INTERNATIONAL BIOTECHNOLOGY WORKFORCE COLLABORATIONS: WHAT WAS LEARNED, SHARED, AND HOW TO GET INVOLVED

COMMUNITY COLLEGE DAY AT BIO 2016
SAN FRANCISCO, CA

JUNE 6, 2016

Facilitator: ***Linnea Fletcher Ph.D***
AC2 Bio-Link Regional Center, PI and Director
Department Chair, Biotechnology
Austin Community College – Austin, TX

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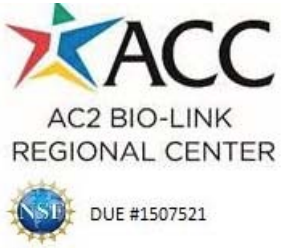
DUE #1507521

Experiences with ATE International Work



- **CREATE**
- **2-Years: Australia, Germany and Denmark**
  - **Purpose: Learn about Clean Energy and Building Construction Policies, Regulation, and Educating the Workforce**
  - **Participants: ATE Centers and Projects, and DOL**
  - **Pre-Trip: Extensive Background Readings, Developed the Community**
  - **On the Trip: Each Participant Took Ownership of One or Two Sites and Educated the Group, All Participants Reported on Sites**
  - **After the Trip: Presented at ATE PI Meeting, Hi-TEC, and in Our Own Regions**
  - **What Else?**

Long-Term Outcomes

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Australia

- **Commercialization of Community Colleges (Education is their 2nd largest export)**
- **Turn Your Buildings Into Learning Labs**

Germany and Denmark

- **National Policy is Everything When Promoting New Technologies**
- **Workforce Education is As Valuable as an Academic Education**

- **History and Culture Influence Science, Technology, Policy and Therefore Workforce Education**

Office of International Science & Engineering (OISE)

- **Vision Statement: Toward a Globally Engaged Workforce**
- New ideas emerge from diverse backgrounds
- Planned activities need to contribute to the accomplishment of NSF's overall goals

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Panelists

- **Dr. Brian Shmaefsky**
- Professor, Biology & Environmental Sciences**,** Lone Star College
- **A Serendipitous Lesson in Evaluating Workforce Needs: Global Perspectives on Biotechnology Workforce Development**

- **Dr. Sulatha Dwarakanath**
- Professor, Biotechnology, Austin Community College
- Coordinator, DOL funded $c_3$bc TAACCCT Grant
- Bio-Link Liaison
- **Biotechnology and Global Collaborations: Bridging Academics and Industry**

- **Dr. Jim DeKloe**
- Director, Biotechnology Program
- Solano Community College
- **The Haiti Bioscience Initiative**

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Biotechnology and Global Collaborations: Bridging Academics and Industry

Sulatha Dwarakanath Ph.D

CCP Bio 2016

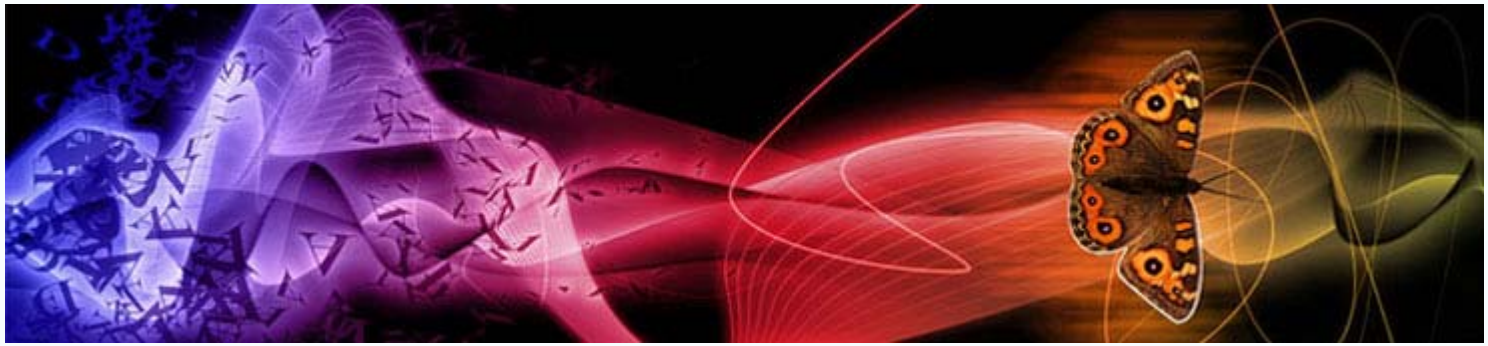
Biotech Industry - Global

Global biotechnology market size was valued at US$ 270.5 billion in 2013 and is expected to grow at annual rate of 12.3% to 2020

