

Lawrence Berkeley National Laboratory The Molecular Foundry

# The Molecular Foundry at LBNL

User Program: Statistics, Experiences, and Opportunities

# DAVID BUNZOW

**USER PROGRAM MANAGER** 

February 22, 2012

The Molecular Foundry at the Lawrence Berkeley National Laboratory is funded by the U.S. Department of Energy through its Office of Science and Basic Energy Services





Through access to State-of-the-Art instruments, materials, technical expertise and training, the Molecular Foundry provides its researchers with the tools to enhance development and understanding of the synthesis, analysis, characterization and fundamental theories of nanoscale materials.



# USER PROGRAM: MISSION & PERSONNEL

## **MISSION STATEMENT**

Delight our Users with exceptional, accurate and timely services that address their multiple LBNL administrative and scientific needs.

# UPO PERSONNEL



DAVID A. BUNZOW TMF User Program Manager



LORRI M. STCLAIRE PROGRAM ADMINISTRATION



DONALD J. LEE DATABASE ADMINISTRATION





### The Molecular Foundry

# **RESEARCH THEMES**

Combinatorial Nano

SCIENCE

NANOINTERFACES

Robotic synthesis to generate and test large libraries of biological and inorganic nanostructures

Analyzing and engineering the properties of hybrid nanomaterials

Multimodal in situ Nanoimaging

Applying multiple imaging techniques to investigate dynamic nanoscale phenomena

SINGLE-DIGIT

NANOFABRICATION

Fabricating nanoscale structures, features and spaces

 $<\!10 nm$ 









# SIX USER FACILITIES AVAILABLE

Imaging & Manipulation of Nanostructures

Nanofabrication

Inorganic Nanostructures

Organic & Macromolecular Synthesis

Biological Nanostructures

Theory of Nanostructured Materials Characterization, analysis, visualizations, measurement and manipulation of organic/inorganic nanostructures

E-beam lithographic, nano-imprint, ALD, PECVD, ICP and multiple thin-film deposition and etch processing techniques

Semiconductors, spintronics, thermoelectrics, PVs and carbonbased hybrid nanostructures including graphene electronics

> Studies of "soft" materials: organic molecules, macromolecules, polymers and their assemblies

New bio-inspired materials; peptoids, synthetic biological structures, and novel drug delivery techniques

Theoretical support to guide understanding of new principles, behavior sand experimental results



# USER PROGRAM DESCRIPTION

Proposals are submitted by potential User teams from throughout US and ROW to Molecular Foundry via our customized database

Users describe what they want to accomplish scientifically, type of proposal (Standard, Instrument Only, Sample Only) Users request access to Lead/Support facilities equipment and staff capabilities as well as affiliated labs and other LBNL user facilities

Very best proposals within current/projected capacity are awarded up to one year of access time to accomplish their work

Several process variations (proprietary, directors discretion and rapid access) can be requested Proposals are evaluated internally for capability and effort, then externally for scientific merit by panels of subject matter experts

Work results must be published in open journals (nonproprietary) Follow-on proposals are encouraged with good previous results

Non-locals and industrial users are strongly encouraged to apply!





# DOE NSRC "BUSINESS MODEL"

Encourage cross-disciplinary investigations leading to critical scientific discoveries having high impact on global needs

Basic energy-related research – key to our collective future!

Science for the public good – drives our program, operations & themes

Encourage more non-local user proposals and key collaborations

Shorten the research – development – VC - startup - manufacturing continuum

Attract & encourage greater number of quality industrial users



# USER SERVICES AVAILABLE TO AUGMENT YOUR DISCOVERY & COMMERCIALIZATION

### Staff

- Scientist assign to your project
- > Additional scientific staff collaborations
- > Administrative support for business operations
- > User Office always available to address issues

### Collaboration

S

Select from 1-6 Foundry facilities - all in same proposal!

- Other LBNL user facilities available for selection
- Affiliated labs support for specialized needs
- Distinguished Lecture Series attendance at LBNL

Weekly Seminar Series(features work by users)

> Membership in Foundry Users Association (TMFUA)

### Equipment

- Dedicated and state of the art for users
- foundry.lbl.gov/six/ index.html
- > Scheduling services available





# USER SERVICES AVAILABLE TO AUGMENT YOUR DISCOVERY & COMMERCIALIZATION

Training

User Resources & Services

- User training provided on select pieces of equipment
- Lab specific OJT safety and process training

- Cubicle spaces assigned
- Wireless and telecom included
- Office supplies provided
- Copy/scan/fax/inter net provided
- Badging and
   Foundry-specific
   lab access

Documentation

- User agreements negotiation and process
- Material Transfer
   Agreements
- CRADAs and WFOs
- Proprietary process (data in and data out) options



# TOTAL NUMBER OF PROPOSALS



# UTILIZATION OF OTHER LBNL USER FACILITIES



THE MOLECULAR FOUNDRY

# USER PROPOSALS BY ORIGIN



# TOTAL NUMBER OF USERS



# USER PROJECTS BY LEAD FACILITY



LAWREN

THE MOLECULAR FOUNDRY

Country

# DISTRIBUTION OF USER PROJECTS



Australia	11
Austria	3
Belgium	2
Canada	4
China	5
Denmark	3
Finland	1
France	11
Germany	19
India	2
Ireland	3
Israel	3
Italy	27
Japan	3
Netherlands	4
Pakistan	1
Singapore	7
South Korea	4
Spain	7
Sweden	5
Switzerland	1
Taiwan	1
United Kingdom	17

### THE MOLECULAR FOUNDRY TMF – INDUSTRIAL COLLABORATION AN ONGOING SUCCESS STORY!

### **Company Profile**

		3 joint user projects completed from 2007
Company Name	aBeam Technologies, Inc.	Spectrometer-on-chip: integrated optical chip for high resolution spectroscopy
Location:	Castro Valley, CA, USA	New photonic chip to increase the brightness of high-
Status:	Ongoing LBNL User	power laser diodes
Business Sector:	Nanofabrication/photonics	BEAMETR: Nano-patterns for automatic measurement of e-beam size
Employees:	17	Outcomes
Founded:	2006	<ul> <li>BEAMETR is a commercial product</li> </ul>
Web Site:	www.abeamtech.com	A prototype of high resolution spectrometer-on-chip was successfully developed
Contact Info:	5286 Dunnigan Ct.	2011 US-Air Force STTR project: High-resolution
	Castro Valley. CA 94546	spectrometer chip
	support@abeamtech.com	2012: New joint proposal on nanoimprinting of inorganic materials

LAWRENCE BERKELEY NATIONAL LABORATORY

Projects



# THE MOLECULAR FOUNDRY AT LBNL

TMF - 1 of 5 DOE NSRCs co-located at 6 National Labs

A DOE User facility for basic nanoscale research

Our User Program is robust and encourages collaboration with industry, government and academia

TMF integrates a strong nanoscale safety and health

culture into all our user projects

TMF user statistics show strong growth for us at multiple interfaces of basic nanoscience research

The Molecular Foundry wants you ...!

# Next user proposal window:

June 15 – July 16, 2012

DAVID BUNZOW MOLECULAR FOUNDRY USER PROGRAM MANAGER Email: dabunzow@lbl.gov Phone: 510-486-4574 Fax: 510-486-7424 Cell: 510-542-1747

### Lawrence Berkeley National Laboratory The Molecular Foundry

