Biotechnology – Meeting the demand for a skilled workforce

Montgomery County, MD is a world-class center for biotechnology.

The Montgomery College BT Program responds to the workforce needs of a rapidly changing growth industry.

The Montgomery College BT Program is the largest program in the state of MD.
BT Program Mission

• Prepare students for entry-level jobs in the biotech industry in Maryland
• Prepare students for transfer to bachelor’s degree programs in biology, biotechnology, and molecular biology.
• Be part of the Montgomery County Educational Continuum – HS, AAS, BS, MS, PhD
• Foster the academic/industry partnership
Biotechnology Program Focus

• Industry relevance
  – Input from industry for content and rigor

• Hands on experience
  – Laboratory focus
  – Documentation emphasis
  – SOP or batch record format for labs

• Workplace behavior
  – Team work, attitude, time management

• Science as business

• Student scheduling needs
  – Classes offered day and evening
Industry Partners for the Biotechnology Program

- Bioreliance
- Human Genome Sciences
- MedImmune Astra Zeneca
- Invitrogen (Frederick, Md Facilities)
- Lonza (Walkersville)
- Qiagen
- Charles River Labs
- BioFactura
- IIVS
Biotech Industry Support

• Equipment donations
  – Life Technologies (inVitrogen)
  – Human Genome Sciences
  – SRA
  – Gene Logic

• Funding support
  – $40,000 grant from MedImmune for scholarships
  – $5,000/year scholarships from HGS and Bioreliance
  – $1 Million private donation from Paul Peck
Academic Partners for the Biotechnology Program

• MCPS (Montgomery County Public Schools)
• HCPS (Howard County Public Schools)
• DCPS (District of Columbia Public Schools)
• Montgomery College
• University of Maryland System (UMCP, UMB, USG and UMUC)
• UMBI / CARB
• Johns Hopkins University
• Towson State University
• Hood College
Options for Biotechnology Students

• AAS degree leading to transfer to a 4-year program
  – Articulation agreements with
    • UMUC
    • USG
    • UMB
    • Towson University
    • Hood College
    • Stevenson University*
    • Mount St. Mary’s University*

• Biomanufacturing certificate
  – “Fast track” to a job
  – Continue on for AAS

• Biotechnology certificate
  – Designed for students with a 4-year degree

* Articulation agreements in progress
In progress: A Bioscience Academic Continuum – one stop shop for education in Montgomery County – all programs will flow one to another and create a continuous pipeline of bioscience student workers...

• Middle school teacher workshops and education
• High school biotechnology academies
• Associate Degree and Biotechnology Certificate
• Baccalaureate Degree Program (UMSG)
• Masters Degree Program (JHU)
• Post-doctoral training for business acumen
The Academic Program - Biotechnology Credit Courses (Degree or Certificate)

Credit courses leading to a certificate or degree

- BT 101 Introduction to Biotechnology (online and classroom)
- BT 115 Instrumentation for Biotechnology
- BT 117 Cell Culture and Cell Function
- BT 200 Protein Biotechnology (online and classroom)
- BT 204 Immunology and Immunological Methods
- BT 213 Nucleic Acid Methods (online and classroom)
- BT 235 Biomanufacturing Principles
- BT 221 Biotechnology Practicum (internship – optional)
Biotechnology Workforce Development at Montgomery College

• Offering non-credit training and education to residents, employees and employers.
• Enabling current employees to enhance/obtain additional skills
• Providing corporate trainers the opportunity to enhance in-house training via collaboration with MC faculty
• Developing customized classes and content to meet specific needs and may be offered on-site
• Working with agencies that fund training
• Providing documentation upon course completion
Biotechnology Non-Credit Courses

- BIT 033 Basic Biotechnology
- BIT 031 Basic Biotechnology Lab
- BIT 032 Basic Cell Culture
- BIT 049 FDA Good Laboratory Practices
- BIT 044 Quality Assurance

New this semester:
- BIT 047 Biotechnology for the Life Science Major

Offered on the same day:
- BIT 035 How to find a job in Biotech
Biotechnology Workforce Development at Montgomery College – Curricula for Lab Skills

• Lab Math
• Basic Lab Skills for the Biotechnologist
• Introduction to Statistics
• Cell Culture Basics
• Introduction to Proteomic Methods
• Introduction to Genomic Methods
• In planning
  – Bioreactor Basics
  – Protein Purification Basics
  – Introduction to Immunoassay Methods
Enrollment Statistics For the Biotechnology Program

- 480% increase in the number of BT majors since 2003
- Over 200 students have completed the program and obtained employment in the Biotech industry since 2000
Key Demographics for Biotechnology Students

- Majority of students already have a BS or MS degree
- Most students are already employed, including in the Biotechnology Industry
Meeting Demand of Employers and Employees

• 2010 – 2015 estimate 50 -100 entry level jobs per year in companies that partner with Montgomery College

• Additional non-lab jobs - administrators, managers, senior scientists

• Starting salary with Associate’s Degree $32,000 - $38,000 per year plus benefits – (health insurance, stock options, life insurance and tuition assistance)
Is it Successful?

-Tom Watkins, President and CEO of HGS Human Genome Sciences in Rockville, MD has some 900 employees and plans to add up to 100 employees across the nation. Montgomery College has been a good source to find qualified employees, said Tom Watkins. "They have a really good biotechnology program. They turn out to be terrific employees."

- Gazette Newspaper 29 Jan 2010
“Limitations of ordinary degree programs spurred Montgomery College in Maryland to develop curriculum specifically aimed at preparing students for life after college. By soliciting information from industry personnel, coordinators of the program have developed and continually update courses that meet the current skill sets expected from entry level employees. Students acquire real life experience through internships engineered by the program. The success of this program depends highly on the continual collaboration between working professionals and academic faculty...both sides benefit: educators gain valuable input for relevant curriculum while industry gains practical, productive entry level employees. Programs like these emphasize the absolute necessity for industry involvement....I commend unique programs and organizations such as NIPTE, NSF and Montgomery College for offering much needed curriculum that unites academia with industry. With increasing awareness and initiatives, my hope is that future graduates will be endowed with the basic education and ability to hit the ground running within this rapidly emerging industry.”
The Future
Bioscience Education Center - 2012

• Dedicated labs
  – Cell Culture
  – Proteins and Immunology
  – Nucleic Acids (DNA)

• Dedicated biomanufacturing suite
  – Simulate cGMP environment
  – Based on FDA designed facility used to monitor vaccine production

The proposed 127,000 square foot Bioscience Education Center will house the education and training continuum from Middle Schools through Postdoctoral education.
Our Vision Realized -

- Bioscience Education Center with state-of-the-art laboratories and facilities
- Well-trained and educated workforce
- Internships and employment in the industry
- Baccalaureate degree in biotechnology available in Montgomery County
- Scientists successfully transitioned from research to business
Our Vision Realized -

• A successful business incubator nurturing start-up businesses
• Industry opportunities for teaching, curriculum development, and laboratory support
• Montgomery County maintaining its position as a premier biotechnology center in the nation
Endless possibilities through partnerships

Thank you