



IMAG



**ASME 2013 2nd Global Congress on NanoEngineering for Medicine
and Biology (NEMB2013)**
Boston, Massachusetts
February 5, 2013

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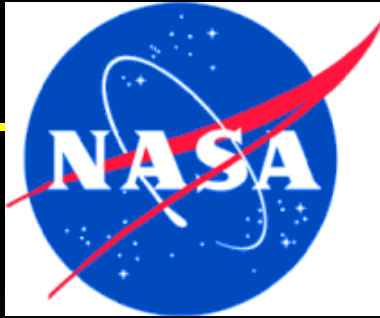
**GOVERNMENT PERSPECTIVES
FROM IMAG ON MULTISCALE
MODELING**



IMAG



Interagency Modeling and Analysis Group

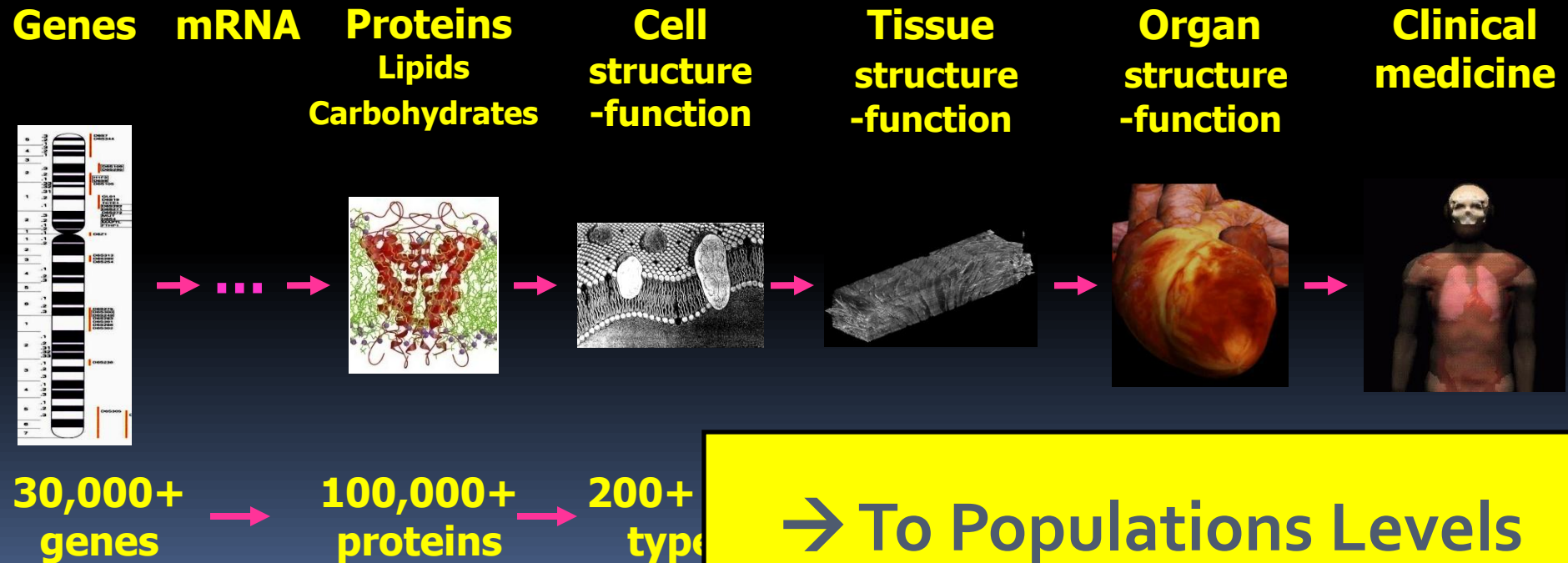


The Intelligence Advanced Research Projects Activity (IARPA)

Multiscale Modeling

Multi-scale modeling deals with spanning scales from molecular to population and is expected to largely impact the understanding of biological processes and also further the predictive capability in biological, biomedical and environmental systems. Multi-scale modeling encompasses concepts of space, time and state space.

Biological Scales



IMAG Activities

- 2003 - Created
- 2004 - Interagency Solicitation for Multiscale Modeling in Biomedical, Biological and Behavioral Systems (NIH, NSF, NASA, DOE)
- 2006 – Formation of the MSM Consortium
- 2007 - Predictive Multiscale Models of the Physioome in Health and Disease (R01)
- 2009 – IMAG Futures Meeting
- 2011 - Predictive Multiscale Models for Biomedical, Biological, Behavioral, Environmental and Clinical Systems (Interagency U01) (NIH, NSF, DOE, FDA)

CURRENT IMAG Funding Opportunity

PAR 11-203

Predictive Multiscale Models for Biomedical, Biological, Behavioral, Environmental and Clinical Research (Interagency U01)

