



Biomedical Technology Research Centers

Leading-Edge Technologies in Support of Biomedical Researchers

November 11, 2009

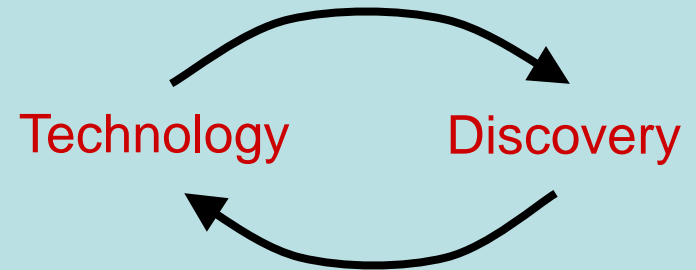
Douglas M. Sheeley, Sc.D.

Division of Biomedical Technology

Accelerating and enhancing research from basic discovery to improved patient care

Biomedical Technology Research Centers

Engines for translation of advances in the physical sciences into transformative tools for biomedical discovery.



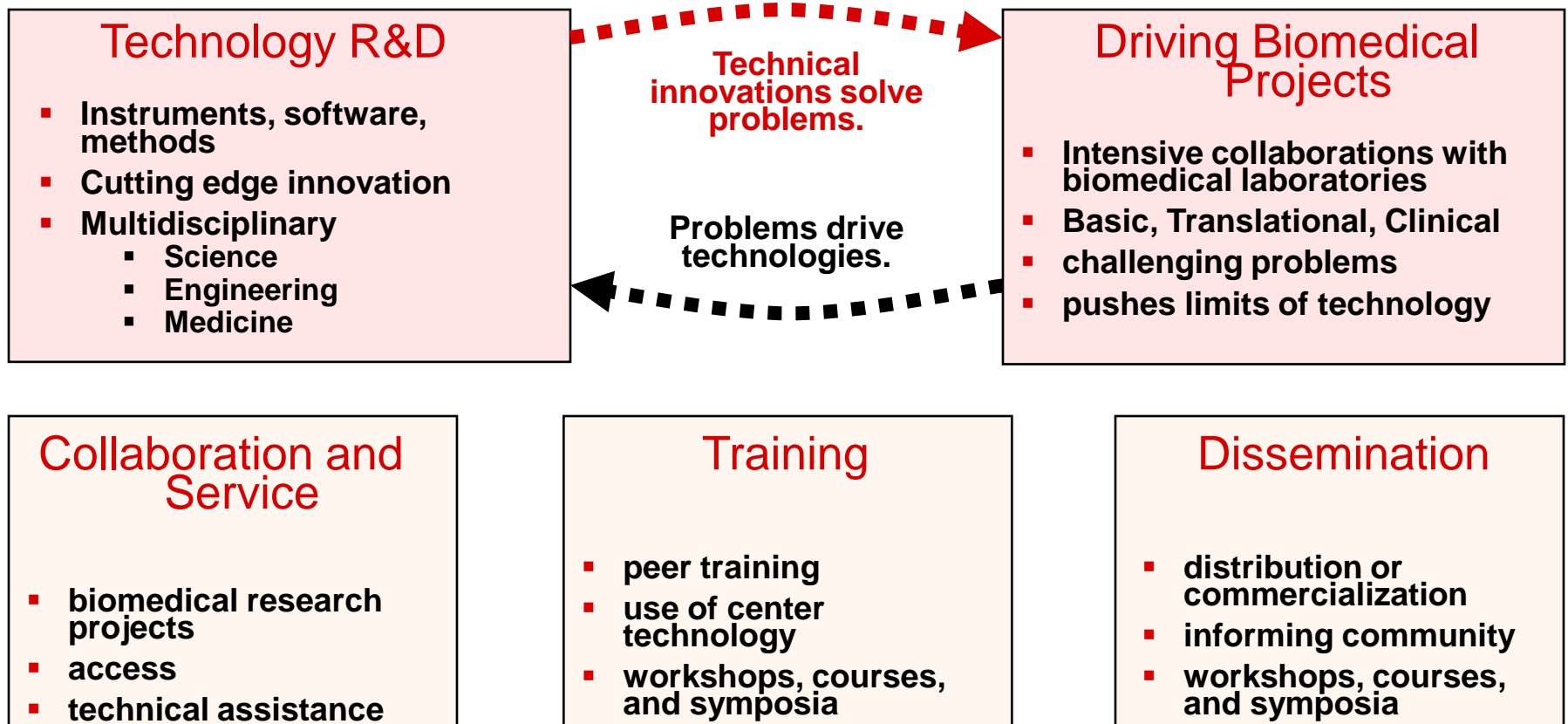
- Funding Mechanism: P41 grants, 5 years, renewable
- Since 1962 – 188 Resource awards (52 current)
- Multidisciplinary & collaborative, a catalyst for integrating diverse research efforts
 - Physical scientists
 - Engineers
 - Biological researchers
 - Clinicians

