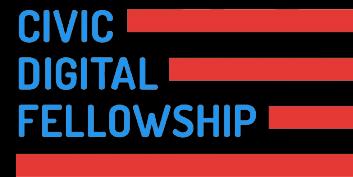


# Improving UX of the IMAG Wiki

**National Institute of Biomedical Imaging and Bioengineering**

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Grace Zhou  
Stanford University  
Computer Science



# What's the IMAG wiki?

- Platform for researchers and government staff members to share their activities related to multiscale modeling and get inspiration
- Contains resources, multiscale models, meeting information, funding opportunities, and more

The screenshot shows the IMAG wiki homepage. At the top, there's a banner for "UPCOMING RECEIPT DATES" featuring a calculator and some mathematical equations. Below it, a section for "Upcoming Funding Opportunities" lists several grants:

- Request for RAD-UP Reviewers
- BRAIN Funding Opportunity: Integrated and Quantitative Approaches to Understanding Circuits
- Application Due Date: [redacted]
- Simulation Modeling and Systems Science to Address Health Disparities
- Application Due Date: Monday, May 26, 2020
- Jewell Theory Fellow Program
- Application Due Date: Wednesday, April 01, 2020/Saturday, August 01, 2020/Tuesday, December 01, 2020
- Collaborative Research in Computational Neuroscience (CIRCN)
- Application Due Date: Thursday, December 10, 2020
- Harnessing Data Science for Health Discovery and Innovation in Africa (DS-Africa) Research Hubs (U54-Clinical Trial Optional)
- Application Due Date: Friday, December 18, 2020
- Cancer Intervention and Surveillance Modeling Network (CISNET) Incubator Program for New Cancer Sites (U01 Clinical Trial Not Allowed)
- Application Due Date: Wednesday, January 20, 2021

A "SHOW MORE" button is at the bottom.

This screenshot shows the IMAG wiki homepage with a different layout. It features a large banner for "Job Opportunities in the Consortium". Below it, a section titled "10 Simple Rules for Credible Practice of Modeling" includes a link to "Access Rules Here". Further down, there are three images illustrating modeling applications: a person working on a laptop, a garden with a watering can, and a modern office interior. A "RESEARCH HIGHLIGHTS", "FUNDING", and "RELEVANT MEETINGS" section follows. At the bottom, there's a "About IMAG & MSM" section with links to "About IMAG", "About MSM", "IMAG Participants", "MSM Participants", and "Add a resource". A "SUPPORT" section has links to "How to Get Started", "Creating a New Web Page", "Submitting Content & Images", and "Add a resource". A "TERMS" section includes "Privacy Policy" and "Terms of Use". The footer includes links to "NSB Website", "National Institute of Health", and "Department of Health and Human Services".

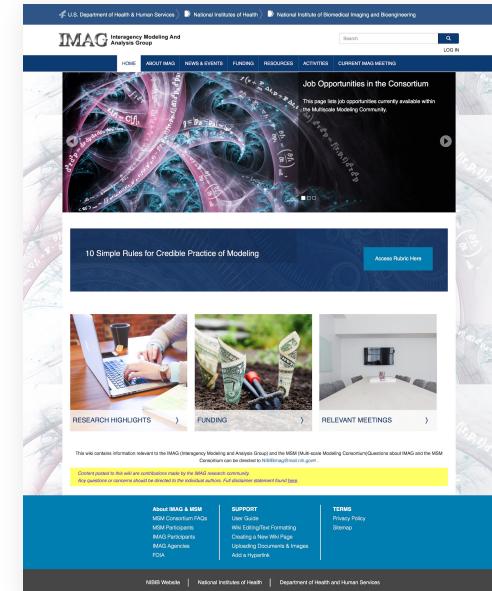
This screenshot shows the IMAG wiki homepage with a sidebar for "MSM TASK FORCES & WORKING GROUPS". It lists various groups: "Computational Neuroscience Working Group", "Multiscale Modeling Working Group", "Model and Data Mining Working Group", "Clinical Translational Applications", "Multiscale Modeling and Virtual Prototyping", "MSM for Medical Devices", "Clinical and Translation Issues Working Group", "Cell-to-Macroscale Working Group", "Population and Policy Modeling Working Group", "High Performance Computing Working Group", "Theoretical and Computational Methods Working Group", and "Multiscale Systems Biology". The main content area shows a "Create new account" form with fields for "Email address", "First name", "Last name", "Degree", "Institution", "Division/Department", "Faculties/Units", "LinkedIn URL", "Twitter URL", "Visiting", "GPA", and "Other". A "CAPTCHA" section at the bottom asks "XG P7H What code is in the image?" with a "Get another image" link.

