UB’s NYS Center of Excellence in Materials Informatics (CMI) Update

Featured Speakers:
Mark Swihart, PhD, CMI Executive Director
Michael Ulbrich, President, Buffalo Manufacturing Works
WELCOME

Amy Schmit,
Director of Management and Strategic Implementation, CMI
2015-2016 UB CAT PROJECTS - APPLY NOW!

UB CAT awards matching funds to eligible projects including:

- New product development
- Product optimization, design & prototyping
- Testing services utilizing specialized equipment
- Validation and quality control
- Clinical trials
- Other projects supporting commercialization

Information Sessions:

<table>
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<th>Information Sessions</th>
<th>February 26: 4—5 pm</th>
<th>March 5: 8:30—9:30 am</th>
<th>April 2: 5:30—6:30 pm</th>
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<td>Location</td>
<td>NYS Center of Excellence in Bioinformatics &amp; Life Sciences (CBLS) 701 Ellicott Street Buffalo, NY 14203</td>
<td>Baird Research Park 1576 Sweet Home Road Amherst, NY 14228</td>
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For more information, visit:
[buffalo.edu/cbls/cat](http://buffalo.edu/cbls/cat)
or contact:
Karen Utz, Director, Program Administration
716.881.7588 or kmutz@buffalo.edu

NYSTAR
Empire State Development Division of Science, Technology & Innovation
Did You Know?

**START-UP NY is not just for startups!**

- out-of-state businesses relocating to NYS
- existing NYS businesses with expansion plans
- graduates of NYS incubators

**Benefits**

- No NYS income tax (for company or employees)
- No NYS business, corporate, sales, property taxes or franchise fees
- Access to world-class NYS higher education system, state-of-the-art technology, and industry experts

To find out how you can participate in START-UP NY with UB, please contact:

Karen Utz  
Director, Program Administration  
716.881.7588 or kmutz@buffalo.edu

For more information on Start-Up NY, visit:  
http://startup.ny.gov/
UPCOMING CBLS EVENTS

May 27-28, June 4, 2015

Pre-Seed Workshop, Buffalo
CBLS | 701 Ellicott Street, Buffalo

- A forum for high-tech ideas with potential—bring an idea from concept to plan in just two days
- Looking for entrepreneurs/idea champions
- Contact Sandra Small, PhD at sksmall@buffalo.edu to apply your high-tech idea
UPCOMING CBLS EVENTS

March 26, 2015 | 4:00 p.m. – 5:00 p.m.

Life Sciences Commercialization Lecture Series: “Rebuilding Buffalo: Community Impact of the Buffalo Niagara Medical Campus”

CBLS | 701 Ellicott Street, Buffalo

- Learn about BNMC’s continuous efforts to strengthen the Buffalo community from President and CEO, Matt Enstice
- Hear more about the life sciences business landscape on the BNMC and how you can be a part of it from CBLS Business Development Executive Kim Grant
- To register, visit bnmcaddress.eventbrite.com
PARTNER EVENTS

February 26, 2015 | 5:00 p.m. – 7:00 p.m.

Beakers and Beer
Sponsored by the Buffalo Niagara Medical Campus
Jacobs Institute | 100 High Street (5th Floor), Buffalo

- Enjoy a night of networking, free food & drinks
- RSVP at bnmc.org/beakers
CMI Overview & Vision

Mark T. Swihart, PhD
Executive Director, CMI
Who is CMI?

UB’s NYS Center of Excellence in Materials Informatics (CMI), established in 2012, aims to support regional growth in materials science and advanced manufacturing, while advancing UB’s global reputation in these fields by fostering industry-university interactions and public-private partnerships.

The CMI:

- Leverages UB’s network of over 50 faculty members engaged in groundbreaking materials-related research
- Utilizes UB’s substantial supercomputing and informatics infrastructure through the Center for Computational Research (CCR)
- Fosters collaboration between the university and industry
- Facilitates access to world-class equipment
- Offers business consultation, funding and support programs
- Develops critical R&D activities that directly impact private sector growth

Since its establishment the CMI has engaged with over 200 companies, 10 universities and colleges and 5 federal agencies seeking to partner with UB’s vast network of technical resources and capabilities.
Who is CMI?