Program recently revised: See PA-08-259 and PA-08-260 for pre-application and application instructions

Biomedical Technology Research Centers:


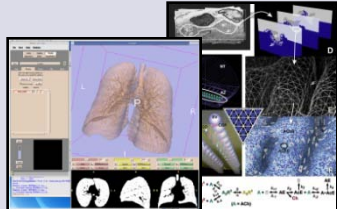

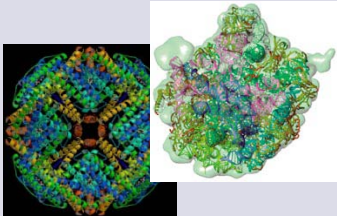
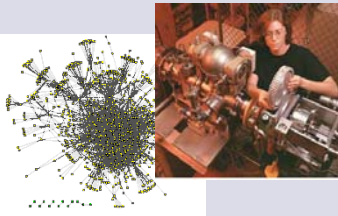
Centers are designed to drive rapid application and broad adoption of new tools that change our approach to biomedical problems.

Synergy between biomedical and technical research is the driving force.



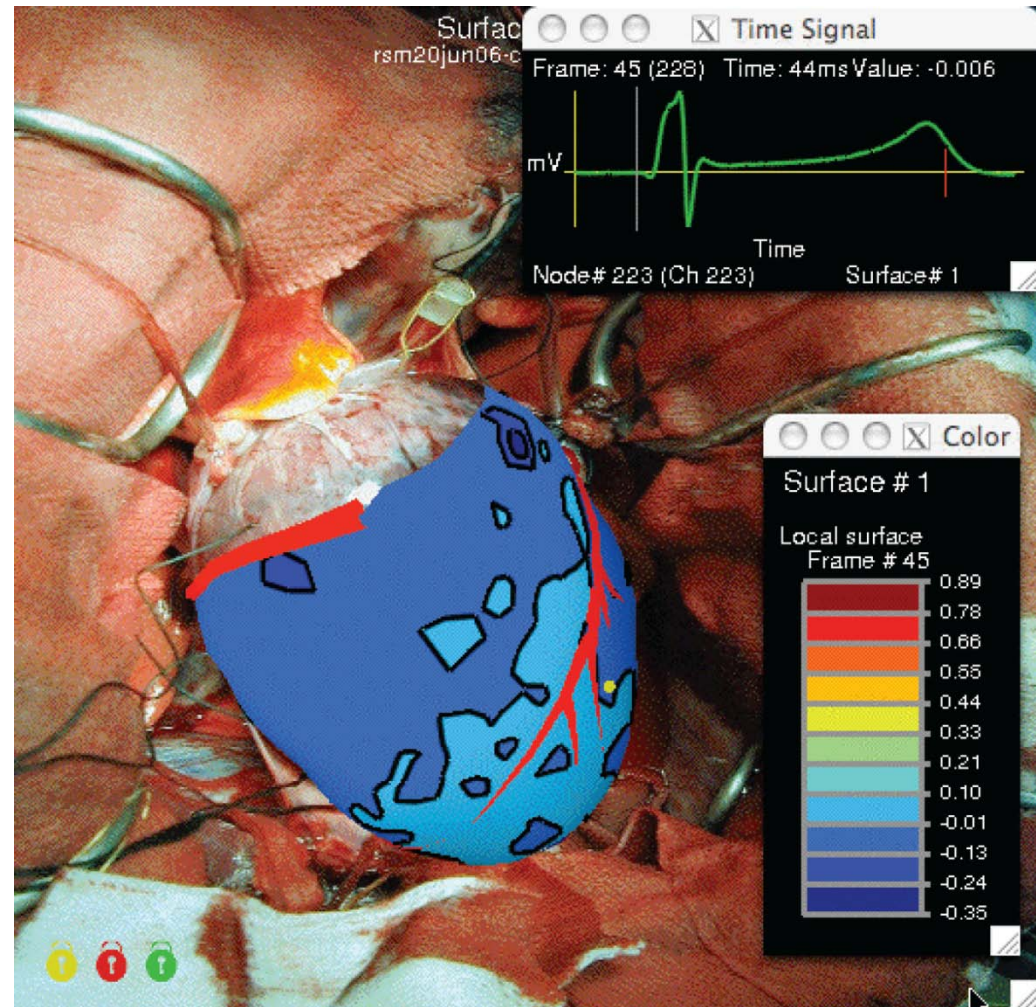
Biomedical Technology Research Centers

- 52 Unique Centers classified in 5 Broad Areas
- **Scope:** from basic discovery to clinical research
- **Scale:** from molecule to organism

Imaging Technology	Informatics Resources	Optics & Laser Technology	Technology for Structural Biology	Technology for Systems Biology