# Goals

**My main goal was to provide recommendations to improve the user experience of the wiki.**

The specific goals were:

- Fix **usability issues** with the wiki
- Help users **complete common tasks** on the wiki more efficiently and with fewer errors
- Make the wiki **more useful** to researchers



# Research

1	Page	Pageview	Unique Pa	Avg. Time
84	/modeling-tools-databases	244	144	18.93
85	/resources/publications	243	177	51.15
86	/model-indexing	238	145	28.74
87	/content/frequently-asked-questions-faq	235	144	61.26
88	/content/2019-ml-msm-all-meeting-information	231	151	66.03
89	/content/machine-learning-information	228	149	105.74
90	/current-imag-meeting/2020-imag-and-futures-trainee-podium	225	122	154.90
91	/content/modeling-subgroup	222	154	86.85
92	/users/anujsharma	220	165	127.12
93	/content/theme-1-ode-breakout-human-safety	215	112	108.01
94	/current-imag-meeting/reports	209	99	228.01
95	/webinars	209	139	30.34
96	/news-events/announcements/ostp-calls-action-scientific-co	207	149	105.22
97	/content/2019-ml-msm-registration-information	206	167	37.10
98	/current-imag-meeting/meeting-agenda/oral-presentation-4	205	98	214.91
99	/news-events/research-highlights	205	156	33.07
100	/content/nwb-standards-subgroup	199	133	78.58
101	/nms-consortium/registration	199	141	52.86
102	/resources/presentations	195	121	72.00

## Home Page Best Practices

### Mission statement is at the top

Home pages include a mission statement at the very top, communicating the purpose of the site. It's clear to users what the site is for.



SimTK and SGCI make their mission statement the first thing you see on the page.



### Help guides are above the fold

If the wiki has help guides, they are accessible from the top of the home page without scrolling. This makes them easy and quick to find.



## Affinity Map



# Usability Audit

Evaluated usability of wiki based on design best practices and heuristics (rules of thumb); reviewed web analytics data

