

- Awarded an average of 4,500 research grants annually.
- Maintained a funding success rate of approximately 24 percent.
- Spent \$224 million annually³ to support grants in response to requests for applications.
- Prevented the loss of valuable resources and highly trained staff by providing an additional \$16 million in interim funding to productive principal investigators who experienced a lapse in R01 funding at their initial grant renewal.
- Enhanced the research career pipeline by funding 1,016 [new/early-stage investigators](#).
- Supported approximately 4,300 biomedical and behavioral research trainees annually at colleges, universities and medical centers across the country.
- Awarded an annual average of 122 [MERIT Awards](#), which provide long-term, stable support to superior investigators.
- Established the Division of Biomedical Technology, Bioinformatics, and Computational Biology, which administers research and research training grants in areas that join biology with the computer sciences, engineering, mathematics and physics. It also supports the development of

³ Includes both competing and noncompeting grants; approximately 11 percent of NIGMS annual budget.

essential, cutting-edge technologies that enable biomedical research discoveries as well as those in behavioral and social research.

- Acquired programs formerly housed in the National Center for Research Resources, including the [Biomedical Technology Research Centers](#), which develop and promote the widespread and routine application of cutting-edge imaging and computer-based technologies across the full spectrum of biomedical research, from bench to bedside.

Fostering Innovation

Between 2008 and 2012, NIGMS continued to monitor the evolution of biomedicine, creating space for new ideas, approaches and fields of study. During this period, the Institute:

- Issued the first awards in its EUREKA (for Exceptional, Unconventional Research Enabling Knowledge Acceleration) program, designed to help investigators test novel, often unconventional hypotheses or tackle major methodological or technical challenges.
- Supplemented NIGMS-funded researchers' grants with funds to extend their research to include induced pluripotent stem (iPS) cells.
- Offered planning grants for multisite clinical trials to allow applicants to complete essential organizational and oversight elements before a trial is funded.
- Hosted 2008 and 2010 workshops in quantitative and systems pharmacology to explore potential in this emerging area.
 - The workshops facilitated a white paper from the community and strategic funding decisions by the Institute to support this area of research.
- Hosted a 2008 workshop on modeling social behavior.
 - NIGMS issued a funding announcement to solicit applications and received a robust response from the scientific community.
- Announced its intent to seek new experimental and computational approaches to determine the functional relevance of human DNA sequence variants in well-phenotyped populations.
- Maintained its support of the [Collaborative Cross](#), a research effort that has generated an online database of mouse genetic variation that represents approximately four times the genetic variation of the world's human populations.

Enhancing Peer Review

Between 2008 and 2012, NIGMS led by example by experimenting with innovative review practices. During this period, the Institute:

- Designed a concise, eight-page EUREKA grant application that discourages undue focus on details of experimental design and has a streamlined biosketch that lists only those publications that demonstrate innovation and an applicant's ability to solve difficult problems.

- Conducted reviews of the [NIH Pathway to Independence Award](#) program using a two-stage, editorial-style system that helps to ensure that applications are evaluated consistently and that they meet NIGMS' programmatic needs.

Nobel Prizes

To date, 75 scientists funded by NIGMS have received the Nobel Prize. Between 2008 and 2012, 11 grantees were honored for their exemplary work.

NAME	NOBEL PRIZE	OFFICIAL CITATION
Brian K. Kobilka	Chemistry 2012	For studies of G-protein-coupled receptors
Ei-ichi Negishi	Chemistry 2010	For palladium-catalyzed cross couplings in organic synthesis
Venkatraman Ramakrishnan, Thomas A. Steitz and Ada E. Yonath	Chemistry 2009	For studies of the structure and function of the ribosome
Elizabeth H. Blackburn, Carol W. Greider and Jack W. Szostak	Physiology or Medicine 2009	For the discovery of how chromosomes are protected by telomeres and the enzyme telomerase
Osamu Shimomura, Martin Chalfie and Roger Y. Tsien	Chemistry 2008	For the discovery and development of the green fluorescent protein, GFP

Selected Scientific Discoveries by Year

Reported in 2008

- After public health officials discovered tainted batches of heparin, an NIGMS grantee used nuclear magnetic resonance to identify the contaminant in several batches of the drug. The work showed how the contaminant was responsible for the reported adverse reactions in humans.
- An NIGMS-funded chemist broadened the use of an already popular “click” chemistry method, which snaps together molecules in a test tube. The new method attaches nontoxic chemical tags to sugars and fats, allowing scientists to study their movement in real time.
- NIGMS-funded scientists solved the detailed, three-dimensional structure of the beta-2-adrenergic receptor. This receptor is part of a family of proteins called G protein-coupled receptors that control critical bodily functions and the action of about half of today’s pharmaceuticals.
- An NIGMS-funded researcher “reset” human skin cells to the embryonic state by supplying them with four genes, giving them the potential to become any of the 220 cell types in the body. These induced pluripotent stem cells have provided an extremely useful tool for biomedical research.