<ul style="list-style-type: none">■ MRI■ Image-guided therapy■ PET■ CAT■ Ultrasound	<ul style="list-style-type: none">■ Genetics■ Modeling of complex systems■ Molecular dynamics■ Visualization■ Imaging informatics	<ul style="list-style-type: none">■ Microscopy■ Fluorescence spectroscopy■ In Vivo diagnosis	<ul style="list-style-type: none">■ Synchrotron x-ray technologies■ Electron microscopy■ Magnetic resonance	<ul style="list-style-type: none">■ Mass spectrometry■ Proteomics■ Glycomics & glycotecology■ Flow cytometry
				

BTRC Computational Resources

- Visualization - Center for Integrative Biomedical Computing (Johnson, U of Utah)



Imaging and Electrophysiology in Treatment of Atrial Fibrillation

National Flow Cytometry Resource Los Alamos National Laboratory (LANL)

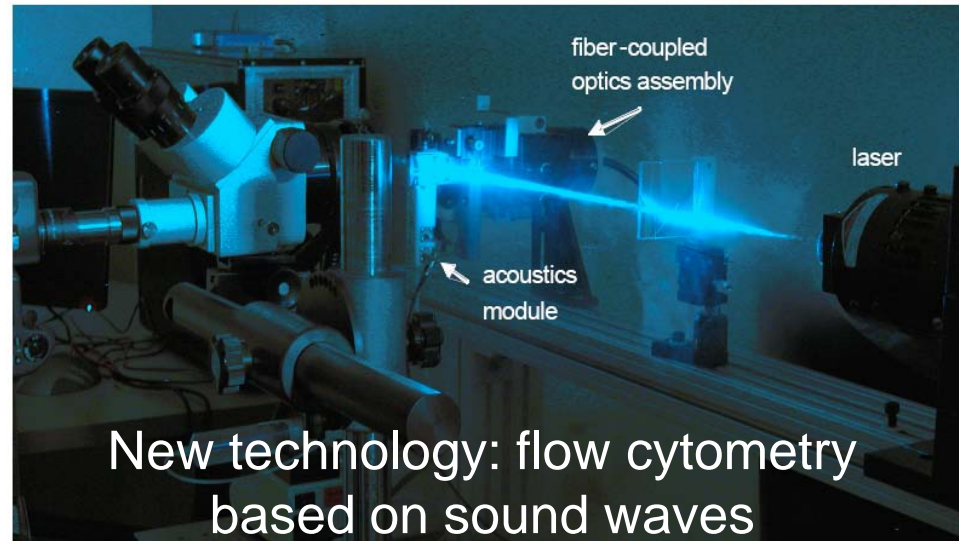
- **Development of new instrumentation and applications**