http://www.grandviewresearch.com/industry-analysis/biotechnology-market

Biotech Industry - India

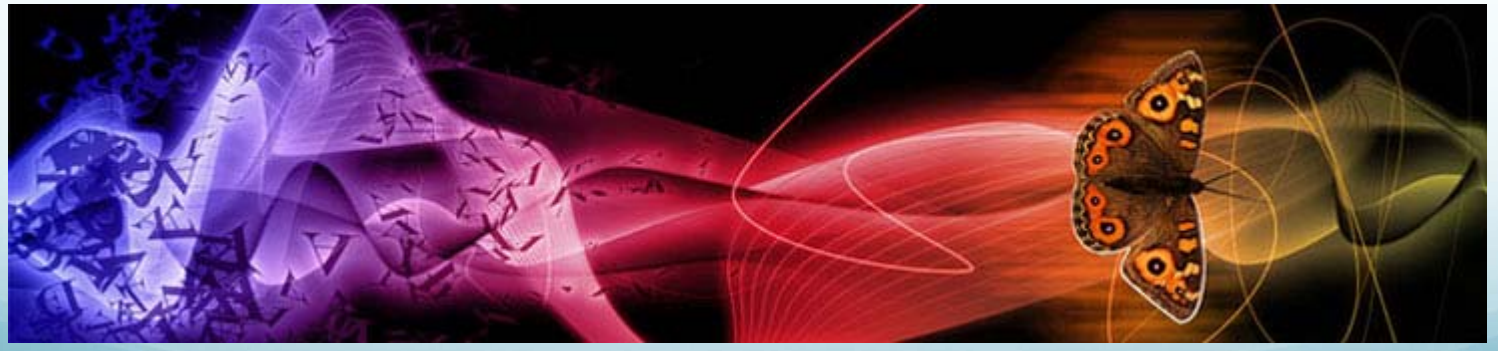
Their industry is comprised of about 800 companies



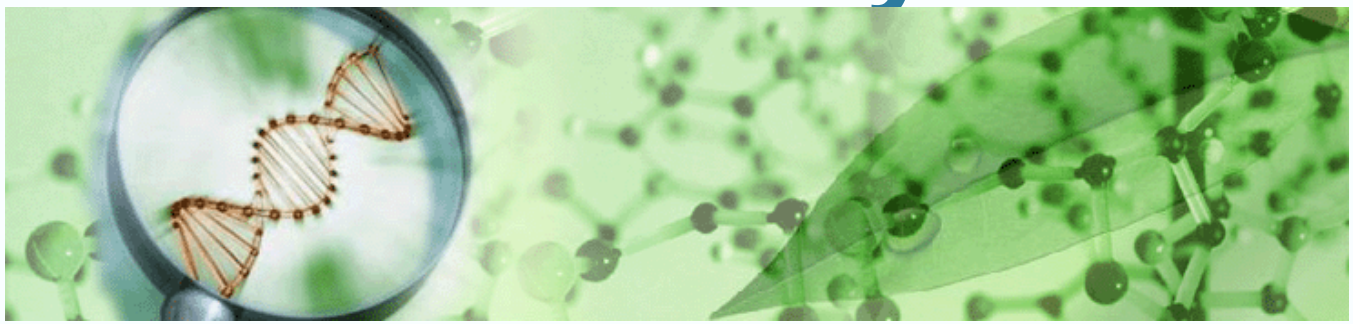
The biotechnology sector is expected to grow from the current US$ 5-7 billion to US$ 100 billion by 2025, growing at an average rate of 30 per cent

Biotech Industry - India

Biopharma is the largest sector contributes about 64 % total revenue



Biotech Industry-India



India has emerged as a leading destination:

- for clinical trials
- contract research
- manufacturing activities owing to the growth in the bioservices sector

A need for technician training in Biotech in India

- Indian polytechnic colleges focus on Engineering
- Undergraduate programs in biotechnology
- Not much hands on training
- Industry needs to work with Academics to setup these training
- Lot of interest from companies to take this forward

Antibody Production in Chicken Egg Yolk!