# Comparative Analysis

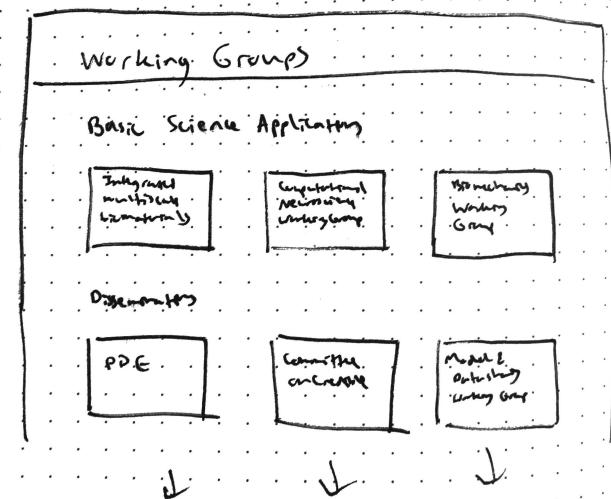
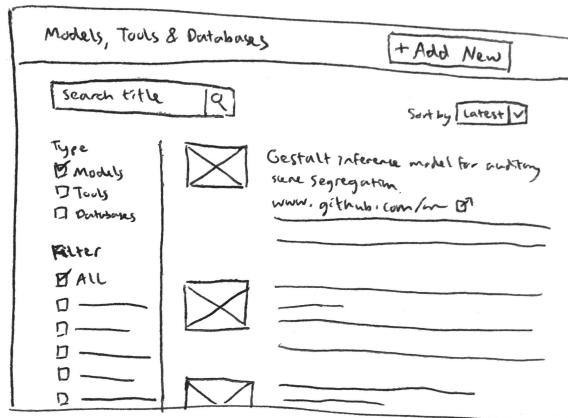
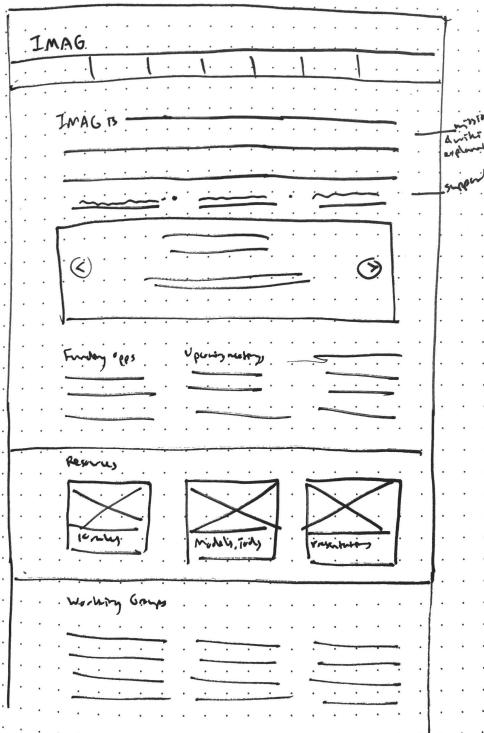
Identified 6 similar sites and studied their forms, pages, editing processes, etc.

# Interviews

Conducted 5 45-min interviews with wiki users about their experiences and observed how they use the current site

Additional steps: content audit, use cases, persona, value/effort matrix

# Sketches



# Prototypes & Usability Testing

**IMAG** Interagency Modeling and Analysis Group

Home About IMAG News & Events Funding Resources Working Groups Current IMAG Meeting

### ADMINISTRATION

#### Job Opportunities in the Consortium

This page lists job opportunities currently available within the Multiscale Modeling Community.

Welcome to the IMAG wiki! This wiki facilitates the activities of the Interagency Modeling and Analysis Group (IMAG), Multiscale Modeling (MSM) Consortium, and other supported research consortia that focus on modeling and analysis projects.

IMAG participants are government staff members involved in managing research programs. The Multiscale Modeling (MSM) Consortium is a community of researchers participating in activities that promote the MSM Mission.

User Guide • Wiki Editing • Creating a New Wiki Page

### FEATURED RESOURCES

- 10 Simple Rules for Credible Practice of Modeling
- Models, Tools, and Databases
- Educational Resources

### FUNDING OPPORTUNITIES

Request for R&D UP Resources  
DOE Funding Opportunities: Integrated and Quantitative Approaches to Understanding Cancers  
Simulation Modeling and Systems Science to Address Health Disparities

### UPCOMING MEETINGS

New NCI Innovation Lab on Modeling Emergent Cellular Behaviors in Cancer  
Save the new date: Workshop on Multi-Cellular Engineered Living Systems  
Center for Reproducible Biomedical Modeling

### RESEARCH HIGHLIGHTS

Engage activities predictably by metabolite concentrations and solvent capacity in the cell  
MSM member, Natalia Troyanova, receives NSF award to address COVID-19 with modeling

### RECENT MODELS →

- Cardio-respiratory coupling: sensory input in synchronizing inspiratory-expiratory activity
- Hippocampal Large-Scale Model
- Multiscale Model for Functionalized Nanosensor Targeting for Drug Delivery