- Access to unique LANL infrastructure
- Access to scientists with unique technical and mathematical capabilities

- **Provides access to state-of-art flow cytometry instrumentation**

- Large particle sorting
- Virtual microarrays
- Chromosome sorting

- **Provides training for the biomedical research community**



Training:

“build a cytometer” course

Research Resource for Integrated Glycotechnology



Geert-Jan Boons



Ron Orlando



Jim Prestegard (PI)

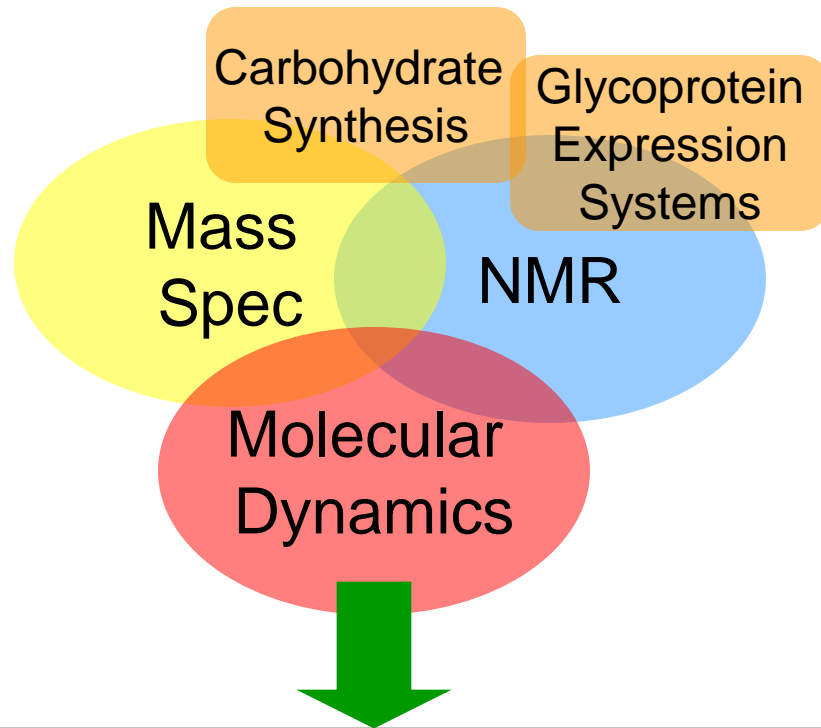


Rob Woods



Kelley Moreman

<http://glycotech.ccruc.uga.edu/>



3D structure and dynamics
of sugar/protein interactions

Software and Web Resources

REDCAT

A tool for structure validation and elucidation using residual dipolar couplings (RDCs).

XRambo

A tool for extracting parameters from time domain NMR data.

Glycam

An AMBER force field parameterized for carbohydrates.
Tools are available to create input files suitable for MD simulations using the AMBER/GLYCAM program.

Reagents, Analytical Services, Expertise, Courses, and Software are available from the BTRCs at the Complex Carbohydrate Research Center, UGA, Athens, GA

<http://www.ccrc.uga.edu>

Complex Carbohydrate research Center - Microsoft Internet Explorer


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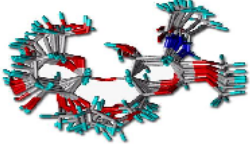
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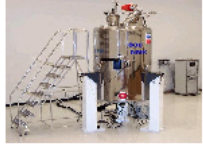
Address <http://www.ccrc.uga.edu/services/servicesframe.html> Go Links >>

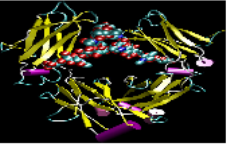
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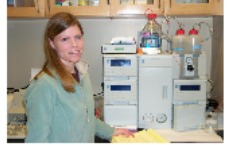
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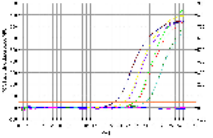

