National Center for the Biotechnology Workforce

Hi-Tec Virtual Conference July 29-30, 2020

BETA Skills

Russ H. Read

NSF ATE

DUE # 1800909

Forsyth Tech Community College

Ivy Tech Community College Bloomington

College of the Canyons

Newberry Technology Associates

Digital World Biology

Welcome to our presentation on our project we call BETA Skills which is an acronym for biomedical emerging technical applications. We are seeking out the skills for technicians working in this space with our partners Forsyth Technical Community College in Winston – Salem, NC., Ivy Tech Community College in Bloomington, IN, College of the Canyons, San Clarita, CA, Newberry Associates, Minneapolis, MN, and Digital World Biology, Seattle, WA. We are thankful to the National Science Foundation, Advanced Technological Education division for its support of our project DUE # 1800909.

Skills for Biomedical Emerging Technology Applications (BETA Skills)

National Center for the Biotechnology Workforce(NCBW) at Forsyth Tech Community College (Winston-Salem, NC) leads BETA Skills with PI Read & Co-PIs leading regional nodes

Co - PI	Node	Location	Community
Dr. Sengyong Lee	Ivy Tec Community College	Bloomington, IN	Indiana Health Industry Forum
Dr. Kathy Bakhit	College of the Canyons	Santa Clara, CA	So Cal Bio
Deb Newberry	Newberry Associates	Minneapolis, MN	Life Sciences Medical Alley

Each node functions as a Community of Practice (CoP). Example: The NCBW works with NCBIO and NC Biotech Center to gauge the NC community.

This slide illustrates the management of the grant. Russ Read of the National Center for the Biotechnology Workforce based at Forsyth Technical community College is the principal investigator, Sengyong Lee of Ivy Tech, Bloomington IN, Dr. Kathy Bakhit, College of the Canyons, CA, and Deb Newberry of Newberry Associates of Minneapolis. MN are the Co - leads for the grant..

Skills for Biomedical Emerging Technology Applications (BETA Skills)

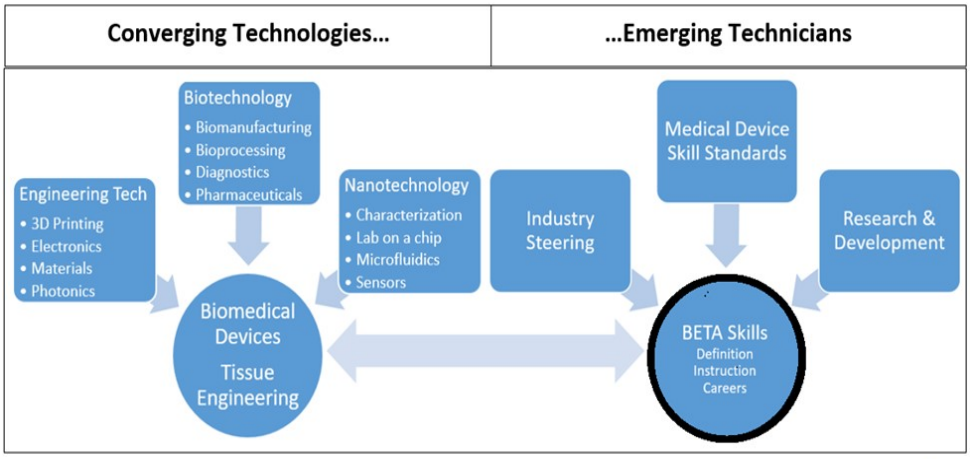
BETA Skills focuses on advanced technological education around “convergent technology platforms” supporting:

Example: the interface between Biomedical Devices & Tissue Engineering

Wake Forest® School of Medicine
Institute for Regenerative Medicine

This slide provides a bit more focus for the grant: advanced “technological education” around “convergent technology platforms. The picture shows an organ of the body, a bladder which was made in the Wake Forest Institute for Regenerative Medicine in Winston – Salem, NC.

Skills for Biomedical Emerging Technology Applications (BETA Skills)



This slide is a diagram depicting, in more detail, both converging and the need for emerging technicians. Example are engineering technology, biotechnology and nanotechnology. Biomedical devices intersecting with tissue engineering is an example. Which skill set will technicians need to be able to be effective the development of these.

Skills for Biomedical Emerging Technology Applications (BETA Skills)

Key Deliverable

Defined **BETA Core Skills** for national use by educators, industry, researchers and employers.

BETA Core Skills	New Competencies	Pathways
Harmonized by educators, researchers & industry	For Skilled Technicians	Education to careers

Our central mission is define the what we call BETA Core Skills. These are the new competencies which educators will use for aligning curriculum. They are developed with our industry, research and academic colleagues.