### WORKING GROUPS →

Integrated multiscale biomaterials experiment and modeling group (imBEAM)  
Multiscale Modeling and Viral Pandemic  
Cell-to-Macroscale Working Group  
Population and Policy Modeling Working Group  
BRAIN Initiative - Theories, Models and Methods  
MSM Projects, Special Issues, Reports, Newsletters

Computational Neuroscience Working Group  
Committee on Credible Practice of Modeling & Simulation in Healthcare  
MSM for Medical Devices  
High Performance Computing Working Group  
Theoretical and Computational Methods Working Group  
Intensive Longitudinal Health Behaviors Network (ILHBN)  
Public Dissemination and Education (PDE) Working Group

**IMAG** Interagency Modeling and Analysis Group

Home About News & Events Funding Resources Working Groups Current IMAG Meeting

### MODELS, TOOLS & DATABASES

+ ADD NEW

Type  
 All  
 Models  
 Tools  
 Databases

Research topics  
 Lorem ipsum  
 Lorem ipsum  
 Lorem ipsum  
 Lorem ipsum

Spatial scales  
 Molecular  
 Cellular  
 Tissue  
 Organ  
 Whole organism  
 Group/society

**Hippocampal Large-Scale Model**  
<https://github.com/nci/nci-pz-hippocampus-large-scale-model>  
This project is to develop a full-scale model of rat hippocampus using compartmental models of neurons and synapses. These simulations can be used to examine the connectivity of an entorhinal-dentate network with lateral and medial entorhinal cortical cells as spike generators and compartmental models of dentate granule cells and basket cells.

**Multiple granuloma model (MultiGran)**  
<http://mathus.mrc.med.umich.edu/~molev/MultiGran/>  
hybrid multi-scale computational model that tracks whole-lung Mycobacterium tuberculosis infection and predicts factors that inhibit dissemination.

**nivelo: an R package for RNA velocity estimation using nonlinear models**  
<https://github.com/quinntn/nivelo>  
La Manno et al. used a linear model to relate abundance of pre-mRNA U1(U) with abundance of mature mRNA S2(U) (La Manno et al., Nature 2018).

**Neurospora crassa Pathway-Genome Knowledgebase**  
<https://doi.org/10.1177/journal.pcbi.1093128>  
This is a BioRx genome-scale model of Neurospora crassa, with on-going curations including metabolism, regulation, and genetics, adapted from the original work by Dryfus, Zicker, et al. (<https://doi.org/10.1371/journal.pcbi.1009128>)

**IMAG** Interagency Modeling and Analysis Group

Home About News & Events Funding Resources Working Groups Current IMAG Meeting

### WORKING GROUPS

#### Basic Science Applications

- Integrated multiscale biomaterials experiment and modeling group (imBEAM)
- Computational Neuroscience Working Group
- Biomechanics Working Group

#### Dissemination

- Public Dissemination and Education (PDE) Working Group
- Committee on Credible Practice of Modeling & Simulation in Healthcare
- Model and Data Sharing Working Group

#### Clinical Translational Applications

- Multiscale Modeling and Viral Pandemics
- MSM for Medical Devices
- Clinical and Translational Issues Working Group

#### Methods

- Cell-to-Macroscale Working Group
- High Performance Computing Working Group
- Population and Policy Modeling Working Group
- Theoretical and Computational Methods Working Group

#### Other Interest Groups

- BRAIN Initiative - Theories, Models and Methods
- Intensive Longitudinal Health Behaviors Network (ILHBN)
- NH BRAIN Initiative U19 Data Science Consortium
- MSM Projects, Special Issues, Reports, Newsletters

# Iterate

[U.S. Department of Health & Human Services](#) [National Institutes of Health](#) [National Institute of Biomedical Imaging and Bioengineering](#)

**IMAG Interagency Modeling And Analysis Group**

Job Opportunities in the Consortium

This page lists job opportunities currently available within the Multiscale Modeling Community.