Venu Govindaraju, PhD
Interim Vice President for Research and Economic Development, UB

Mark T. Swihart, PhD
UB Distinguished Professor, Department of Chemical and Biological Engineering
Executive Director, CMI

Thomas R. Furlani, PhD
Director, Center for Computational Research
Co-Director, New York State Center of Excellence in Bioinformatics & Life Sciences

Amy M. Schmit, MPA
Director of Management & Strategic Implementation
New York State Center of Excellence in Materials Informatics
New York State Center of Excellence in Bioinformatics & Life Sciences

Kenneth Kort, PhD
Applications Engineer, NYS Center of Excellence in Materials Informatics

Chris Janson
Business Development Executive
New York State Center of Excellence in Materials Informatics
What does CMI do?

The CMI is at the forefront of computationally-aided materials science, accelerating the discovery and commercialization of innovative new materials:

- Employing physico-chemical modeling, data analytics and machine learning in concert with sophisticated laboratory experiments
- Accelerating scientific research that is helping to enable future technologies
- Application areas for faculty-led research include:
  - Creating less expensive, more efficient solar cells
  - Smaller and more powerful batteries for applications from large-scale energy storage to implantable medical devices
  - Developing new nanomaterials for improved medical imaging and drug delivery
Our Industry Focus Areas

- Materials processing
- Nanomaterials
- Polymers
- Ceramics
- Composites
- Semiconductors
- Membranes
- Nanodefectivity
- Interconnect technologies
- Automotive
- Architectural
- High Purity Gases
- Piezoelectrics

- Imaging technologies
- Drug Delivery
- Bio-sensors
- Implantable Devices
- Cardio and Endovascular Devices
- Batteries
- Surface modification technologies
- Prosthetic Devices
- Orthopedic Devices
- Medical Packaging

- Smart Windows
- Building Materials
- Photovoltaics
- Electric Vehicles
- Batteries
- Nanomaterials
- Rare Earth Elements
- Magnetics
- Light Emitting Diode (LED) technologies
- Lighting
- Superconductivity
- Fuel Cell technologies
Research Expertise

- Biological & Biomedical Materials & Devices
- Continuum & Multiscale Modeling
- Data Analytics & Machine Learning
- Design, Digital & Additive Manufacturing
- Inorganic Materials Synthesis & Processing
- Materials Characterization & Spectroscopy
- Photonic & Electronic Devices
- Polymeric & Macromolecular Materials Synthesis & Processing
- Quantum, Atomistic & Molecular Modeling
Business Development

Helping to solve applied materials, product and process related challenges

**Modeling** – CFD, magnetic fields, materials informatics
**Design** – 2D to 3D CAD conversion, new materials & products
**Development** – flow analysis, material properties
**Optimization** – chemistry, composition, characterization
**Improvement** – increasing competitiveness
**Performance** – product validation

The CMI Business Development Process

- Challenges are discussed
- UB and Regional resources are mapped
- Confidentiality is ensured
- Resources are engaged (TCIE, NYSCEDII, and many others)
- Faculty alignment is determined
- Scope of Work is defined
- Terms of engagement are outlined
Business Development

How does the business development process start?

- Company outreach
- Faculty-initiated applied research outreach
- Start-Up NY Program
  - Attracting companies to NYS
  - Spurring growth of NYS companies
  - UB has engaged with over 300 companies in relation to Start-Up NY
- Referrals
- Partners
- Industry events
Business Development

- Examples

- Dimien, LLC - founded by UB graduate Dr. Brian Schultz, Dimien specializes in manufacturing advanced materials and bringing laboratory inventions to the marketplace. Dimien's focus has been on producing advanced energy efficient building materials. In addition, Dimien is exploring new solar cell related materials and technologies. With CMI-supported faculty collaboration (Eva Zurek group), the company is working to explore new materials that are environmentally safe, low cost and that exhibit high efficiency.
Business Development