- Collaboration with Dr. Geetha Bali @ Bangalore University
- Setup NSD first antibody purification lab
- Successful production and developed new methodology for antibody production
- Biggest negative: Lack of hands on trained technicians. NSD had to train the workforce! Big overhead for companies.

Our Trip to Mysore, India

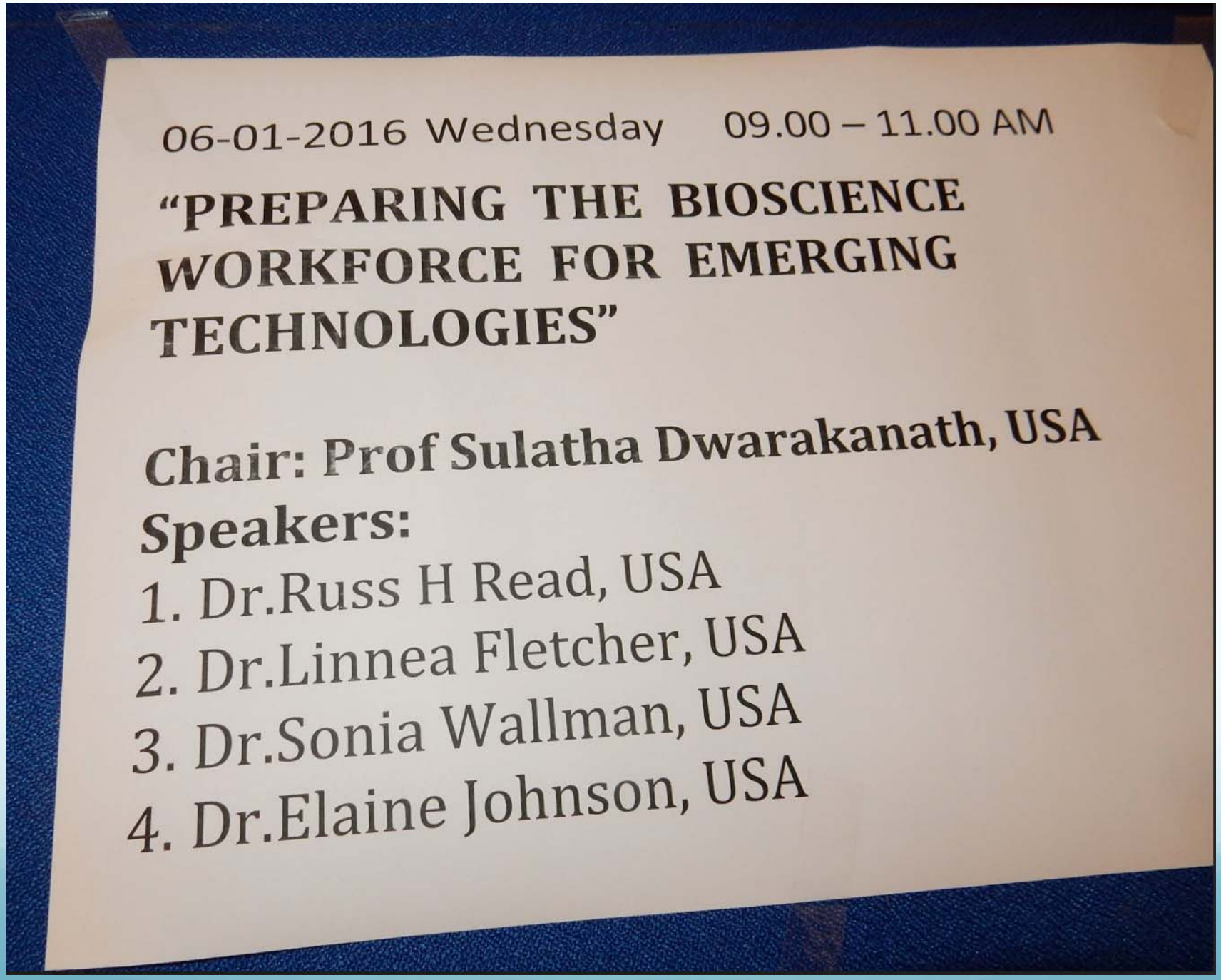
National Flag

Prime Minister Modi

Mysore University

23 Recognized Languages

1.3 Billion People


06-01-2016 Wednesday 09.00 – 11.00 AM
"PREPARING THE BIOSCIENCE WORKFORCE FOR EMERGING TECHNOLOGIES"
Chair: Prof Sulatha Dwarakanath, USA
Speakers:
1. Dr.Russ H Read, USA
2. Dr.Linnea Fletcher, USA
3. Dr.Sonia Wallman, USA
4. Dr.Elaine Johnson, USA

"A Passage to Biotech in India"

Mysore Agenda

We…

- were in invited by the 103rd Indian Science Congress
- saw the Prime Minster of India give an address on Science & Technology Policy
- gave our talk on the Bioscience Workforce
- toured the bioscience and nanoscience labs at Mysore University
- toured a small innovative research company in Bangalore doing CNS stimulation and stem cell research

"A Passage to Biotech in India"

Mysore Agenda

Observations

- Technical/Vocational community colleges workforce training seemed new to the discussion regarding biotechnology *
- Our presentation was well attended just under 200 people
- Attendees agreed that there was a need for workforce training in Biotechnology