Analytical Services
[Service Request Submission Form](#)


Custom Synthesis


NMR Spectroscopy


Molecular Modeling-GLYCAM


CarboSource Services


[Transcript analysis of glycan related genes qRT-PCR.](#)

Internet

BTRC Workshops and Courses

Glycomics and Glycotechnology courses offered at the CCRC

<http://www.ccrcc.uga.edu/>

- Separation and Characterization of Glycoconjugate Oligosaccharides
- Analytical Techniques for Carbohydrates Structure Determination
- Mass Spectrometry of Glycoproteins
- NMR Fundamentals and Applications: NSF supported workshop, Participants from academic institutions emphasizing undergraduate training



Separation and Characterization of Glycoconjugates, July 11-15, 2005

BTRC Workshops and Courses

Structural Biology


- Rapid Data Collection and Structure Solving at the NSLS: A Practical Course in Macromolecular X-Ray Diffraction Measurement (<http://www.px.nsls.bnl.gov/>)
- National Resource for Automated Molecular Microscopy: A Practical Course in Molecular Microscopy (<http://nramm.scripps.edu>)
- National Center for Macromolecular Imaging – Cryo-EM Workshop (<http://ncmi.bcm.tmc.edu>)



RapiData Course, NSLS April 2006

NCRR Glycomics and Glycotechnology Centers

<http://www.ncrr.nih.gov/glycomics>



National Center for Research Resources
National Institutes of Health
Department of Health and Human Services

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NCRR Home > Biomedical Technology > Biomedical Technology Research Resources > Technology for Systems Biology > Technology for Glycomics and Glycotechnology

BT QUICK LINKS

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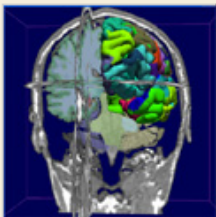
Technology for Glycomics and Glycotechnology

ON THIS PAGE: Integrated Technology Resource for Biomedical Glycomics • National Center for Glycomics and Glycoproteomics • Research Resource for Integrated Glycotechnology • Resource for Mass Spectrometry in Biology and Medicine

SEE ALSO: Imaging Technology • Informatics Resources • Optical and Laser Technology • Technology for Structural Biology • Technology for Systems Biology • Program Information

NCRR supports four Biomedical Technology Research Resources focused on the unique analytical challenges of **carbohydrates and glycoconjugates**. The primary mission of the centers is to create novel, highly effective technologies and methods, with a strong focus on support for the research community. Each center is interdisciplinary, incorporating biomedical, analytical, and informatics research. The first two of the four centers listed focus specifically on creating integrated glycomics technologies to be used in a system-wide context compatible with proteomics.

Integrated Technology Resource for Biomedical Glycomics—located at the [Complex Carbohydrate Research Center \(CCRC\)](#) of the University of Georgia—is developing methods in separation science, mass spectrometry, quantitative PCR, and informatics for characterization of changes in glycoprotein and glycolipid structures in development and disease. (See the [Biomedical Technology Resource Directory](#) listing for more information.)



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Internet

Can BTRCs advance the goals of IDeA programs?

A primary mission of the BTRC program is to disseminate technologies and train researchers in their use.