More

Home About News & Events Funding Resources Working Groups Education

March 2020 MSM Meeting Registration Register Now

Featured Resources

- 10 Simple Rules for the Credible Practice of Modeling
- Publications
- Models, Tools, and Databases

Funding Opportunities

- Simultaneous Modeling and Systems Science to Address Healthcare Needs
- Due Wednesday, May 26, 2021
- Jamilia Theory Fellow Program
- Due Wednesday, April 15, 2020
- Harnessing Data Science for Health Discovery and Innovation in Africa (DS-iAfrica) Research Hub
- Due Tuesday, December 15, 2020

Recent Models

- Hippocampal Large-Scale Model
- Hippocampal Large-Scale Model

Upcoming Meetings

- New NC3Rs Innovation Lab on Modeling Emergent Cell Behavior in Disease
- Thursday, February 25, 2021
- Saves the Date: Workshop on Multi-Cellular Engineered Living Systems
- Tuesday, June 15, 2021
- Register for the Computational Approaches for Cancer Research (CANCER) Webinar
- Friday, November 13, 2020

[U.S. Department of Health & Human Services](#) [National Institutes of Health](#) [National Institute of Biomedical Imaging and Bioengineering](#)

**IMAG Interagency Modeling And Analysis Group**

MODELS, TOOLS & DATABASES

Resources > Models, Tools, & Databases

Search title, keyword, person, grant number, etc.

Type  All  Models  Tools  Databases

Model types  Algebraic  Topological  Statistical  Dynamical  Agent-based  Geometric

Data types  Sequencing  Expression  Fluorescence  Electrical

**Hippocampal Large-Scale Model**  
<https://github.com/greenbaumlab/hippocampalmodel>

The project is to develop a full-scale model of hippocampus using compartmental models of individual neurons. The code available can be used to construct the connectivity for an anatomical circuit network with basic properties of entorhinal cortical cells as spike generators and compartmental models of dentate granule and border cells.

**Multiple granuloma model (MultiGran)**  
<http://mathlab.micro.med.umich.edu/lab/mosca/MultiGran/>

Hybrid multi-scale computational model that tracks whole lung Mycobacterium tuberculosis infection and predicts factors that inhibit dissemination.

**nlevel: an R package for RNA velocity estimation using nonlinear models**  
<https://github.com/sqj/nlevel>

La Manno et al. used a linear model to relate abundance of pre-mRNA U1C with abundance of mature mRNA S10 (La Manno et al., Nature 2018).

[U.S. Department of Health & Human Services](#) [National Institutes of Health](#) [National Institute of Biomedical Imaging and Bioengineering](#)

**IMAG Interagency Modeling And Analysis Group**

WORKING GROUPS

See the activities of the MSM Consortium and related IMAG consortia. The activities are organized by Task Forces of the MSM and other IMAG research consortia Working Groups. Each Task Force in the MSM cover multiple Working Groups that fall under the Task Force theme. Working Groups are organized by the Working Group Leads. Working Groups use the IMAG web to facilitate communication and presentation of ideas and updates to all interested in the focus of the Working Group.

If you are currently not a member of any groups and would like to join one, create an account and mark the Working Group(s) you would like to be involved in.

Basic Science Applications

- Integrated multiscale biomaterials experiment and modeling group (iMSBEAM) Group
- Computational Neuroscience Working Group
- Biomechanics Working Group

Dissemination

- Public Dissemination and Education (PDE) Working Group
- Committee on Cross-disciplinary Modeling & Simulation in Healthcare
- Model and Data Sharing Working Group

Clinical Translational Applications

- Multi-scale Modeling and Viral Pandemics
- ISBM for Medical Devices
- Clinical and Translational Issues Working Group

Methods

- Cell-to-Macroscale Working Group
- High-performance Computing Working Group
- Population and Policy Modeling Working Group
- Theoretical and Computational Methods Working Group

Other Interest Groups

- BBMRI Initiative - Theories, Models and Methods
- Intensive Longitudinal Health Behaviors Network (ILHBN)
- NIH BRAIN Initiative U13 Data Science Consortium
- MSM Projects, Special Issues, Reports, Newsletters