- On our tours of the university and the private company labs we met top notch educators, scientists, and saw well equipped labs
- Our hosts had a great interest in our work and a desire to collaborate

"A Passage to Biotech in India"

The Indian government estimates that 500 million young people must be trained by 2022 and has made skills training a major policy issue

http://mobile.nytimes.com/2013/06/03/world/asia/filling-indias-huge-need-for-vocational-training.html?referer&_r=0

Technical/Vocational community colleges workforce training seemed new to the discussion regarding biotechnology

"A Passage to Biotech in India"

Trip Results

We…

- had several enquiries about attending our NSF ATE BIFP summer program and a potential stem cell collaboration
- made many great contacts
  - Prof. From University of Mysore wanted to collaborate
  - Prof. From Karnatak University wanted to collbarate and will be coming for discussions in June 2016
  - Collaboration with ANSA (will talk more in next few slides)
- got great Community College exposure-14,000 people attended the Indian Science Congress

ANSA- Stem Cell Research
Bangalore India

- Research on using stem cells in CNS disorders
- Run by Dr. Venkataraman, Neurosurgeon
- Has put some of the research into practice with great success
- Set up CRO work
- Stem Cell Certification: To train the local technicians: In collaboration with CCSF (Bio-Link), MATC, ACC (AC2- Bio-Link regional center) and FTC (C3BC)
- Workshop for Workforce Training using the MATC model