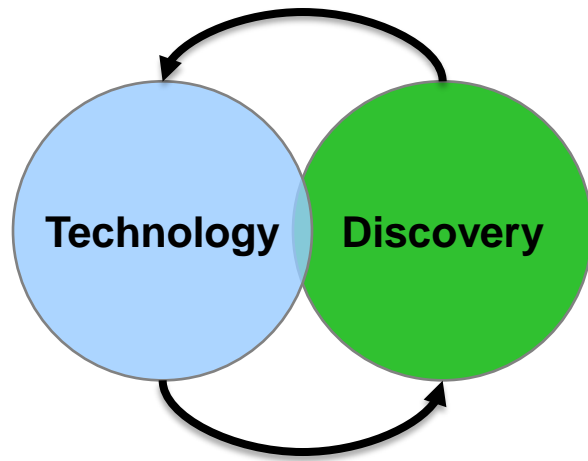
- BTRC researchers want to share technology, software, and expertise
- Two complementary models:
 1. Incorporate tools from BTRCs to build infrastructure
 2. Investigators form collaborative relationships with BTRCs
- Freely available technology and training materials developed in the centers may be useful in graduate and undergraduate education
 1. Pittsburg Supercomputing Center (Dr. Joel Stiles)
 2. Center for Cell Analysis and Modeling (Dr. Les Loew)
- BTRCs have solved infrastructure problems and are eager to share solutions. For example:
 1. LIMS for proteomics, etc.
 2. Software for proteomics data analysis

How to Access BTRC Technologies and Expertise

- Every BTRC has a web site
- Contact BTRC directors
- Contact NCRR DBT program staff
- What do the centers have to offer?
 1. Scientific collaborations
 2. Analytical services
 3. Courses
 4. Workshop
 5. Hands-on training in the lab
 6. Freely distributed software
 7. Technical support for software
 8. Expertise
- Remember:
 1. Access is largely FREE: instruments, expertise, infrastructure
 2. BTRC scientists WANT to share what they have created

BTRCs: 52 Nationally Accessible Engines for Translational Research

BTRCs



- Enabling technologies
- Expertise
- Computing

Individual Investigators
NIH Programs
CTSA
NCI Glycomics
Why not IDeA?

Each BTRC is accessible to NIH-supported investigators and programs from across the nation.

- **Call NCRR staff**
- **Call BTRC investigators**
- **Apply for a BTRC?** →

Biomedical Technology Research Centers

How to apply:

1. Contact NCRR DBT Staff
2. PAR-08-260: Pre-application for a Biomedical Technology Research Center
 - Conceptual statement of center goals and potential impact
 - No budget
 - Peer reviewed
3. Invitation to submit a full application
4. PAR-08-259: Application for a BTRC



National Center for
Research Resources

NATIONAL INSTITUTES OF HEALTH

Accelerating and enhancing research from basic discovery to improved patient care

The Small Business Grant program

IDeA Tech Transfer Webinars

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Division of Biomedical Technology
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Email: swaina@mail.nih.gov

Lili Portilla, MPA
Office of the Director
Email: lilip@nih.gov

Why are SBIR and STTR Important to NCRR Researchers?

- **NCRR provides clinical and translational researchers with the training and tools they need to understand, detect, treat, and prevent a wide range of diseases**
- **SBIR and STTR**
 - **an excellent resource for enabling commercialization of innovative high impact technologies essential for clinical and translational research, such as:**
 - research tools, medical devices, therapeutics**
 - **provide incentive to academic investigators to translate technology (form new company or collaborate with existing)**
 - **a large source of early-stage life sciences R&D financing**

Program Descriptions

Small Business Innovation Research (SBIR)

2.5%

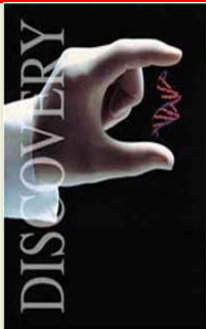
Set-aside program for small business concerns to engage in federal R&D -- with potential for commercialization.

Small Business Technology Transfer (STTR)

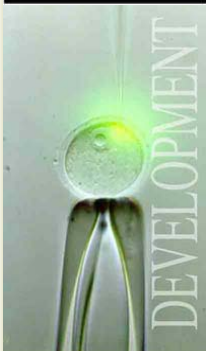
0.3%

Set-aside program to facilitate cooperative R&D between small business concerns and U.S. research institutions -- with potential for commercialization.