# Findings & Recommendations

# 1. Home page

## Finding

People aren't aware the wiki has funding opportunities, models, and other resources that they find helpful

## Recommendation

Restructure the home page to help people discover useful content in the wiki →

The screenshot shows the IMAG website homepage. At the top, there's a navigation bar with links for Home, About, News & Events, Funding, Resources, Working Groups, and Education. A search bar and user account links (Create account, Log in) are also at the top right. The main content area features a dark background with a blue DNA helix graphic. A section titled "Job Opportunities in the Consortium" is displayed, followed by a "More" button and three circular icons. Below this, a welcome message from the IMAG wiki is shown, along with links for History of IMAG, Wiki Editing, and Creating a New Wiki Page. A prominent blue banner at the bottom of the main content area says "March 2020 MSM Meeting Registration" and includes a "Register Now" button. To the right of this banner, there are three sections: "Featured Resources" (with links to "10 Simple Rules for the Credible Practice of Modeling", "Publications", and "Models, Tools, and Databases"), "Funding Opportunities" (listing several grants like "Simulation Modeling and Systems Science to Address Health Disparities" and "Janelia Theory Fellow Program"), "Recent Models" (showing images of a hippocampus and lungs), and "Upcoming Meetings" (listing events like "New NCI Innovation Lab on Modeling Emergent Cellular Behaviors in Cancer" and "Saves the new dates: Workshop on Multi-Cellular Engineered Living Systems").

## 2. Models, Tools, & Databases page

### Finding

People struggle to find models, tools, and databases relevant to them

### Recommendation

Redesign Models, Tools, and Databases page to help people find resources related to their research →

Screenshot of the Interagency Modeling And Analysis Group (IMAG) website's Models, Tools, & Databases page.

The page features a header with the U.S. Department of Health & Human Services, National Institutes of Health, and National Institute of Biomedical Imaging and Bioengineering logos. The main navigation menu includes Home, About, News & Events, Funding, Resources, Working Groups, and Education. A search bar and user profile links are also present.

The central content area is titled "MODELS, TOOLS & DATABASES". Below it is a breadcrumb trail: Resources > Models, Tools, & Databases. A search bar with a placeholder "Search title, keyword, person, grant number, etc." and a "Search" button are located here.

On the left, there are several filter sections:

- Type:** All (checked), Models, Tools, Databases.
- Research domain:** Lorem ipsum (repeated 6 times).
- Model types:** Algebraic, Topological, Statistical, Dynamical, Agent-based, Geometric.
- Data types:** Sequencing, Expression, Fluorescence, Electrical, Systemic, Imaging.

The main content area displays a list of resources:

- Hippocampal Large-Scale Model**  
 <https://github.com/genejongyu/hippocampalmodel>  
The project is to develop a full-scale model of rat hippocampus using compartmental models of individual neurons. The code available can be used to construct the connectivity for an entorhinal-dentate network with lateral and medial entorhinal cortical cells as spike generators and compartmental models of dentate granule cells and basket cells.
- Multiple granuloma model (MultiGran)**  
 <http://malthus.micro.med.umich.edu/lab/movies/MultiGran/>  
Hybrid multi-scale computational model that tracks whole-lung Mycobacterium tuberculosis infection and predicts factors that inhibit dissemination.
- nlevel: an R package for RNA velocity estimation using nonlinear models**  
 <https://github.com/sqin/nlevel>  
La Manno et al. used a linear model to relate abundance of pre-mRNA U(t) with abundance of mature mRNA S(t) (La Manno et al., Nature 2018).
- Neurospora crassa Pathway-Genome Knowledgebase**  
 <https://doi.org/10.1371/journal.pcbi.1003126>  
This is a Biocyc genome-scale model of Neurospora crassa, with on-going curation including metabolism, regulation, and genome, adopted from the original work by Dreyfuss, Zucker, et al. (<https://doi.org/10.1371/journal.pcbi.1003126>).
- Microconnectomics of motor cortex: a multiscale computer model**  
 <https://github.com/Neurosim-lab/netpynne/tree/development/examples/M1detailed>  
We developed a model of primary motor cortex (M1) microcircuits [1] with over 10,000 biophysically detailed neurons and 30