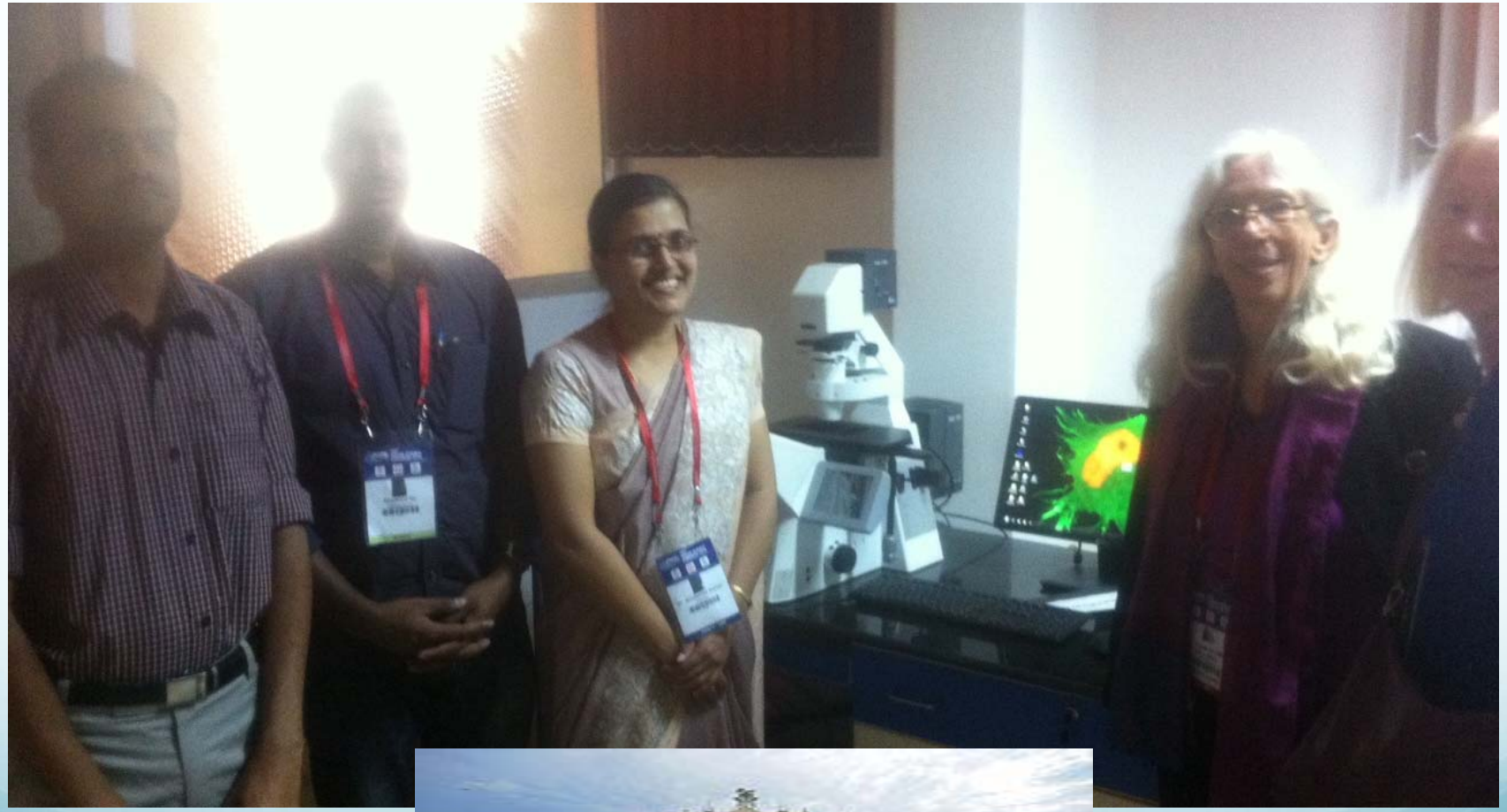
ANSA- Stem Cell Research
Bangalore India

Going forward:

- Collaboration agreement
- Workshop on Stem Cell by Tom Tubon (in Bangalore, India) Target date Jan-Feb 2017
- Work on the curriculum for he Stem Cell Certification
  - Who will administer ie., which college
  - Who are the partners
  - What Skills standards to be incorporated

Mysore University Labs

Mysore University Labs



A Visit to a Biotech Company

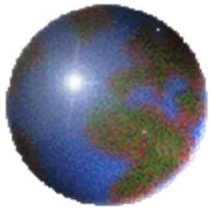
Visit to a Biotech Company

Visit to a Mysore Regional School

A Visit to a Mysore Regional School

Community College Day at BIO 2016

A Serendipitous Lesson in Evaluating Workforce Needs: Global Perspectives on Biotechnology Workforce Development



Dr. Brian R. Shmaefsky
Lone Star College – Kingwood, TX

International Biotechnology Workforce Collaborations: What Was Learned or Will Be Shared, and How To Get Involved

San Francisco, CA

June 6, 2016

8:30am-9:45am

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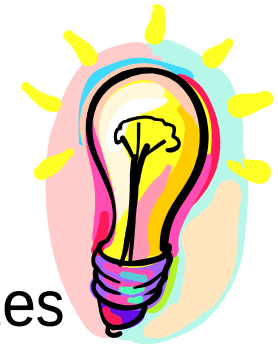
What I Went There to Do

- Help, by convincing them what I thought they should being doing.