Reported in 2009

- An NIGMS grantee described the natural sugar molecule “Gc” that is made naturally by chimps and other nonhuman mammals. The findings showed that many people have antibodies against Gc—which the body absorbs through Gc-rich foods like red meat and milk—and suggest that the antibodies may contribute to immune dysfunction.
- A team of NIGMS-funded researchers determined the three-dimensional structure of a “super antibody”—an infection-fighting protein that recognizes seasonal and pandemic influenza viruses.
- NIGMS-funded researchers developed an animal (fruit fly) genetic model of one form of the rare condition Charcot-Marie-Tooth disease.
- NIGMS-funded scientists reported that a gene variant carried by about a third of the population plays a major role in this group’s response to the anticlotting medicine clopidogrel (Plavix®). Despite its widespread use, up to a third of people do not respond to clopidogrel and may experience serious cardiovascular events as a result of inappropriate drug therapy.

Reported in 2010

- NIGMS grantees used a healthy person’s complete genome sequence to generate a first-of-its-kind personalized risk report by comparing the individual’s genetic signatures against several

databases of disease-related gene variants and also factoring in the person's medical and family history and statistical disease risks.

- NIGMS-funded scientists solved the three-dimensional structure of CXCR4, a molecule that acts as a cellular gateway for HIV and other harmful substances. The results shed light on HIV-AIDS, cancer and other disorders.
- NIGMS-supported researchers created a new, iPS model of the rare human condition LEOPARD syndrome. The scientists reprogrammed skin cells from people with the disorder into iPS cells, which then became heart muscle cells that showed signs of the disease.
- A team of NIGMS-funded scientists used computer modeling to analyze the spread of H1N1 flu in a Pennsylvania elementary school. They determined that transmission occurs mostly through girl-to-girl and boy-to-boy interactions, as well as that sitting directly next to a child with the flu does not raise a child's risk of getting it.

Reported in 2011

- NIGMS-funded scientists discovered a way to generate human intestinal tissue from human embryonic stem cells and pluripotent stem cells extracted from biopsied human skin cells. The researchers made the gut cells by adding chemicals and growth factor proteins to the two stem cell groups and then manipulated the cells to form three-dimensional intestinal tissue.
- NIGMS-funded researchers used computers and genomic information to predict new uses for existing medicines already on the market. The scientists created a computer program to search through the thousands of possible drug-disease combinations in a publicly available research database, aiming to pair drugs with diseases in novel combinations.
- An NIGMS-funded structural biology team determined the three-dimensional protein structure of a major class of receptors that control how the body conducts normal metabolism as well as that of a multitude of medications.
- NIGMS-supported scientists used whole-genome sequencing to trace the path of the *Escherichia coli* outbreak that made thousands of people ill and killed over 50 people in Germany and France. The project was one of the first uses of genetic detective work to study the dynamics of a food-borne outbreak.

Reported in 2012

- NIGMS-funded scientists used a comprehensive approach to uncover nearly 500 interactions between HIV and human proteins. The study has produced one of the most detailed surveys to date of how HIV interacts with human cells.
- Using data from the FDA's Adverse Event Reporting System, NIGMS-funded researchers sifted through millions of reports, analyzing similarities among people taking a particular medication and then predicting previously unidentified side effects and drug interactions. The work has resulted in two publicly available databases for others to use in investigating adverse drug events.

- NIGMS-funded scientists pinpointed the identity of a key substance called a cryptochrome, which sets biological timing and also controls glucose production in the liver. They are currently working on developing ways to block this cryptochrome system as a way of keeping under control the body's metabolism of protein, fat and sugar.
- NIGMS-funded researchers showed that methicillin-resistant *Staphylococcus aureus*, or MRSA, infections are better prevented when hospitals cooperate and coordinate their infection control procedures.

Goal 2: Address selected scientific needs and opportunities through coordinated research programs.

The Institute recognizes that multiple approaches are needed to solve complex research problems. Modern biomedical research is a collaborative enterprise that may involve one or a few laboratories or a large group of researchers. In addition, as biomedical tools and technologies improve rapidly, researchers face an avalanche of complex data that requires accurate curation, creative analysis and secure storage. Standards for data sharing and archiving, along with rigorous training of personnel in this burgeoning area, are of key importance to NIGMS-funded researchers and to the broader scientific and health communities.

