



**National Science Foundation
4201 Wilson Boulevard
Arlington, Virginia 22230**

NSF 12-059

Dear Colleague Letter - IGERT-CIF21 Track

DATE: March 29, 2012

The National Science Foundation's vision for a Cyberinfrastructure Framework for 21st Century Science and Engineering (CIF21) views an integrated, scalable, and sustainable cyberinfrastructure along with foundational advances in computing and information science and technology as crucial for innovation in science and engineering (see www.nsf.gov/cif21). Within this framework, NSF recognizes the need to educate and support a next generation of researchers able to address fundamental challenges in 1) core techniques and technologies for advancing big data science and engineering; 2) analyzing and dealing with challenging computational and data-enabled science and engineering (CDS&E) problems, and 3) researching, providing, and using the cyberinfrastructure that makes cutting-edge CDS&E research possible in any and all disciplines.

NSF will soon institute a new CIF21 track in its Integrative Graduate Education and Research Traineeship (IGERT) program as a mechanism to address the training and education needs in CDS&E and cyberinfrastructure research. Of particular interest for this track are focused interdisciplinary efforts that involve:

- Partnerships between computational, mathematical and statistical, and computer and information sciences on the one hand and the science and engineering domains on the other, that drive interdisciplinary research in cyberinfrastructure (software, data and visualization, networks, advanced computational infrastructure, etc.);
- Foundational and applied research in a variety of tools essential for advanced scientific discovery and engineering innovation in collaboration with domain sciences. Such tools could include computational models and the underlying mathematical and statistical theory and methodology; parallel programming languages; novel algorithmic techniques; real-time visualization; scalable data mining; effective utilization and optimization of computing, storage, and communications resources;
- Research and development of novel end-to-end science-driven scenarios that integrate and leverage major cyberinfrastructure investments including high-end supercomputers, cloud environments, real-time and remote visualization, provisionable networks, distributed data archives and software frameworks;
- Integration of educational and training opportunities with major cyberinfrastructure investments such as
 - XSEDE, Open Science Grid, FutureGrid, DataNet partners, the Global Environment for Network Innovations (GENI), International Research Network Connection sites, etc. (see www.nsf.gov/cif21 for a more extensive list of cyberinfrastructure components);
 - ongoing NSF Major Research Equipment and Facilities Construction (MREFC) projects or other large scale efforts such as iPlant or Network for Computational Nanotechnology;
 - cyberinfrastructure-related facilities managed by NSF, by other state or US federal agencies, or internationally;
- Synergies in cyberinfrastructure and CDS&E research with ongoing and emerging activities in CIF21;
- Significant impact on new curricula and career possibilities for cyberinfrastructure and/or CDS&E;
- Research, education and outreach activities that are expected to have a significant impact in developing an increasingly diverse STEM workforce that is inclusive of women and men,

underrepresented minorities, and persons with disabilities.

This CIF21 track will incorporate many of the ideals and requirements of the NSF-wide IGERT activity, as described in http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=12759. A funding opportunity containing guidelines and information about specific requirements, deadlines and eligibility will be published shortly.

James H. Lightbourne
Director
Division of Graduate Education

Thomas F. Russell
Senior Staff Associate
Office of Integrative Activities
Co-chair, CIF21 Strategy and Leadership Group

Mark A. Suskin
Deputy Director
Office of Cyberinfrastructure
Co-chair, CIF21 Strategy and Leadership Group