Skills for Biomedical Emerging Technology Applications (BETA Skills)

Data from NIIMBL- the future of biomanufacturing - reported a survey of contacts in industry, academia and government/non-profit sectors

Top training needs for existing technicians and operators are:

- GMP – Good Manufacturing Practices
- Quality (Quality Control / Quality Assurance)
- Risk Analysis
- Advanced Manufacturing
- Automation
- Validation
- Analytical Methods
- Single Use Bioreactors

This slide reports on a NIIMBL study which was designed for the future of biomanufacturing where Good Manufacturing Practices, Quality and Advanced Manufacturing were some of the top training needs highlighted.

Skills for Biomedical Emerging Technology Applications (BETA Skills)

Development of BETA Core Skill Sets				
CoPs/Nodes	**Regional Input**	**National Input**	**Input to DWB***	**Dissemination**
Educators	X	X	X	X
Companies	X	X	X	X
Trade organizations	X	X	X	X
Workforce experts	X	X	X	X

Digital World Biology *

CoPs/Nodes unite educators, companies, trade organizations, to identify BETA Skill Sets

This slide illustrates how each investigator anchors a location which we call a Node. As the community builds through dialogue we refer to it as the Community of Practice or COP.

Skills for Biomedical Emerging Technology Applications (BETA Skills)

Digital World Biology advises in developing a taxonomy—an architecture for conversation about interdisciplinary skills, occupational needs and specialized technician education—to better serve the emerging field. Take a tour of www.Biotech-Careers.org Press the link below.

https://youtu.be/1X2addx9XJE

This slide has a link that leads to a narration by Dr. Dr. Todd Smith, a principal of DWB. He walks a reader/viewer through the use of www.biotech-careers.org

Skills for Biomedical Emerging Technology Applications (BETA Skills)

Grant Output		
Product	**Supports**	**Format**
National BETA Skill Standards	R&D, MFG - TE & Biomedical Devices	Published booklet
Community of Practice	Node & Community	Meetings & Advice
Online Database	Industry, Academia	www.biotech-careers.org
Boot Camp	Professional development in novel area of TE & Biomed Devices Interface	5-day program for instructors and teachers
Courses, certificates	GMP, GLP, QA, Nano Bio & Regen Med.	Example: GMP non-credit 3-day course

MFG = Manufacturing; TE = Technician Education; GMP/GLP = Good Manufacturing / Lab Practices

This slide describes the grant output or grant products: BETA Skill Standards, Community of Practice, Biotech careers web site, Boot camp five days of professional development and several courses including GMP, Nano Bio and a Clinical Research course.

Skills for Biomedical Emerging Technology Applications (BETA Skills)

BETA Feedback

1. Skill listening sessions in Durham and LA
2. Survey in Indiana
3. Interviews in Minneapolis
4. Advisory committee meetings
5. Community of Practice discussions

This slide describes the feedback sessions we have had to date. Two listening sessions took place in Durham. NC and LA. A statewide survey was done in Indiana and interviews were done Minneapolis. We have had both advisory committee meetings and a continuous community of practice. The picture is of our national advisory committee meeting in Winston- Salem, NC.

Skills for Biomedical Emerging Technology Applications (BETA Skills)

Preliminary BETA Skills

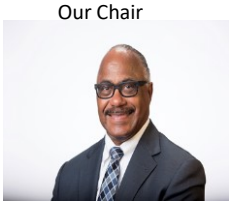
- Maintain Safe and Productive Work Environment
- Comply with Regulations and Standards
- Conduct Good Documentation Practices
- Monitor, Maintain, Use, Troubleshoot and Repair Equipment
- Maintain Inventory of Raw Materials, Prepare Materials/Supplies for use
- Perform Measurements, Tests and Assays
- Perform Mathematical Manipulations
- Manage and Communicate Information

This slide illustrates our BETA Skills headings as per our process. The headings are maintaining a safe environment, complying with regulations and standards, conduct good documentation practices, monitor and maintain equipment, maintain inventory, perform measurements, test and assays, perform math manipulations and manage and communicate information. The poster is a picture of a nerve blocking medical device from Wake Forest University.