What I Learned

- An understanding of the cultural and historical influences on international biotechnology business
- A recognition of the growth of global biotechnology linkages today
- An understanding of the U.S. position in biotechnology world trade and the impact international business has on the United States
- An appreciation of the opportunities and challenges offered by international biotechnology business



Where I Learned It

Some Trends of the Emerging Biotechnology Industries

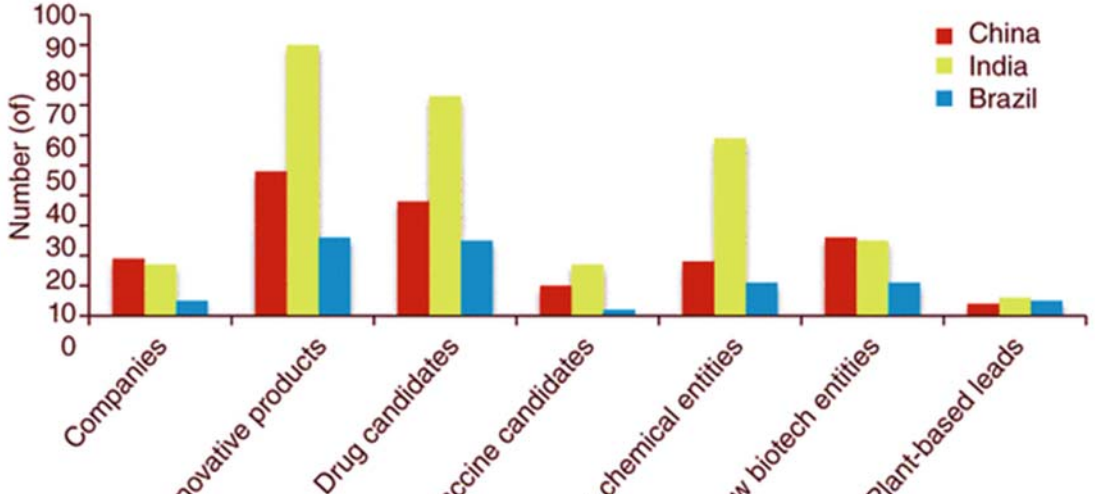
- There has been a shift of traditional biomanufacturing from developed nations to countries with emerging economies

Some Trends of the Emerging Biotechnology Industries

- Emerging economies are also investing in biotechnology through education, infrastructure change, and collaboration.

Some Trends of the Emerging Biotechnology Industries

- Some directions of emerging economies directions:
  - Niche markets
  - Direct competition



Need for International Biotech

- **International business:**
  - Causes a flow of ideas, services, and capital across the world
  - Offers consumers new choices
  - Permits the acquisition of a wider variety of products
  - Facilitates the mobility of labor, capital, and technology
  - Provides challenging employment opportunities
  - Reallocates resources, makes preferential choices, and shifts activities to a global

My Message to You

- Teach students the following:
  - Understanding of cultural diversity
  - Understanding how to collaborate globally
  - Develop excellent communication skills
  - Know cultural differences in time and project management
  - Learning about sustainability principles
  - Understand principles of outsourcing
  - Continually self-assess and update their skills


The End

Haiti Bioscience

The Haiti Bioscience Initiative

BIO Community College Day

BIO 2016 Conference

Haiti statistics (pre-earthquake) Source: UN

- 55 percent of Haitians live on less than $1.25 per day.
- Per capita annual income is $660.
- 58 percent of children are under-nourished.
- 58 percent of the population lacks access to clean water.
- Devastating hurricanes in 2008 affected 800,000 people.
- Deforestation has left the nation with less than two percent forest cover.

Haiti Earthquake January 12, 2010

January 12, 2010

Haiti Earthquake Relief

Several hundred thousand people lost their lives in the several hundred thousand buildings that collapsed; the earthquake destroyed national treasures like the Presidential Palace, the National Assembly building, and the Port-Au-Prince Cathedral.

The world pledged $ 16.3 billion in relief and volunteers rushed to Haiti to help. It became “The Republic of NGOs”

$6.43 billion disbursed by multilaterals and bilaterals from 2010-2012

"If you give a man a fish you feed him for a day. If you teach a man to fish you feed him for a lifetime."