Goal 2 Objectives

- Facilitate team science along a continuum of scales to advance multidisciplinary and interdisciplinary inquiry.
- Identify and develop large-scale research programs that offer value, insight and the broadest applicability to the scientific community.
- Create programmatic linkages in support of NIH-wide translational initiatives.
- Seek collaborative and shared research opportunities with other agencies and NIH institutes and centers in areas that show particular promise.
- Expand support for resources and database development to facilitate biomedical research advances.

Goal 2 Progress

Facilitating Collaboration

Between 2008 and 2012, NIGMS employed various strategies to join efforts with other units and organizations toward achieving common goals and increasing efficiency. During this period, the Institute:

- Administratively managed (on behalf of the NIH Office of the Director) the [Pioneer Award Program](#) and the [New Innovator Award Program](#), both of which support individual scientists of exceptional creativity.
- Issued a funding announcement, the [Dynamics of Host-Associated Microbial Communities](#), that complements the NIH Common Fund's [Human Microbiome Project](#).
- Decided not to re-announce its EUREKA program due to significant overlap/redundancy with a trans-NIH Common Fund initiative, the [NIH Director's Transformative Research Award Program](#), which was modeled after EUREKA.
- Participated in multiple collaborations with many NIH components (the Office of the Director, the NIH Roadmap/Common Fund, the Neuroscience Blueprint, and the Nanomedicine Initiative),

federal agencies (the National Science Foundation, the Centers for Disease Control and Prevention, the Indian Health Service, the Department of Defense and the Department of Energy) and organizations (the Howard Hughes Medical Institute), and contributed funds toward the development of several interagency agreements.

- Established the [NIH Office of Emergency Care Research](#), which serves as the agency lead for coordinating basic, clinical and translational biomedical research and research training within emergency care settings.

Supporting Large-Scale Science

Between 2008 and 2012, NIGMS nurtured the development of several large-scale research programs with broad applicability to the scientific community. During this period, the Institute:

- Continued its support of the [Pharmacogenomics Research Network and Knowledge Base](#), which consists of members from nine NIH components and provides a free, state-of-the-art data repository to help forge new links between gene variation and drug response.
- Launched a trans-NIH, interagency collaboration⁴ in glycomics toward developing chemical and structural standards and leveraging resources.
- Continued its support of the [Protein Structure Initiative \(PSI\)](#), which develops effective pipelines, methodologies and technologies for determining three-dimensional protein structures.
 - Launched [PSI:Biology](#), which pairs supported PSI centers conducting high-throughput structure determination with funded “biology partners.”
 - Broadened access to PSI resources by developing the [PSI-Nature Structural Biology Knowledgebase](#) and the [PSI:Biology Materials Repository](#).
- Continued its support of the [National Centers for Biomedical Computing](#) initiative that created a national network to build the computational infrastructure for biomedical computing.
- Provided input and expertise leading to the development of recommendations from the [Advisory Committee to the Director Working Group on Data and Informatics](#) toward addressing the challenges and opportunities presented by “big data.”
- Continued its support of the [Models of Infectious Disease Agent Study \(MIDAS\)](#), a collaboration of research and informatics groups that develops computational models of the interactions between infectious agents and their hosts, diseases spread, prediction systems and response strategies.
- Issued a funding announcement for applications to ensure the availability of important “legacy” resources developed as a part of NIGMS-supported large-scale research activities that are not being renewed under the original initiatives.
- Established the [Supplements for Collaborative Science](#) program, which advances team science at the small end of the scale by providing funds to enable a principal investigator to initiate new

⁴ NIH, Food and Drug Administration, National Institute of Standards and Technology, and National Science Foundation.

collaborations that will provide novel approaches or techniques to advance the aims of his or her funded grant.

- Until 2010, continued support for its “glue grant” program that provides resources for scientists to form teams to tackle complex problems that are beyond the means of any one research group.
 - In 2011, NIGMS conducted an assessment of its glue grant program, led by an external panel whose conclusions pointed to the need for NIGMS to pursue a more tailored collection of approaches for designing funding strategies for future large-scale studies.

Goal 3: Identity innovative approaches among individuals and institutions to foster training and the development of an inclusive and effective scientific workforce.

A key aspect of the NIGMS mission is nurturing the biomedical research workforce, and achieving a workforce that accurately reflects the U.S. population remains an Institute priority. The NIGMS training investment will continue to set a high standard for students' acquisition of both research skills and important career-related knowledge beyond specific research training. The positive effects of NIGMS-funded training grants and fellowships are extended through collaborative interactions with students and faculty within and across academic departments.

