

# **NSF Funding for Bioinformatics & Computational Biology**

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National Science Foundation

Computer and Information Science & Engineering Directorate

Intelligent Information Systems Division

Information Integration and Informatics Program

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Funders' Panel

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# NSF Directorates that fund bioinformatics ...

- **Biology Directorate**
  - **DBI**: Advanced Biological Informatics (ABI)
  - Systematics: Assembling the Tree of Life (ATOL)
- **Computer and Information Science and Engineering Directorate**
  - **IIS** – databases, knowledge representation, bioinformatics, CRCNS, ...
  - **CCF** – algorithms, data structures, molecular computing
- **Engineering Directorate**
- **Mathematics and Physical Sciences Directorate**
  - **Division of Mathematical Sciences**, Mathematical Biology

# BIO Directorate

# Biology Directorate

- Division of Biological Infrastructure
  - Advanced Biological Informatics (NSF 08-563)
    - Generic bioinformatics and computational biology projects
    - Primary criterion = impact on biological research
    - Deadline is Aug. 12, 2008
    - Contacts:
      - Peter McCartney, email: [pmccartn@nsf.gov](mailto:pmccartn@nsf.gov)
      - Patrick Brian Heidorn, email: [pheidorn@nsf.gov](mailto:pheidorn@nsf.gov)

# Biology Directorate (cont.)

- Assembling the Tree of Life (phylogeny)
  - NSF solicitation 08-515
  - Deadline was March 14, 2008
  - Joint BIO/GEO/CISE
- Various other biology divisions
  - Bioinformatics specific to particular biological domains, e.g., plant biology, systematics, molecular and cell biology, ...

# CISE Directorate

# CISE / IIS / III Program

- IIS = Information and Intelligent Systems Division
- III = Information Integration and Informatics Program
- Includes bioinformatics and computational biology
- **Novel computer and information science and engineering is the primary review criterion !!**
- Examples include:
  - machine learning, data mining, pattern matching, graph data mining and data management, chemoinformatics, scientific workflow management, sequence analysis, data management, uncertain data, text data mining

# CISE / IIS / III Program

- Review panels:
  - are mostly CS, bioinformatics folks, ontologists, logicians, some biologists or biochemists
- Expertise in biology is essential for bioinformatics proposals.
- Collaborations with biologists are encouraged.

# CISE / IIS Solicitation

- New solicitation (NSF 08-575)
- Award sizes:
  - Small < \$500K, Medium (\$500K to \$1.2M), Large (\$1.2M to \$3.0M)
- Max. Duration:
  - 3 yrs (small), 4 yrs (medium), 5 yrs (large)
- Deadlines: Oct. (medium), Nov. (large), Dec. (small)
- Contacts for bioinformatics
  - Sylvia J. Spengler, [sspengle@nsf.gov](mailto:sspengle@nsf.gov)
  - Frank Olken, [folken@nsf.gov](mailto:folken@nsf.gov)

# CISE Expeditions

- A few (3/year) large (\$2M/year) long (5 year) awards
- Can be any topic in computer and information science and engineering (including **bioinformatics / computational biology**)
- Solicitation NSF 08-568
- Preliminary Proposal Deadline: 2008-09-10
- Contact: Timothy Pinkston, [tpinksto@nsf.gov](mailto:tpinksto@nsf.gov)

# CISE/IIS CRCNS

- Collaborative Research in Computational Neuroscience: NSF 08-514
- NSF contact: Ken Whang, [kwhang@nsf.gov](mailto:kwhang@nsf.gov)
- CS, neuroscience, brain informatics, ...
- Joint NSF/NIH program
- Deadline: Oct. 30, 2008
- Funding: est. \$5M/year
- Disease related research OK for CRCNS

# CISE CCF

- Algorithms, Data Structures for computational biology
- Molecular computing and communication
- New solicitation, NSF 08-577
- Similar sizes, deadlines as CISE IIS
- Review panels: mostly CS, bioinformatics
- Contact:
  - Tatsuya Suda, Email: [suda@nsf.gov](mailto:suda@nsf.gov)

# Rules

# Disease Related Research at NSF

- NSF supports disease related research which advances computer and information science and engineering, engineering, or mathematical biology.
- Primary evaluation criterion (for CISE) is innovation in computer and information science and engineering
- NSF supports research to aid persons with disabilities.
- CISE/III funds some public health informatics & healthcare IT proposals (also see CRCNS), e.g.,
  - Electronic patient records technology, image analysis, ...
  - Contact: Larry Brandt, [lbrandt@nsf.gov](mailto:lbrandt@nsf.gov), Sylvia Spengler, [sspengle@nsf.gov](mailto:sspengle@nsf.gov)
- **ENG/Biomedical** supports some clinical devices studies at the discovery level, etc.

# CISE/BIO Rules

- Only 2 proposals allowed (per PI) to all CISE divisional solicitations (IIS, CCF, or CNS)
- 2 additional proposals allowed to cross-cutting solicitation (e.g., data intensive computing)
  - Penalty – all later proposals are returned
- PI's can also apply to OCI, CDI, BIO, NIH, DOE, ...
- No duplicate proposals within NSF
  - Penalty – all proposals are returned
- BIO prohibits submission to both NSF/BIO & NIH

# Content Development is low priority for CISE

- CISE will not fund proposals primarily to create and populate new databases
- CISE is not in the content creation business
- CISE will support methodological / technology / tool development with incidental DB content creation
- Contact NSF/BIO, NIH, or DOE for DB content development.
- Note BIO/DBI is also deemphasizing content development.