Haiti Bioscience

Haiti Bioscience Initiative – Pilot 2014

Haitian Bioscience Initiative Team (so far)

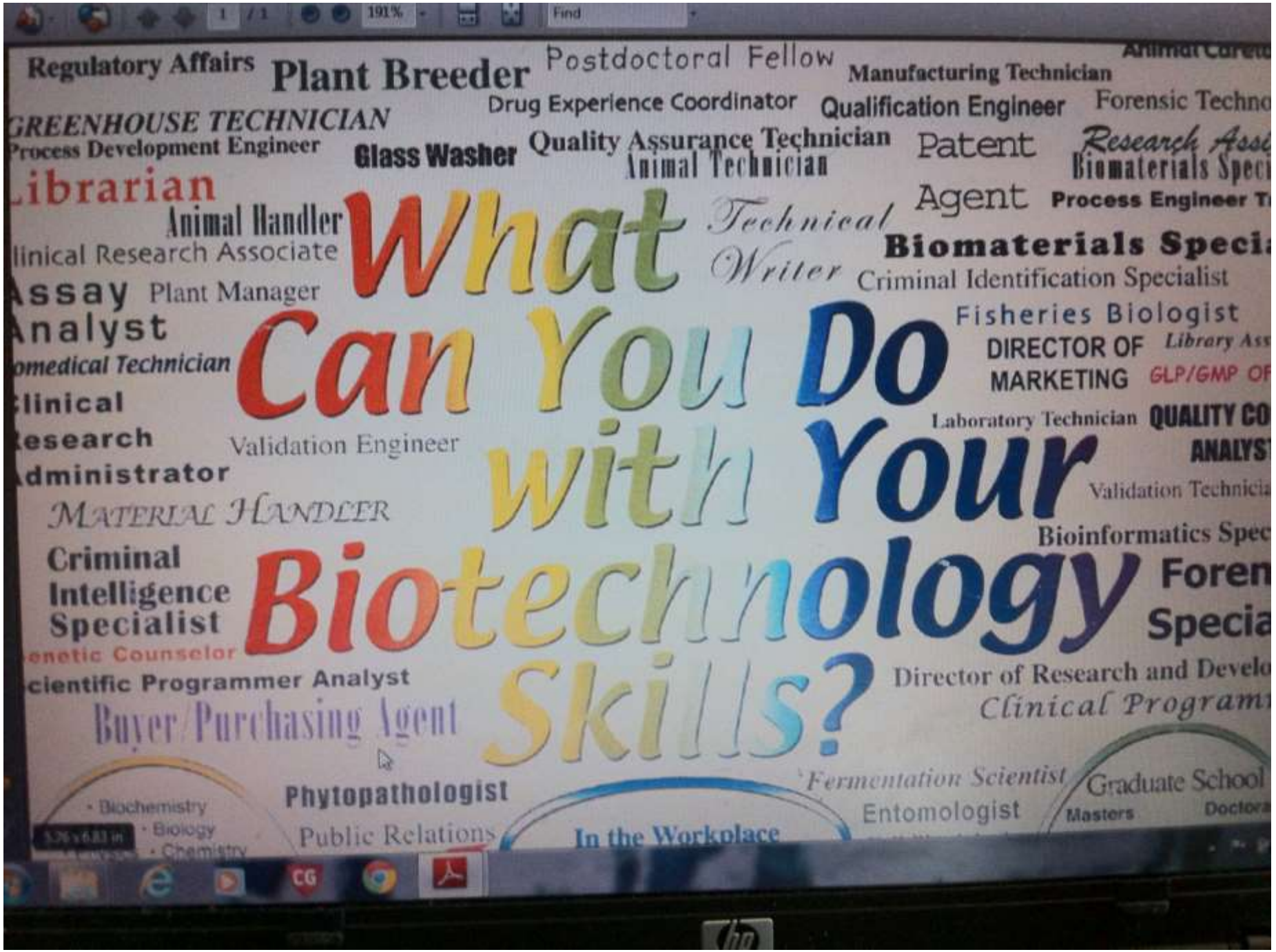
Ecole Superieure d’Infotronique d’Haiti
Lekòl Siperyè Enfotwonik

- College Catts Pressoir
- ESIH
- UEH
- Vivario

Challenges

- Language?
- Equipment?
- Curriculum?

