



$1\ \mu$ BEAM

The Interagency Modeling and Analysis Working Group on
Integrated Multiscale Biomaterials Experiment and Modeling

2017 Annual Report

Markus Buehler, MIT Guy Genin, Washington University

<https://www.imagwiki.nibib.nih.gov/content/integrated-multiscale-biomaterials-experiment-and-modeling-group-imubeam>

Markus Buehler (MIT), working group co-lead
Guy Genin (WUSTL), working group co-lead

Mark Alber (Notre Dame)
Mark Bathe (MIT)
David Breslauer (Refractored Materials)
Ioannis Chasiotis (UIUC)
Changqing Chen (Tsinghua)
Horacio Espinosa (Northwestern)
Jeff Holmes (Virginia)
Iwona Jasiuk (UIUC)
Songbai Ji (Dartmouth)
David Kaplan (Tufts)
Roland Kaunas (Texas A&M)
Spencer Lake (WUSTL)
Bob Latour (Clemson)
CT Lim (National University of Singapore)
Reza Mirzaeifar (Virginia Tech)
Vicky Nguyen (Johns Hopkins)
Pedro Ponte Castañeda (UPenn)
Paolo Provenzano (Minnesota)
Vivek Shenoy (University of Pennsylvania)
Stavros Thomopoulos (Columbia)
Mark Van Dyke (Wake Forest)
Jeff Weiss (Utah)
Tony Weiss (U. Sydney)
Joyce Wong (BU)
Feng Xu (Xi'an Jiaotong)
Michael Yu (Johns Hopkins)
Sulin Zhang (Penn State)

Goals and Objectives:

- This WG aims to provide an active forum to foster, report and assess interactions between experimental and computational groups engaged in the design, synthesis and testing of hierarchical biomaterials. Key issues to be explored are to identify common approaches, tested methods and validation steps, and to develop ways to make maximum impact in the medical community. We also anticipate sharing activities such as the organization of conferences and workshops, and tutorials. Our vision is that the discussions lead to a set of tools, data, software, training and related products for the broader community. The membership of this WG is diverse and brings together a group of people who do not regularly interact.
- We work on joint workshops, symposia, organize webinars, and promote the close integration of biomaterials experiment and modeling in diverse scientific communities.
- The IµBEAM working group (WG) was founded to identify and develop guiding principles for designing multi-scale experiments and simulations that simultaneously inform and guide each other. The WG employs an integrated case study approach and inductive inference.

I μ BEAM Membership



A close-up photograph of a spider on its web, with the web's spiral pattern filling the background. The spider is positioned in the upper right quadrant, facing towards the center.