# Experimental Biology

- May be included in bioinformatics / computational biology proposals for purposes of validation of computational predictions
- Can not be the primary focus of the project for CISE or BIO/DBI
- More likely for BIO/DBI than CISE

# NSF-wide

# NSF CAREER Proposals

- NSF 08-557
- 5 years awards (min. \$400K (CISE) - \$500K (BIO))
- Only open to tenure track assistant professors, et al.
- Topics include bioinformatics, computational biology
- Accepted by all NSF divisions, esp. CISE/IIS, CISE/CCF, BIO/DBI
- Deadline was July 22, 2008 (annual)
- Only 3 attempts allowed (lifetime)
- Success rate approx. 15 percent (varies)

# CDI – Cyber-enabled Discovery and Innovation

- NSF 07-603 solicitation (new version coming)
- NSF-wide interdisciplinary solicitation
- Expected to become a very large program .... depends on appropriation
- Must produce results in two domains – e.g., biology and CS
- Very intense competition
- Prelim proposals due: Winter
- Multiple Computational biology / bioinformatics proposal are being awarded for CDI.

# IGERT

- Integrative Graduate Education and Research Traineeship Program (IGERT)
- NSF 08-540
- Due: 4/24/2008 (prelim), 10/20/2008 (full)
- Annual program, 5 yr awards, \$400K-\$600K/yr, 20 new/cont. awards/yr
- Interdisciplinary graduate traineeships
- Bioinformatics / computational biology qualify
- Must have sharp focus

# ENG Directorate

# ENG: Biomedical Engineering

- Biomedical engineering, instrumentation, bioinformatics, tissue engineering, systems biology, imaging, drug delivery, assistive technologies, mathematical modeling
- ENG: Biomedical Engineering and Engineering Healthcare Cluster:
  - Biomedical Engineering (PD 08-5345) - Semahat Demir, [sdemir@nsf.gov](mailto:sdemir@nsf.gov)
  - Biophotonics, Advanced Imaging and Sensing for Human Health (PD 08-7236) - Leon Esterowitz
  - Research to Aid Persons with Disabilities (PD 08-5342)- Ted Conway
- Deadline: Sept. 15, 2008

# ENG/CBET: Biotechnology, Biochemical, and Biomass Engineering (BBBE)

- Metabolic engineering, systems biology, synthetic biology, mathematical modeling and simulation, cell simulation
- CBET division:
  - Chemical, bioengineering, environmental, and transport systems
- Program Description PD-1491
- Deadline: Sept. 15, 2008
- Contact: Frederick Heineken, [fheineke@nsf.gov](mailto:fheineke@nsf.gov)
- E.g., Bernard Palsson (UCSD), A. Arkin (UCB), D. Endy, D. Lauffenberger (MIT)

# **MPS**

# **Directorate**

# Mathematical Biology Program

- MPS Directorate / DMS Division / Math Bio Program
- supports research in areas of applied and computational mathematics with relevance to the biological sciences.
- Requires novel mathematical methods !!
- Program Description: PD 09-7334
- Deadline: January 13, 2009
- Apply under General Program Guide (GPG)
- PD: Mary Ann Horn, email: [mhorn@nsf.gov](mailto:mhorn@nsf.gov)

# Joint DMS/NIGMS Program in Mathematical Biology

- Joint NSF/NIH program
- NSF 06-607 solicitation
- Math & statistics innovation for mathematical biology
- Deadline: Oct. 1, 2008
- Awards: \$100K-400K/yr, 3-5 yrs
- Contacts:
  - Mary Ann Horn, [mhorn@nsf.gov](mailto:mhorn@nsf.gov)
  - Junping Wang, [jwang@nsf.gov](mailto:jwang@nsf.gov)
  - John Whitmarsh, [whitmarj@nigms.nih.gov](mailto:whitmarj@nigms.nih.gov)

# Budgets, ...

# **NSF Budget Outlook FY 09**

# **Uncertain**

# Funding Rates for NSF Bioinformatics Proposals

- Varies by program, directorate, division
- Typically (for CISE/IIS):
  - Between 10 and 15 percent for most competitive solicitations
  - Another 5 percent for various SGERs, supplements, workshops, ....
- CISE is funding additional large proposals in FY 08 (cf. FY 07), also is funding CISE Expeditions proposals (large)

# Reviewers needed !!

- **NSF needs reviewers/panelists** for bioinformatics and computational biology proposals
- Please volunteer, or **agree when asked**
- Contact PD's (next slide)
- Especially useful for new PI's to learn about writing successful NSF proposals
- Email: [folken@nsf.gov](mailto:folken@nsf.gov), subject: volunteer panelist for bioinformatics

# Contacts

# Contact Information

- **Frank Olken** (CISE/IIS/III) [folken@nsf.gov](mailto:folken@nsf.gov)
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