Computational Sciences within NIGMS

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NIGMS Mission

• Promote fundamental research on living systems to lay the foundation for advances in disease diagnosis, treatment and prevention.

• Enable the development of the best trained, most innovative and productive biomedical workforce possible.
Biomedical Technology, Bioinformatics and Computational Biology Division

- **Develop** innovative tools and methods to understand biological systems, from molecular and subcellular to physiological and to population scales

- **Support** multidisciplinary research and rapid translation of new technologies to biomedical researchers

- **Create** training opportunities that are scientifically integrative and interdisciplinary
NIGMS Budget Percentage Share by Mechanism FY 2014 Appropriation

- RPGs: 58%
- R00
- R01
- R15
- R21
- R37
- P01
- DP1
- DP2
- U01
- Other Research: 7%
- Centers: 19%
- SBIR/STTR: 3%
- Training: 8%
- R&D Contracts: 2%
- RMS: 3%
- Intramural: 0%

FY 2014 NIGMS budget: 2.359 billion
Targeted support for specific areas of research increased during the budget doubling.
BBCB’s Funding Mechanism

- R01 (Research Projects Grants)
- R03 (Small Research Grants)
- R13/U13 (Conference Grants)
- R15 (Academic Research Enhancing Awards, AREA)
- R24 (Resource-Related Research Projects)
- R25 (Education Projects; courses, training, evaluation)
- R41/42 (Small Business Technology Transfer, STTR, grants)
- R43/44 (Small Business Innovation Research, SBIR, grants)
- P01 (Research Program Projects)
- P41 (Research Program Centers; e.g., BTRR)
- P50 (Research Program Centers; e.g., Systems Biology Centers)
- U01/U24/U27 (Cooperative agreements)
- T32 (Pre-doctoral Training; investigator-initiated)
- F31 (Individual pre-doctoral fellowship)
- F32 (Individual post-doctoral fellowship)
- F33 (senior scientists, change in the direction of research)
- K99-R00 Pathway to Independence Award
Computational and Systems Biology
New approaches, algorithms and methods for an integrative understanding of complex biological processes

Mathematical and Statistical Modeling
Promote research at the interface of the biological and mathematical sciences.

MIDAS - Modeling of Infectious Disease Agent Study
Collaborative research to model the dynamics of infectious diseases

Data Sciences
New shared computing algorithms and bioinformatics methods to manage, visualize and analyze complex scientific data, including standards and ontology
BBCB Partnerships

- **Biomedical Information Science and Technology Initiative (BISTI)**
  Promote the optimal use of computer science and technology to address problems in biology and medicine by fostering collaborations and interdisciplinary initiatives

- **Big Data to Knowledge Initiative (BD2K)**
  Develop new approaches, standards, methods, tools, software and competencies that will enhance the use of biomedical Big Data by supporting research, implementation and training in the data sciences

- **Interagency Modeling and Analysis Group (IMAG)**
  Provide an open forum for communication among government representatives for trans-agency activities that have a broad impact in science

- **NSF/NIGMS**
  Initiative to support research at the interface of biological and mathematical sciences

- **NIH/DOE**
  Partnership for stewardship of synchrotron beamlines for structural biology and other national laboratory BTRR activities
Biomedical Information Science and Technology Initiative (BISTI)

- Consortium of representatives from each of the NIH institutes and centers
- Established in May 2000 to serve as the focus of biomedical computing issues at the NIH
- To make optimal use of computer science and technology to address problems in biology and medicine by fostering new basic understandings, collaborations, and transdisciplinary initiatives between the computational and biomedical sciences

- [http://www.bisti.nih.gov](http://www.bisti.nih.gov) (Susan Gregurick, Director, BBCB)
Research Grant - Parent R01

- **Funding Opportunity Announcement (FOA) - PA-13-302**
  - Standard due dates (new applications):
    - February 5th, June 5th, and October 5th
  - Early Stage Investigator: New Investigators within ten years of completing their terminal research degree
  - New Investigator: New Investigator if he/she has not previously competed successfully as PD/PI for a substantial NIH independent research award
  - CSR review – study section
  - Review Criteria: Significance, Investigator(s), Innovation, Approach, and Environment
  - Multiple Principal Investigators: to maximize the potential of team science efforts
New BISTI Funding Opportunities

• Early Stage Development of Technologies in Biomedical Computing, Informatics, and Big Data Science (R01) **PA-14-155** and (R43/R44) **PA-14-154**

• Major themes of research include:
  - collaborative environments and technologies
  - data integration
  - analysis and modeling methodologies;
  - novel computer science and statistical approaches.

- This initiative aims to address biomedical research areas in biomedical computing, informatics, and big data science through the **early stage development** of new software, tools and related resources, as well as the fundamental research (e.g., methodologies and approaches) leading up to that development.

• Cross-disciplinary collaborations are strongly encouraged
New BISTI Funding Opportunities

• Extended Development, Hardening and Dissemination of Technologies in Biomedical Computing, Informatics and Big Data Science (R01) PA-14-156 and (R41/R42) PA-14-157

• Major themes of research include:
  - collaborative environments and technologies
  - data integration
  - analysis and modeling methodologies;
  - novel computer science and statistical approaches.