MULTISCALE MATERIALS DESIGN

Markus Buehler

McAfee Professor of Engineering

Department Head: Civil and Environmental Engineering

JUNE 20-24 2016

REGISTER NOW: <http://shortprograms.mit.edu/mbd/>

Multiscale Materials Design

MIT Short Course

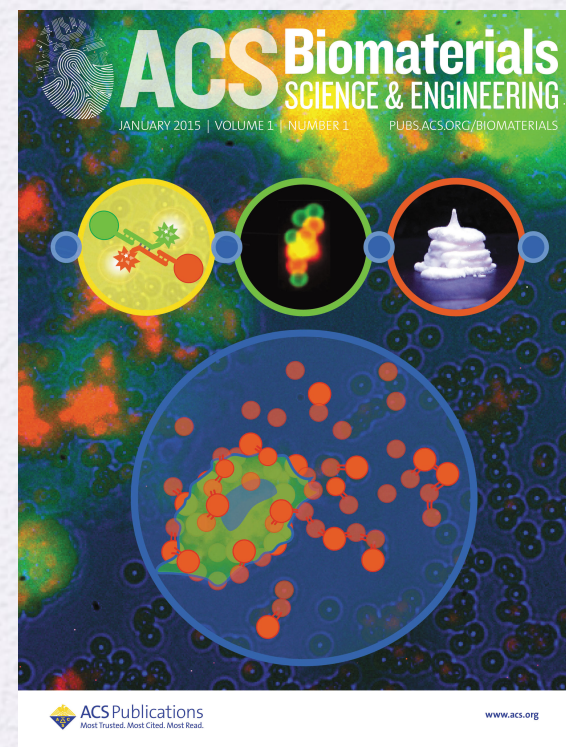
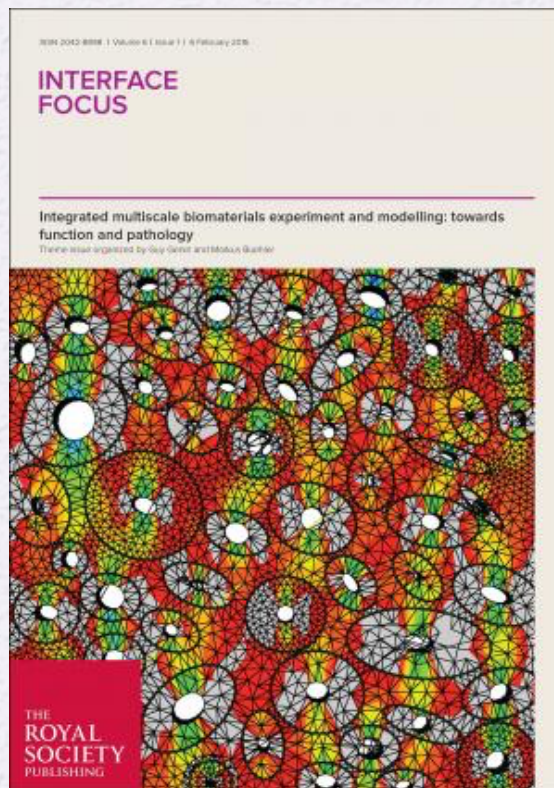
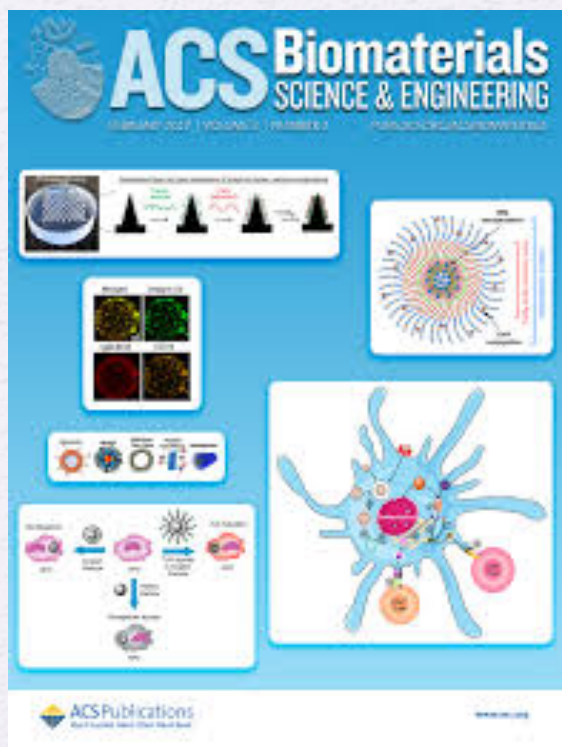
One-week bootcamp on multiscale modeling, design, manufacturing of biomaterials

As the demand for high-performance materials with superior properties, flexibility and resilience grows, a new design paradigm from the molecular scale upwards has revolutionized our ability to create novel materials. This course covers the science, technology, and state-of-the-art in atomistic, molecular, and multiscale modeling, synthesis, and characterization.

Through lectures and hands-on labs, participants will learn how superior material properties in nature and biology can be mimicked in bioinspired materials for applications in new technology. Bridging vast hierarchies of length- and time-scales, this course trains participants in applications to polymers, metals, biomaterials, and ceramics as well as composites and sustainable construction materials.