- Promoting the next generation cutting edge multiscale models – **think out of the box**
- Participating Agencies: **NIH, NSF, DOE, FDA**
- 9 receipt dates until: **January 31, 2014**
- Cooperative Agreement allows investigators to contribute funded efforts to the MSM Consortium
- Requirements detailed in the FOA – **please read!**
 - Partnership Plan and MSM Consortium Plan

IMAG

PAR-11-203 Interests

- addressing **compelling** biological, biomedical, behavioral, environmental and clinical problems that require multiscale models to bring together different spatial and temporal scales within a specific field
- next generation multiscale models that **integrate between different fields** (e.g. cardiovascular and neuroscience) and predict integrated functions
- novel methods to **fuse data-rich and data-poor scales** to enable predictive modeling
- novel methods to **fuse biological and/or behavioral processes** and mechanisms to model outcomes as a result of various interventions
- **useable and reuseable** multiscale models that will be integrated and adopted into **model-poor fields** (e.g. tissue engineering, regenerative medicine, drug and gene delivery, preventive interventions)
- multiscale models strongly coupled with standardized protocols for **model-driven data collection**
- implementing **virtual clinical trials** with multiscale models to predict outcomes

PAR-11-203 Interests

- problem-driven multiscale models that require **high performance computing** (NSF-OCI, DOE-BER)
- model predictions that drive a community of experimentalists towards **systematic testing and validation**
- predictive multiscale models that strongly **incorporate uncertainty quantification**
- mechanistic multiscale models that **bridge to the population level** to capture more clinical and biological realism for the population
- stochastic multiscale models that **characterize interactions between individual-level behaviors and group-, market-, or population-level outcomes**
- models to explore **underlying mechanisms** of individual-, community-, or **population-level preventive or therapeutic interventions**
- predictive multiscale models to **improve clinical workflow**, standard operating procedures, patient-specific modeling for diagnosis and therapy planning

Interagency Modeling and Analysis Group (IMAG)Wiki (Google: IMAG Wiki)

IMAG

search

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toolbox

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WELCOME TO THE IMAG WIKI

This wiki contains information relevant to the [IMAG](#) (Interagency Modeling and Analysis Group) and the [MSM](#) (Multi-scale Modeling Consortium).

Questions about IMAG and the MSM Consortium can be directed to
Dr. Grace Peng: penggr@mail.nih.gov

- [MSM Consortium FAQs](#)
- [MSM Participants](#)
- [IMAG Participants](#)
- [IMAG Agencies](#)
- [About the Wiki](#)

Participation Welcome!

Announcements

October 2-3 Mark Your Calendars 2013 MSM CONSORTIUM MEETING

feedback and suggestions for next year's meeting! [2012 MSM Planning Feedback](#)

- Editorial published on the 2009 IMAG Futures Meeting
 - [IEEE Transactions on Biomedical Engineering](#)
 - Editorial: [What Biomedical Engineers can do to Impact Multiscale Modeling](#) (TBME Letters Special Issue on Multiscale Modeling and Analysis in computational Biology and Medicine: Part-2)

Funding Opportunities

- Predictive Multiscale Models for Biomedical, Biological, Behavioral, Environmental and Clinical Research (Interagency U01)
Next Receipt Date: Jan 31, 2013; May 31, 2013

Webinars

- **Thurs Jan 24 at 3:00pm ET: Mike Hucka, Caltech**
A status update on COMBINE standardization activities, with a focus on SBML.
[Model and Data Sharing Working Group](#)
Archived Presentation:
<https://webmeeting.nih.gov/p35121409/>
Presentation Slides: [Link](#)
- **Upcoming Webinars for February 2013, Details TBA**
[Multiscale Systems Biology Working Group](#)
[Model and Data Sharing Working Group](#)

All Webinars

Upcoming Meetings

- Feb 4-6, 2013: NEMB2013, ASME 2013 2nd Global Congress on Nanoengineering for Medicine & Biology
Boston, MA
[More Information](#)

The MSM Consortium provides opportunities to:

- converse with program officers from 10 government agencies, [IMAG Participants](#), from the United States and Canada
- network with other MSM investigators, [MSM Participants and Projects](#)
- participate in [Working Group](#) discussions on the wiki
- participate in virtual scientific presentations by all [Working Groups](#) throughout the year
- participate in annual meetings of the MSM Consortium, [IMAG/MSM Events](#)
- learn about the latest modeling and MSM related activities from around the world, [Multiscale Modeling of the Physiome - Projects Around the World](#)
- access various [Resources for Modeling](#)

2013 MSM Working Groups

- Multiscale Systems Biology Working Group
- Biomechanics Working Group
- Theoretical and Computational Methods
- Model and Data Sharing Working Group
- High Performance Computing Working Group
- Clinical and Translational Issues Working Group
- Computational Neuroscience Working Group
- Population Modeling Working Group
- Cell-to-Macroscale Working Group

Thank You!

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