### 3. Create new account form

#### Finding

The create account form is long and error-prone

#### Recommendation

Revise this and other forms to be shorter and reduce likelihood of errors →

**Create new account**

---

**Account details**

Email address \*

Username \*

First name \*

 Last name \*

Working group involvement \*

CNTRL + click or command + click to select multiple groups

- None -

Biomechanics Working Group  
BRAIN Initiative - Theories, Models and Methods  
Cell-to-Macroscale Working Group  
Clinical and Translational Issues Working Group

Role in IMAG/MSM \*

Select a value

Institution \*

---

**Your profile**

Profile photo

No file selected

Project / lab site

 Personal site

---

**Captcha**

i Q e Q j

Enter characters shown in the image \*

By clicking "create new account," you acknowledge you have read and agreed to our Terms of Use and Privacy Policy.

## 4. User profile

### Finding

People don't know how to access their previous posts

### Recommendation

Create a section holding the user's previous posts under their profile →

The screenshot shows a user profile page for Greg Hunter (he/him) on the IMAG website. At the top, there is a navigation bar with links to Home, About, News & Events, Funding, Resources, Working Groups, and Education. The user's name, profile picture, and gender indicator (he/him) are displayed prominently. Below this, a message states "This page is private to others." A search bar and a "Filter" button are also present. The main content area displays a table of contributions:

NAME	CONTENT TYPE	AUTHOR	STATUS	UPDATED
Enzyme activities predicted by metabolite concentrations and solvent capacity in the cell	Research Highlights	ghunter	Published	10/27/2020 - 16:43
New IMAG – MSM Working Group for MULTISCALE MODELING AND VIRAL PANDEMICS	Announcement	ghunter	Published	10/15/2020 - 20:13
Oxytocin and socio-spatial behavior	Basic Page	ghunter	Saved	09/30/2020 - 17:47

# 5. Working Groups

## Finding

People have trouble finding Working Group pages

## Recommendation

Change the navigation menu and Working Groups landing page to make it easier to navigate to a Working Group page →

U.S. Department of Health & Human Services | National Institutes of Health | National Institute of Biomedical Imaging and Bioengineering

**IMAG** Interagency Modeling And Analysis Group

Home About News & Events Funding Resources Working Groups Education

**WORKING GROUPS**

See the activities of the MSM Consortium and related IMAG consortia. The activities are organized by Task Forces of the MSM and other IMAG research consortia Working Groups. Each Task Force in the MSM cover multiple Working Groups that fall under the Task Force theme. Working Groups are organized by the Working Group Leads. Working Groups use the IMAG wiki to facilitate communication and presentation of ideas and updates to all interested in the focus of the Working Group. If you're interested in joining a group, read the instructions on [this page](#).

**Basic Science Applications**

 Integrated multiscale biomaterials experiment and modeling group (ImuBEAM)

 Computational Neuroscience Working Group

 Biomechanics Working Group

**Dissemination**

 Public Dissemination and Education (PDE) Working Group

 Committee on Credible Practice of Modeling & Simulation in Healthcare

 Model and Data Sharing Working Group

**Clinical Translational Applications**

 Multiscale Modeling and Viral Pandemics

 MSM for Medical Devices

 Clinical and Translational Issues Working Group

**Methods**

 Cell-to-Macroscale Working Group

 High Performance Computing Working Group

 Multiscale Systems Biology

 Population and Policy Modeling Working Group

 Theoretical and Computational Methods Working Group

**Other Interest Groups**

 BRAIN Initiative - Theories, Models and

 Intensive Longitudinal Health Behaviors

 NIH BRAIN Initiative U19 Data Science

## Next steps

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- Final iterations
  - Working Groups page
  - Joining process
- Document and handoff to developer
- Prioritize recommendations and begin implementing

**Thank you!**