The proposed work should apply best practices and proven methods for software design, construction, and implementation to extend the applicability of existing technologies in biomedical computing, informatics and big data science to a broader biomedical research community

• Cross-disciplinary collaborations are strongly encouraged
**NIH SBIR/STTR 3-Phase Program**

**Discovery**

**Phase I Feasibility Study**
- **Budget Guide:** $150K for SBIR and STTR
- **Project Period:** 6 months (SBIR); 1 year (STTR)

**Development**

**Phase II Full Research/R&D**
- $1M for SBIR and STTR, over two years

**Phase IIB Competing Renewal/R&D**
- Clinical R&D; Complex Instrumentation/Tools to FDA
- Many, but not all, IC’s participate
- Varies~$1M per year; up to 3 years

**Commercialization**

**Phase III Commercialization Stage**
- NIH, generally, not the “customer”
- Consider partnering and exit strategy early
http://www.nigms.nih.gov/Training/
Three-year postdoctoral training program providing:

• Outstanding experience in NIH Intramural Research Program

• Access to extensive NIH resources – facilities, expertise, collaborations

• Additional mentorship and extensive career development activities

• In addition to above, NIGMS funding includes stipend, benefits, and travel allowance for three years
NIGMS Postdoctoral Research Associate (PRAT) program - Eligibility

• **Scientific focus** – All research areas supported by NIGMS

• **Career stage** – Prior to arriving at NIH or within first 12 months of postdoctoral appointment at NIH at time of application

• **Citizenship** - US citizens and permanent residents

• **Application** - Competitive application process - Fi2 mechanism with applications submitted via grants.gov, next receipt date is October 3, 2016 for fall 2017 start

• **Questions** – [badgerje@mail.nih.gov](mailto:badgerje@mail.nih.gov) (Jessica Faupel-Badger)
  - [http://www.nigms.nih.gov/Training/Pages/PRAT.aspx](http://www.nigms.nih.gov/Training/Pages/PRAT.aspx)
The Institutional Development Award (IDeA) States

http://www.nigms.nih.gov/Research/CRCB/IDeA/Pages/default.aspx
The Institutional Development Award (IDeA) Programs

- Authorized by Congress, 1993 NIH Revitalization Act
- Intent to enhance geographical distribution of NIH research funds and increase research capacity
- Currently 23 states and Puerto Rico are IDeA eligible
- Similar to NSF Experimental Program to Stimulate Competitiveness in Research (EPSCoR, est. 1980)
The Institutional Development Award (IDeA) Supported Programs

http://www.nigms.nih.gov/Research/CRCB/IDeA/Pages/default.aspx
Big Data to Knowledge - Towards the digital research enterprise

**Mission:** To use data science to foster an open digital ecosystem that will accelerate efficient, cost-effective biomedical research to enhance health, lengthen life, and reduce illness and disability

- How to foster an open digital ecosystem for biomedical research?
  - Ensure there are people who can make it happen
    - People and/or teams who combine biomedical/behavioral/clinical and data science expertise
  - Develop necessary infrastructure and tools
    - make open, accessible digital resources (data, software, etc)
    - that are findable, accessible, interoperable, and reusable (FAIR)
  - Invest in data science research applied to biomedical research challenges
    - prove its utility and push the frontiers

**Goal:** foster a new culture and new capabilities
BD2K: Facilitating the broad use of data

• Making Data Available
  ○ Recommending to change the policies, practices and culture of communities with regard to data
    • Enabling Research Use of Clinical Data

• Making Data Usable
  1. NIH Standards Information Resource
    • To collect, organize and make available to the public trusted, systematically organized, and curated information about data-related standards that are widely-used in biomedical research and related activities.
BD2K: Facilitating the broad use of data

- Making Data Usable (cont.)
  2. Frameworks for Community-Based Standards Efforts:
     - Establish a framework of policies, governance, administrative procedures, and funding to routinely support community-based standards efforts, and
     - Use that framework to provide catalytic support for particularly opportune efforts under BD2K that are broadly relevant to biomedical research.

- Making data Discoverable
  - Development of an NIH BD2K Data Discovery Index Coordination Consortium
NIGMS Support for Conferences and Scientific Meetings (U13)

- FOA Number: PA-13-347

- NIGMS provides support for a limited number of scientific meetings, conferences and workshops on basic biomedical research and research training topics relevant to its mission.

- Meetings may be funded cooperative agreement (U13) assistance mechanisms and may be awarded for up to 5 years.

- In general, NIGMS will only support meetings that fulfill all of the following characteristics:
  - Are closely aligned with NIGMS central mission and interests, and
  - Are non-recurring, and
  - Include participants who do not frequently interact in other venues.
NIGMS is recruiting for a Program Director

- Health Scientist Administrator/Program Director
  - Manage research grants in the Bioinformatics and Computational Biology Branch of the Division of Biomedical Technology, Bioinformatics and Computational Biology
  - If interested contact Paul Brazhnik, brazhnikp@nigms.nih.gov
NIGMS: Investing in Discovery

Division Overview:  [www.nigms.nih.gov/About/Overview/bbcb.htm](http://www.nigms.nih.gov/About/Overview/bbcb.htm)