I μ BEAM Special Issues



I μ BEAM Symposia



THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS



NEMB
NanoEngineering for Medicine
and Biology Conference

JW Marriott Houston, Houston, TX, USA

8th International Conference on Multiscale Materials Modeling

9–14 October 2016, Dijon, France



IμBEAM workshop

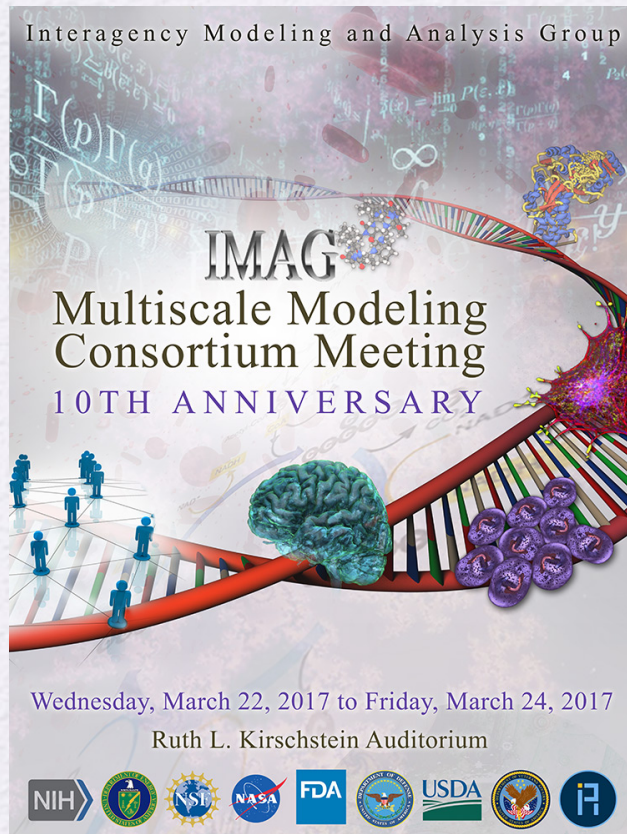


[About](#) [Meetings](#) [Education](#)

2016 Annual Meeting

Upcoming...

- Theme: **Hidden Time and Length-scales**



Upcoming...



7th International Conference on

MECHANICS OF BIOMATERIALS AND TISSUES

10-14 December 2017, Waikoloa, Hawaii, USA



IMECE

International Mechanical Engineering
Congress & Exposition

Tampa Convention Center, Tampa, Florida

CONFERENCE

November 3-9, 2017

EXHIBITION

November 5-8, 2017



[HOME](#)

[ABOUT MBI](#)

[OUR TEAM](#)

[RESEARCH](#)

[RESOURCES](#)

[EVENTS](#)

[OPPORTUNITIES](#)

[EDUCATION](#)

[Home](#) » [events](#) » 7-10 DEC. 16th International Conference on Biomedical Engineering (ICBME 2016)

7-10 DEC. 16th International Conference on Biomedical Engineering (ICBME 2016)

Focus areas for IμBEAM

- More defined scientific focus, 2017-18: **Hidden Time and Length-scales**
- Outreach:
 - Targets: K-12, undergraduates, professionals, general public, policymakers
 - Vehicles: Social media, apps/javascripts, video/images, protocols papers, codes and standards (ASME)

2017 Short Course



MULTISCALE MATERIALS DESIGN

Markus Buehler

McAfee Professor of Engineering
Department Head: Civil and Environmental Engineering

JUNE 12-16 2017

REGISTER NOW: shortprograms.mit.edu

Watch this space for...

NEMB 2018

ASME IMECE 2018
(Materials Division)

1 μ BEAM

The Interagency Modeling and Analysis Working Group on
Integrated Multiscale Biomaterials Experiment and Modeling

Markus Buehler, MIT Guy Genin, Washington University