SBIR/STTR: 3-Phase Program



- PHASE I (R43 or R41)
 - Feasibility Study
 - \$100K and 6-month (SBIR)
 - or 12-month (STTR) Award



- PHASE II (R44 or R42)
 - Full Research/R&D
 - \$750K and 2-year Award (SBIR & STTR)
 - Commercialization plan required



- PHASE III
 - Commercialization Stage
 - Use of non-SBIR/STTR Funds



National Center for
Research Resources

NATIONAL INSTITUTES OF HEALTH

Accelerating and enhancing research from basic discovery to improved patient care

Eligibility Requirements

SBIR/STTR Eligibility Requirements

- Applicant is Small Business Concern
- Organized for-profit U.S. business
- 500 or fewer employees, including affiliates
- Must be:
 - At least 51% U.S.- owned by individuals and independently operated or
 - At least 51% owned and controlled by another (one) business concern that is at least 51% owned and controlled by one or more individuals

SBIR Eligibility Requirements

- **Principal Investigator's primary employment must be with the Small Business Concern at the time of award and for the duration of the project period**
- **Subawards are permitted**
 - **May outsource 33% activities in Phase I**
 - **May outsource 50% activities in Phase II**

STTR Eligibility Requirements

- Principal Investigator's primary employment may be with either the Small Business Concern or the research institution
- Formal Cooperative R&D Effort
 - Minimum 40% by small business
 - Minimum 30% by U.S. research institution
- U.S. Research Institution
 - College or University
 - Other non-profit research organization
 - Federal R&D center
- Intellectual Property Agreement
 - Defines allocation of IP rights and rights to carry out follow-on R&D and commercialization

A New Opportunity: Multiple Principal Investigators on SBIR/STTR Grants

- **More than one Principal Investigator is allowed on SBIR/STTR research projects**
- **This policy offers new approaches to maximize the potential of “team science” efforts**
- **Only the contact PI need be employed primarily by the small business concern**

Keys to a Strong Application

- Significant, innovative, and focused science
- Significant product and/or commercial potential
 - A product-focused application is more likely to have support of business reviewers
 - A project with sound financial projections is more likely to attract a partner
- Translational research/clinical applications projects should involve the appropriate collaborators
 - Clinical investigator in appropriate specialty
 - Statisticians
 - ...



NCRR SBIR/STTR Contacts

Program:

Amy Swain, Ph.D.
Biomedical Technology

Michael Chang, Ph.D.
Comparative Medicine

Krishan Arora, Ph.D.
Research Infrastructure

Jody Sachs, DPM
Clinical Research Resources

Tech Transfer Specialist:

Lili Portilla, M.P.A.
NCRR Office of the Director

Useful Web Links

- **NCRR Web Site**

www.ncrr.nih.gov

- **Sample Application (NIAID Web Site)**

<http://www.niaid.nih.gov/ncn/sbir/app/default.htm>

- **NIH SBIR/STTR Internet Guide**

http://grants.nih.gov/grants/funding/sbirsttr_sites.doc

- **Video Presentations on Writing Successful SBIR Application (NCI web Site)**

http://sbir.cancer.gov/news/recent/san_diego_forum.asp

First IDeA Program Tech Transfer Webinar

- Held on September 24th, 2009
- Hosted by NCRR, Lili Portilla and Fred Taylor
- Approximately 60 participants were on the call; overall positive feedback
- Presenter's included:

Glennis Gold, Acting Director, Technology Transfer Office, Dartmouth College *"MTAs 101 Learning the Basics"*

Russell Nelsen, JD, Contracts Manager, University of Nebraska Medical Center *"MTAs between Non-Profits"*

Kerry Swift, Office of Technology Commercialization, University of Vermont *"Industry MTAs"*

- **Presentations are available, please contact Lili Portilla at lilip@nih.gov**

Suggested IDeA Technology Transfer Webinar Topics

- Discussion on Bayh Dole – provision and reporting requirements
- Discussion on Intellectual Property – US and Foreign patents
- Discussion of licensing of inventions - Licensing nuts and bolts;
- Transactional Agreements:
- Confidentiality/Non-Disclosure Agreements
- Clinical Trial Agreements and Sponsored Research Agreements
- University spin-outs – discuss various academic initiatives and models that promote university spin outs; what does it take

Please let us know if you would be interested in holding future tech transfer Webinars.