Goal 3 Objectives

- Support a broad range of high-quality institutional training programs across the biomedical sciences.
- Provide funding for graduate students and postdoctoral fellows through investigator-initiated research project grants.
- Expand and extend the NIGMS commitment to facilitating the development of a diverse and inclusive biomedical research workforce.
- Address diversity and workforce development in all programs administered by NIGMS as a matter of both policy and practice.
- Adopt a comprehensive, systems-based approach to address future workforce development issues.

Goal 3 Progress

Strategic Plan for Research Training

In 2009, the Institute began developing a strategic plan for research training. The effort articulated a clear, multiyear approach and strategy to ensure that future NIGMS-supported training reflects scientific and workforce needs and contributes to the development a strong and diverse biomedical research workforce. Published in 2011, [Investing in the Future](#), the NIGMS strategic plan for biomedical and behavioral research training, has four key themes:

- Research training is a responsibility shared by NIH, academic institutions, faculty and trainees.
- Research training focuses on student development, not simply the selection of talented students.
- Breadth and flexibility enable research training to keep pace with the opportunities and demands of contemporary science and provide the foundation for a variety of career paths.
- Diversity is an indispensable component of research training excellence, and it must be advanced across the entire research enterprise.

In 2012, NIGMS issued [guidance for implementing the strategic plan for biomedical and behavioral research training](#). Key items include information and resources about:

- Optimizing the research training partnership between NIGMS and academia
- Improvement of research training activities
- Individual development plans
- Evidence-based mentoring
- Limitation of training time
- Training for a diverse skill set
- Multiple career paths

Addressing Workforce Needs

NIGMS continues to keep a close eye on the characteristics and needs of the biomedical and behavioral research workforce. Between 2008 and 2012, the Institute:

- Recognized molecular medicine as an important and growing area of research training, and in 2008, it became a [distinct program area](#).
- Coordinated and hosted two workshops (in 2010 and 2012) for postdoctorates transitioning to independent positions, with an emphasis on those from groups typically underrepresented in the biomedical research workforce.
- Established an [NIH cross-disciplinary career development \(K23\) program in pharmacogenomics and personalized medicine](#) that requires dual mentors from two NIH programs: the [Clinical and Translational Science Awards](#) and the [NIH Pharmacogenomics Research Network](#).
- Renamed its popular intramural training effort, the Pharmacology Research Associate Program, to the [Postdoctoral Research Associate Program](#).
 - The change allows the name to better reflect the program's goal of meeting workforce needs for emerging areas of science within the NIGMS mission.
 - From 2013 to 2015, the NIGMS Postdoctoral Research Associate Program will fund fellows in quantitative/systems pharmacology and computational biology.

Encouraging Diversity

An extensive and growing foundation of social science research demonstrates that broad expertise enhances the quality of research and that all groups benefit from diversity in thought and practice. Between 2008 and 2012, in addition to its concurrent efforts related to the implementation of the strategic plan on biomedical and behavioral research training, the Institute:

- Awarded an annual average of 98 diversity supplements, which support and recruit students, postdoctorates and eligible investigators from groups that have been shown to be underrepresented in biomedical and behavioral research.

- Established a working group (on behalf of the [NIH Working Group on Women in Biomedical Careers](#) and in concert with the NIH Office of Research on Women's Health) charged with examining the issues and addressing the challenges in supporting the advancement of women scientists and engineers.
 - NIGMS managed the resulting request for applications issued in 2009 and funded 14 grants.
 - A November 2012 workshop served as a forum for data presentations from all of the grantees of this trans-NIH initiative, as well as an opportunity for discussion of the results, their implications and potential next steps regarding implementation.
- Acquired the [Institutional Development Award \(IDeA\) program](#) from the former National Center for Research Resources. This program broadens the geographic distribution of NIH funding for biomedical and behavioral research by increasing the competitiveness of investigators at institutions underrepresented in NIH funding in 23 states and Puerto Rico.
- Established a new Division of Training, Workforce Development, and Diversity, which merges NIGMS research training programs with activities that were previously in the Institute's Division of Minority Opportunities in Research.
 - The new division oversees and coordinates NIGMS policies and efforts related to research training, and it is the Institute's focal point for facilitating the development of a diverse and inclusive biomedical research workforce.

Goal 4: Advance awareness and understanding of the basic biomedical research enterprise, including its value, requirements and potential impact.

NIGMS values transparency and positive relations with the scientific community and the public as critical to carrying out its mission. The Institute also believes that it is important to contribute to improvements in science education at the K-12 and other levels as a distinct diversity and workforce development strategy.

