Institute for Engineering-Driven Medicine

AT STONY BROOK UNIVERSITY
Co-directed by Joel Saltz and Yuefian Deng
Our Mission

The Institute for Engineering Driven Medicine (IEDM) is a multi-disciplinary program that spans Medicine and Engineering.

The IEDM focus is to develop ingenious methods for leveraging computational science, imaging and sensor technologies to address pressing biomedical problems.
Why Stony Brook? Why Now?

SoM & CEAS are leaders in Engineering-Driven Medicine.

Cross-cutting institutes bring together faculty in areas that are critical blocks of convergent science.
100 active faculty from 20 departments in 4 colleges and schools

Many from AMS (To name a few):
7 Research Thrusts

1. Integrative Analysis of Multi-Scale, Multimodal Imaging/Sensor Data
2. Neuroengineering
3. Regenerative Medicine
4. Digital Pathology and Tumor Microenvironment
5. Health Systems Data Gathering and Predictive Modeling
6. Drug Discovery
7. Multi-scale Modeling
1. Multi-Scale Imaging/Sensor
2. Neuroengineering
3. Regenerative Medicine
4. Digital Pathology
5. Health Systems Predictive Modeling

- Statistical Model
- Consumer Behavior
- Communication
- Decision Making
- Predictive Behavior
- Visualization
- Machine Learning
- Patterns
- Scoring

PREDICTIVE ANALYTICS
6. Drug Discovery
7. Multi-Scale Modeling

QM methods:
- Fundamental
- Too expensive
- <1K atoms, <1ps

eFF and ReaxFF FFs:
- QM-based analytical PE
- Reactive processes
- Excited states (eFF)
- ~10^6-7 atoms, <10’s ps-ns

Dreiding/UFF FFs:
- QM-trained analytical PE
- Conformations
- ~10^6-9 atoms, <100’s ns

Constrained/Coarse-Grain:
- QM-FF-trained PE forms
- ~10^9-12 atoms, <10’s micros
- Difficult chemistry
- Transferability

Continuum methods:
- Challenging spatial mapping
- Extractable from atomistic

Andres Jaramillo-Botero and William A. Goddard III © 2006
IEDM Annual Workshop 2019
Tuesday Nov. 5th and Wednesday Nov. 6th

Presentations on subjects ranging from:
• Identifying and fighting cancers, through the use of cutting-edge technology
• Technologies and applications of modern neuroscience
• Machine learning in numerous applications

Featuring:
• Two days of presentations
• The announcement of competition for IEDM seed grants
• A banquet in honor of all our wonderful presenters.
$75 million state-of-the-art research facility
IDIME Facilities

Expected in 2023, this new building will be the home of discovery and innovation in medicine and engineering, providing the physical space within which convergence science can flourish.
Partners

1. Brookhaven National Laboratory
2. Cold Spring Harbor Laboratory
3. The Institute for AI-Driven Discovery and Innovation
4. Center for Biotechnology
5. Laufer Center for Physical and Quantitative Biology
6. Montefiore Medical Center
Thanks!