- Examples
  - S. Howes, Inc. – The CMI paired with UB scientific and engineering resources to help one of the oldest local manufacturing firms develop and advance their quantitative design methodology for one of their core products - thermal screw conveyors. Testing, modeling and predictive solution methods were developed to aide product development, design efficiency, and market competitiveness.
Business Development

Examples

- Energy Intelligence – One of the 43 North winners and a Start-Up NY company, Energy Intelligence engaged with the CMI, UB engineering and multiple arms of the regional ecosystem to explore ways to optimize and advance the commercialization of their patented energy harvesting system. Student experiential learning opportunities are also being developed with the schools of Engineering and Business.
Business Development

- Examples
  - HeadsUp Display – a start-up company developing wearable safety devices for hazardous work environments featuring wireless technologies, data logging and monitoring capabilities needed assistance with business formation, hardware, software, rapid prototyping, and market/user validation.
Business Development

- Examples
  - BAK USA – A Start-Up NY attraction company sought connections to UB engineering, business school and student populations to propel their socially-minded android tablet platform to serve educational agendas in underserved nations around the globe and in communities throughout the US.
Business Development

- Examples
  - A local subsidiary company of an international conglomerate sought assistance with studies of a material used in one of their core products, in order to optimize for lightweight packaging and overall system design. The outcome could lead to lower costs, more efficient designs and increased competitive advantage.
Business Development

- **Examples**
  - A local food industry icon is exploring advanced membrane materials water purification. The CMI is co-funding faculty-led studies of advanced materials and the creation of predictive models. This will ultimately produce industrial membranes with antifouling properties, supporting low-cost and sustainable water re-use.
Our Partnerships

At UB:
- CCR
- SEAS
- CAS
- STOR
- TCIE
- NYSCEDII
- CBLS
- CAT
- OED
- SOM
- EQUIP
- CTRC
- SMBS

- NY ESD
- Buffalo Manufacturing Works
- EWI
- SUNY RF
- BNMC
- Insyte Consulting
- World Trade Center BN
- Alfred U
- SUNY Poly
- DOE
- NSF
- WNY REDC
- BNE
- BNP
- NY EDC
- ECIDA
- And many, many more!
SUNY Networks of Excellence

In 2013, the SUNY Research Foundation (RF) launched the Networks of Excellence (NoE), which assemble scientists and scholars from across SUNY to collaborate on joint research programs that enhance the student experience and grow capabilities through industry collaboration...

SUNY Networks of Excellence (NoE) in Materials and Advanced Manufacturing (MAM) –
MAM applies SUNY’s capacity to innovate to revitalize New York’s manufacturing sector. The ultimate objective is to establish a single statewide voice for materials and advanced manufacturing
CMI Collaboration with BMW

Michael Ulbrich
President, Buffalo Manufacturing Works
Buffalo Manufacturing Works helps innovation-driven organizations excel by partnering with their internal manufacturing, engineering and R&D teams to deliver better products, grow, and compete.
## Technology Focus Areas

### Flexible Manufacturing
- Automation & Controls
- Robotics
- Design & Simulation
- Process Monitoring
- Nondestructive Evaluation

### Materials & Testing
- Materials Synthesis
- Surface Engineering
- Modeling and Simulation
- Characterization
- Testing

### Additive Manufacturing
- 3-D Printing
- Functional Printing
- Hybrid Processes
- Digital Manufacturing
- Design Flexibility

### Machining & Finishing
- Assisted Machining (Ultrasonic, Electrical, Chemical & Cryogenic)
- Laser & Waterjet Processing
- Hybrid Processes
- Surface Finishing
Partnership with CMI

- UB CMI and EWI partners in Buffalo Manufacturing Works

- **Initial areas of collaboration**
  - Technology roadmapping
  - Convening of industry opinions and experts
  - Technical working groups
  - Capital equipment identification

- **Other areas**
  - Joint appointments and hires
  - Applied R&D project work with industry
  - Federal funding opportunities
Thank you

Questions?