Goal 4 Objectives

- Continue to foster an open dialogue with the scientific community about evolving scientific trends, gaps and opportunities.
- Raise public awareness and understanding about the value and impact of basic biomedical research.

Goal 4 Progress

Communicating with the Scientific Community

NIGMS continues to engage bi-directionally with its many stakeholders, including the scientific community. Between 2008 and 2012, the Institute:

- Launched a new blog, the [NIGMS Feedback Loop](#), designed to serve NIGMS grantees, applicants and others in the scientific community.
 - With more than 25,000 subscribers, the blog provides a space for engagement and interaction as well as for increasing awareness of funding opportunities and trends, meetings and scientific resources.
 - More than 50 staff members have contributed posts.
- Marked its 50th anniversary in 2012 by hosting symposia and other activities at scientific meetings.
- Engaged with professional organization leadership, particularly those representing new stakeholder organizations related to former National Center for Research Resources programs that were transferred to NIGMS.
- Maintained distribution of the NIGMS Network, an opt-in listserv sent to leaders of key stakeholder organizations.

Raising Awareness and Understanding of Basic Research

Emblematic of its commitment to nurturing the biomedical and behavioral research pipeline and to underscoring to the American public the value of the nation's basic research investment, NIGMS continues to interact with and provide resources to students, teachers and the general public. Between 2008 and 2012, the Institute:

- Worked diligently to encourage electronic access to and use of informational materials.
 - NIGMS now offers its science education publications in a range of widely accessible electronic formats. These include [Inside the Cell](#), [Medicines By Design](#), [The New Genetics](#), [The Structures of Life](#), [Computing Life](#) and others.
- Engaged with widely used e-book catalogs and other online resources to include NIGMS materials in their collections.
- Conducted extensive outreach to science teachers about the content and availability of NIGMS-produced educational resources, including a new high-school curriculum supplement, [Evolution and Medicine](#).
- Produced online fact sheets, a monthly electronic research news digest ([Biomedical Beat](#)), [articles about the science of health](#) and [media galleries](#) with scientific images and videos plus scientist profiles and interviews.
- Planned and hosted [Cell Day](#), an interactive Web chat about cells and research careers for middle- and high-school students and teachers.
- Participated in the inaugural and second [USA Science & Engineering Festival](#) and in the AAAS public science day.
- Established, and continued to maintain, a presence on major social media, including Facebook, Twitter and YouTube.
 - This presence provides NIGMS with the opportunity to reach new audiences and to engage and interact with them in new ways.
- Facilitated easy access to news, announcements and other information through free subscriptions and automatic delivery.
- Partnered with other NIH and HHS components to cross-promote NIGMS subscriptions and resources to interested stakeholders.

The American Recovery and Reinvestment Act of 2009: NIGMS Implementation

The [American Recovery and Reinvestment Act of 2009](#) (ARRA, Recovery Act) was signed into law by President Obama on February 17, 2009. ARRA was an unprecedented effort to jumpstart the U.S. economy. ARRA included measures to modernize the nation's infrastructure, enhance energy independence, expand educational opportunities, preserve and improve affordable health care, provide tax relief and protect those in greatest need. Of the \$10.4 billion NIH ARRA investment, NIGMS received \$505.2 million.

NIGMS Recovery Act awards unleashed pent-up creativity and innovation in laboratories in states across the nation, allowing scientists to explore important research questions while stimulating their local economies through job creation, training and purchasing of new equipment.

- NIGMS obligated \$351.8 million in 2009 (nearly 1,600 awards) and \$153.4 million in 2010.
- In keeping with the NIGMS mission to sustain basic biomedical research that is the engine of innovation, the Institute's primary consideration for ARRA funding was the quality of a proposed idea. However, the Institute also considered two other factors: the economic stimulus impact of the funding and the distribution of funds across regions, states and institutions.
- Most NIGMS Recovery Act funds went to support administrative supplements for active individual investigator awards (R01s and R37s, or MERIT Awards), and a smaller portion funded competitive revisions to current individual investigator awards as well as new, 2-year R01 grants.
- The Institute funded 14 [Grand Opportunity](#) grants to scientists in 13 states to spur the development of new databases, service centers or other resources accessible to the entire scientific community, advancing biomedical research—and possibly medical care—for years to come.
- NIGMS also funded 19 [Challenge Grants](#) in 12 states—projects that focus on overcoming specific scientific and technological challenges in stem cells, molecular imaging, synthetic biology, drug discovery, green chemistry, behavioral research and research training.