National Institute of Biomedical Imaging and Bioengineering

The mission of the National Institute of Biomedical Imaging and Bioengineering (NIBIB) is to improve human health by leading the development and accelerating the application of biomedical technologies. The Institute is committed to integrating the physical and engineering sciences with the life sciences to advance basic research and medical care.

The focus of the division is to support development of science and technology for processing and evaluating complex biomedical information in order to develop solutions to real-world healthcare problems. This research builds toward practical, patient-centered applications such as clinical decision-making support systems, in-home treatment monitoring, medical image improvement through advanced methodologies, next-generation intelligent image and data analysis tools mobile health.

Research Programs

Artificial Intelligence, Machine Learning, and Deep Learning

Behrouz Shabestari, Ph.D.
The emphasis is on development of transformative machine intelligence-based systems, emerging tools, and modern technologies for diagnosing and recommending treatments for a range of diseases and health conditions. Unsupervised and semi-supervised techniques and methodologies are of particular interest.

Digital Health - Mobile Health and Telehealth

Tiffani Bailey Lash, Ph.D.
The program includes the input and delivery of healthcare information digitally for the analysis or monitoring of health or disease status. The emphasis is on developing mobile health technologies driven by clinical needs and integrating these technologies in healthcare delivery, wellness and daily living.

Biomedical Informatics

Qi Duan, Ph.D.
The emphasis is on using biomedical information to achieve better health outcomes and smarter health care. Examples of technical development areas in this program include but are not limited to informatics tools and resources such as: databases, standards for enhanced interoperability, collaborative analysis environments, data modeling and representation, and

techniques for the integration of heterogeneous data, rational data-driven design of experiments, visualization of data, and digital representation of rich qualitative data. This program is intended to support NIBIB's other program areas in biomedical imaging and bioengineering research.

Point of Care Technologies – Diagnostics

Tiffani Bailey Lash, Ph.D.
The program includes the delivery of healthcare that is safe, effective, timely, patient-centered, efficient, and available in centralized and decentralized locations. The emphasis is on developing technologies driven by clinical needs. Examples of technology development areas in this program include but are not limited to disposable lateral flow assays, nucleic acid testing platforms, glucose monitoring devices, etc.

Image Processing, Visual Perception and Display

Behrouz Shabestari, Ph.D.
Qi Duan, Ph.D.
The emphasis is on using image data to achieve better health outcomes and smarter health care. Examples of technology development areas in this program include but are not limited to models, algorithms, software, methodologies, and other tools that will: facilitate medical imaging research; support clinical detection, diagnosis, and therapy; and improve patient healthcare.

Collaborations

Neuroimaging Informatics Tools and Resource Clearinghouse (NITRC)

NIBIB staff lead a trans-NIH team that manages a clearinghouse for tools and resources used by neuroimaging informatics researchers and tool developers. In addition, NITRC helps create and support a community of neuroimaging informatics researchers. http://www.nitrc.org/. For more information, contact Andrew Weitz (Andrew.weitz@nih.gov).

Nanomaterials Registry

The Nanomaterial Registry is a publicly available resource for nanomaterials community and is part of a newly announced

signature initiative from the National Nanotechnology Initiative

(NNI): Nanotechnology Knowledge Infrastructure - Enabling National Leadership in Sustainable Design

http://www.nano.gov/node/819.
The goal of this curated nanomaterial registry is to provide consistent information on the biological and environmental interactions of well-characterized nanomaterials, as well as links to associated publications, modeling tools, computational results and manufacturing guidelines. (http://www.nanomaterialregistry.org).

NIBIB Point-of-Care Technologies Research Network (POCTRN)

This network of centers was created to drive the development of appropriate point-of-care diagnostic technologies through collaborative efforts that simultaneously merge scientific and technological capabilities with clinical need. See http://www.nibib.nih.gov/Research/POCTRN. For more information, contact Tiffani Lash (baileyti@mail.nih.gov).

Smart and Connected Health Program

This is an interagency collaboration which supports the development and use of innovative approaches for transforming healthcare from reactive and hospital-centric to preventive, proactive and person-centered and focused on well-being rather than disease. For more information, contact Tiffani Lash (baileyti@mail.nih.gov).

RadLex Ontology

This is a project developed by the Radiological Society of North America (RSNA) through NIBIB funding for establishing a controlled terminology for radiology and serves as a single unified source of radiology terms for radiology practice, education, and research. When complete, the RadLex Ontology will be capable of describing all the salient aspects of an imaging examination, including modality, technique, visual features, anatomy, findings, and pathology.

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