Name and brief description of initiative:
HealthGrid: Grid Technologies for Biomedicine
U.S. Army Medical Research & Materiel Command (USAMRMC)
Telemedicine and Advanced Technology Research Center (TATRC)

The Telemedicine and Advanced Technology Research Center (TATRC), a subordinate element of the United States Army Medical Research and Materiel Command (USAMRMC), is charged with managing core Research Development Test and Evaluation (RDT&E) and congressionally mandated projects in telemedicine and advanced medical technologies. To support its research and development efforts, TATRC maintains a productive mix of partnerships with federal, academic, and commercial organizations. TATRC also provides short duration, technical support to federal and defense agencies; develops, evaluates, and demonstrates new technologies and concepts; and conducts market surveillance with a focus on leveraging emerging technologies in healthcare delivery, support and research.

Brief description of goals of initiative:
Important trends in biomedical research include the rapid and massive accumulation of diverse and distributed data and a broadening scope of collaborative research. These trends in such a critical sphere of science and technology led TATRC to define a research roadmap for HealthGrid initiatives in March 2006. The primary goal is to provide an understanding of U.S. regional and national network strategies and access to data and information resources; computational capabilities; and algorithmic and process knowledge that support the application of exemplary science to the local, regional, national and global health community. Grid refers to the concept of ubiquitous and transparent computing that encompasses distributed computing and broad sharing of resources (storage, data, and software).

Contact Information:
Mary Kratz, Advisor to the Director
U.S. Army Medical Research & Materiel Command (USAMRMC)
Telemedicine and Advanced Technology Research Center (TATRC)
1054 Patchel Street, Fort Detrick, Frederick, MD 21702-5012
Phone: 734.763-5761
Email: kratz@tatrc.org or mkratz@umich.edu

Website address of initiative http://www.tatrc.org

Brief description of biomedical informatics and computational biology components and their goals:
Grid computing is viewed as the next generation of distributed computing. Built on pervasive Internet standards, grid computing enables organizations to share computing and information resources across department and organizational boundaries in a secure, interoperable and highly efficient manner.

Organizations around the world are utilizing grid computing today in such diverse areas as collaborative scientific research, drug discovery, financial risk analysis, epidemiology and product design. Grid computing enables research-oriented organizations to solve problems that previously were infeasible due to computing and data-integration constraints. Grids also reduce costs through ease of automation and improved IT resource utilization. Finally, grid computing can increase an organization's agility, which enables more efficient business processes and greater responsiveness to change. Over time grid computing will enable a more flexible, efficient and utility-like global computing infrastructure to enable a more intelligent, interoperable and barrier-free environment.

The key to realizing the benefits of grid computing is standardization, so that the diverse resources that make up a modern computing environment can be discovered, accessed, allocated, monitored, and in general managed as a single virtual system—even when provided by different vendors and/or operated by different organizations.

Resources and Tools Available for Sharing:
http://www.nsf-middleware.org
http://www.globus.org
http://www.eu-egee.org/
http://public.eu-egee.org/applications/biomed.html
https://datafarm.apgrid.org/software/
http://www.ggf.org

Interactions with other initiatives:
http://www.healthgrid.org
http://biogrid.icm.edu.pl/
http://www.nbirn.net
https://cabig.nci.nih.gov/
http://www.sura.org/programs/sura_grid.html
http://www.nsf.gov/od/oci/about.jsp
http://www.pragma-grid.net

Opportunities for collaborations or synergy with NCBCs:
The first opportunity for NCBC collaboration with the HealthGrid community is to raise awareness of and provide training and education in leveraging Grids for wide area communications and access to datasets. It is necessary that pioneering work on grid technologies be incorporated within the bio-informatics and medical informatics community to build human capacity for both biomedical researchers who generate datasets and engineers who develop computational algorithms. A leading example of training resources is provided by CERN for grid technologies at http://gridcafe.web.cern.ch/gridcafe/.

An important synergistic opportunity for the biomedical community is to leverage recent advances in distributed computing environments. Grid computing provides the basic 'cyberinfrastructure' for distributed functionality and applications. A variety of

common Grid services are available such as web portals, compute resources (shared clusters, super computers), data storage brokers, workflow engines, community scheduling, etc. The grid computing environment provides the tools necessary for collaboration participants to share datasets, develop joint analysis efforts and for private companies to test emerging business models. A detailed description of Grid computing services is available at http://www.ggf.org/documents/Diff_Faces_foster.pdf

The Open Grid Services Architecture (OGSA) provides the framework for generic metadata management tools of Grid services such as data replication, workflow, community scheduling, database mirroring and access management for remote data acquisition and storage. Globus is an Open Source toolkit that provides the software components necessary to deploy the Open Grid Services Architecture and is available at http://www.globus.org/toolkit/

Effective data management and analysis tools specific to biomedical data and images opens the door to advances in data mining, text mining, distributed data and knowledge management, modeling, simulation and visualization. The grid community works collaboratively to enable development and utilization of advanced technical services http://www.globus.org/alliance/publications/papers/anatomy.pdf

These concrete steps toward a Systems Biology perspective recognize the synergies between bio-informatics research and clinical medical-informatics. The creation of a common biomedical grid, the HealthGrid, offers interoperability of datasets from genomics, proteomics, molecular, cellular, clinical and epidemiological data. Knowledge discovery is possible utilizing Grid tools across federations of distributed biomedical information systems.