Skills for Biomedical Emerging Technology Applications (BETA Skills)- National Advisory Committee (NAC)

Dr. Brenda Summers	Director of Workforce and Communications, NCBIO
Daniel J.C. Herr, PhD	Professor and Nanoscience Department chair at JSNN and director of North Carolina's Nanomanufacturing Innovation Consortium
Diana L. Thomas	Global Quality Assurance, Cook Regentec
Elaine Johnson, PhD	Director, Bio-Link
Gardner Carrick	Vice President of Strategic Initiatives, The Manufacturing Institute
Greg Kepner	Director, Midwest Photonics Education Center
Jim Hyder	Industry Liaison, Seattle's Hub for Industry-Driven Nanotechnology Education (SHINE), North Seattle College
Joan Schanck, MPA	Academic Research Program Officer, Wake Forest Institute for Regenerative Medicine
John Balchunas	Workforce Director, NIIMBL
Kenneth Russell	Director of Medical Device Development, Wake Forest University Innovations
Kristin Jones	President and CEO, Indiana Health Forum
Linnea Fletcher, PhD	PI InnovATE*BIO* & Director, AC2; chair, Biotechnology Department, Austin Community College
Mary A. Russell	Human Resources, Cook Endoscopy
Mary Q. Stewart, PhD	Director of Education and Workforce Development, Advanced Regenerative Manufacturing Institute/BioFabUSA
Nancy Johnston	Executive Director, Piedmont Triad Office, NC Biotechnology Center
Robert Ehrmann, PhD	Managing Director, Center for Nanotechnology & Utilization; Pennsylvania Nanofabrication Manufacturing Technology Partnership; National Nanotechnology Applications and Career Knowledge (NACK) Network
Rohan A. Shirwaiker, PhD	Associate Professor, N.C. State University; associate faculty, U Joint Department of Biomedical Engineering; Director, 3D Tissue Manufacturing Research Team; President, IISE Manufacturing & Design Division
Shaye Mandle	President & CEO, The Medical Alley Association
Thomas C. Tubon, Jr., PhD	Professor, Biotechnology, Madison (WI) Area Technical College, and PI/Project Director, NSF ATE Stem Cell Education Initiative (DUE 1501553)

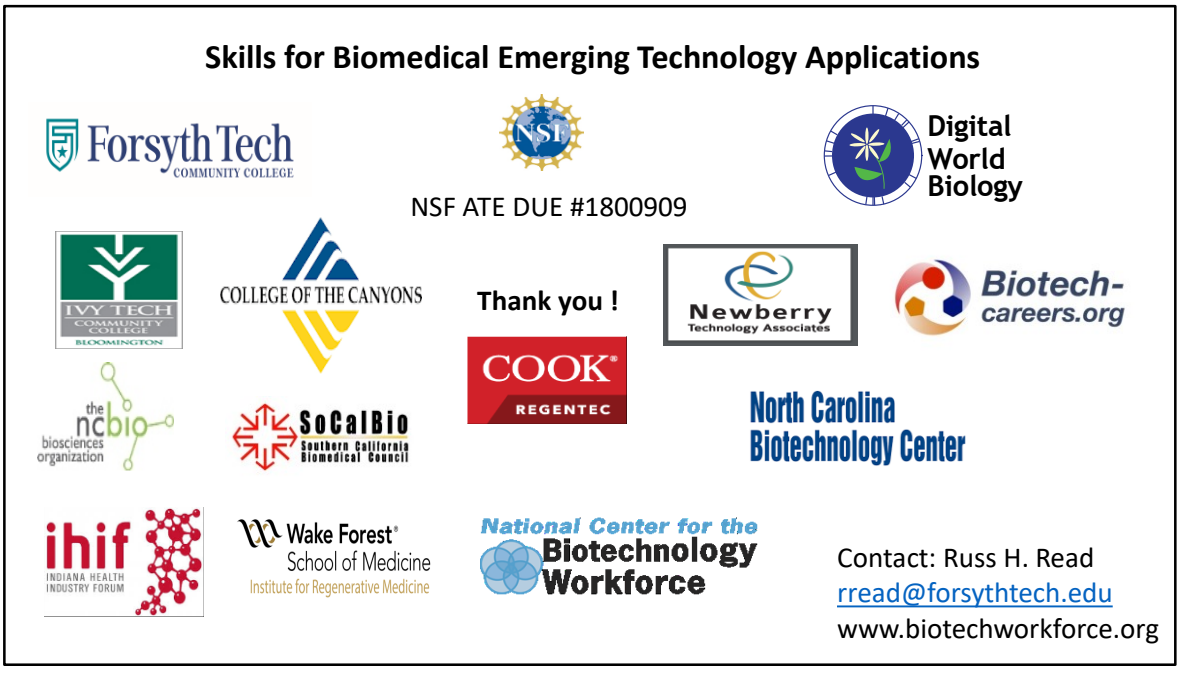
Our Chair



Bryant Moore, PhD
UNC Chapel Hill

Gary M. Green, EdD
NAC Adviser
WFIRM - Wake Forest Institute for Regenerative Medicine

This slide describes our national advisory committee, twenty one members are listed, including Dr. Bryant Moore who is our Chair and Dr. Gary Green who is another of our advisers from the Wake Forest Institute for Regenerative Medicine.



This slide thanks our partner institutions and companies. Among them several colleges trade associations, institutes and the Cook Medical group of companies.