First Slide

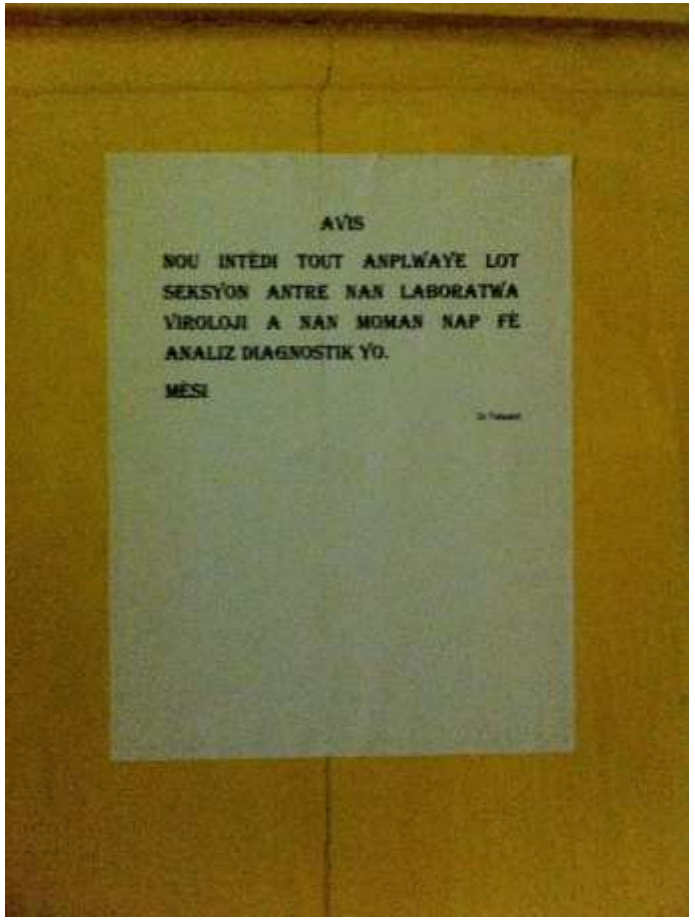

Regulatory Affairs
Plant Breeder
Postdoctoral Fellow
Manufacturing Technician
Drug Experience Coordinator
Qualification Engineer
Forensic Techno
GREENHOUSE TECHNICIAN
Process Development Engineer
Glass Washer
Quality Assurance Technician
Animal Technician
Patent
Agent
Librarian
Animal Handler
Technical
Writer
Biomaterials Speci
Process Engineer T
linical Research Associate
Assay
Plant Manager
Criminal Identification Specialist
Analyst
omedical Technician
Clinical
Research
Administrator
Validation Engineer
Fisheries Biologist
DIRECTOR OF MARKETING
Library Ass
GLP/GMP OF
Laboratory Technician
QUALITY CO
ANALYST
Validation Technicia
MATERIAL HANDLER
Bioinformatics Spec
Criminal Intelligence Specialist
Foren
Specia
enetic Counselor
cientific Programmer Analyst
Director of Research and Develo
Clinical Program
Buyer/Purchasing Agent
What Can You Do with Your Biotechnology Skills?
Phytopathologist
Fermentation Scientist
Entomologist
Graduate School
Masters
Doctora
Public Relations
In the Workplace
Biochemistry
Biology
Chemistry

Laboratory Tours

Equipment


VIROLOGIE-1


BACTERIOLOGIE-1



Haiti Bioscience

10 Haitian Social Media Influencers You Should Follow - Bien Aime Post

- 2. **Ilio Durandis** – Ilio is the founder of Haiti Bioscience. Anyone who follows Durandis is bound to get some valuable insights into Haiti's politics and his passion for changing the limited number of scientists in Haiti. Durandis holds a master's degree in Molecular Biology, a bachelor in Biological Sciences, and a degree in Political Science.
- He currently serves as the Vice-Dean of the Medical Biology department at Universite Notre Dame Haiti- in Hinche. In February 2015, Durandis presented the results of the Haitian Bioscience Initiative pilot at the annual AAAS conference as part of the Science for Haiti Reconstruction Symposium. He has written more than 200 articles on Haiti. His publications can be found at the Haitian Times, Haiti Rewired, Caribbean Journal and Medium. Ilio is also working to launch the startup Veritab Services in Haiti. Reach him @durandis.
- - See more at: http://bienaimepost.com/10-haitian-social-media-influencers-follow/#sthash.twE0z0TT.dpuf

US AID Grant proposal