STEM Learning Exchange Presentations

January 30, 2013

Agriculture, Food and Natural Resources: Jay Runner

Energy: William Hunter

Health Science: Bruce Neimeyer

Information Technology: Colleen White

Manufacturing: Jim Nelson

Research and Development: Jane Fischer

Transportation, Distribution, and Logistics: Ben Brockschmidt
Agriculture, Food and Natural Resources STEM Learning Exchange

Jay Runner
AFNR Career Pathways

- Agricultural Science (Plant, Animal, Food)
- Agricultural Business Management
- Agricultural Mechanic & Technology
- Natural Resources Conservation Management
- Horticulture Science
Highlights

- Agribusiness industry comprises 75% Illinois’ land area
- Employs over 163,000 workers
- Contributes $13.5 billion to state’s economy
- Core of human survival providing food and shelter
- Over 300 career opportunities
- Illinois Agricultural Education students are 90% non-farm, 37% female, 10% minorities
Career Profile

Name: Alex Williams
Job Title: Horticulturist

Employer: Indianapolis Park District
Education: BS, Purdue University: West Lafayette, IN

I am a horticulturist for the Indianapolis Park District. I have had an interest in plants since I was a child. However, it wasn’t until a school counselor told me that I could study horticulture that I decided to pursue a career related to plants.

The position I hold allows me to work with plants and many great people. I participate in the planning, planting, and care of ornamental and vegetative crops. In doing so, I must stay within a budget. I see that the park district conservatory is managed for seasonal shows. I schedule crops for indoor and outdoor displays in the production greenhouse. Among my responsibilities are the selection of plant varieties and calculation of the number of plants to be grown. I supervise technicians who propagate, water, and fertilize crops. I assist landscape architects with park planning by sharing my knowledge of woody landscape plants. I give instruction to crews that conduct maintenance work such as pruning, mowing, and pest management.

One of the most rewarding parts of my job is the interaction with the public. I have been involved in a community vegetable gardening program. This program has gotten people involved in growing their own vegetables. I have also conducted a variety of classes for homeowners on such topics as how to prune trees and shrubs and lawn care.
Career Profile

“Map”

Horticulturist

Overview

A horticulturist applies the science and art of growing plants to various situations.

Suggested High School Courses

- Horticulture Science
- Biology
- Plant Science
- Chemistry
- Mathematics
- Computer Science

Experience Needed

Seek an internship while in school and/or job shadowing to gain practical experience. Plan and implement a related Supervised Agricultural Experience (SAE) Program.

Degree(s) Required

An associate’s degree with six months to one year related experience and/or training. A bachelor’s degree may be preferred. Certifications such as a Pesticide Applicator’s License are recommended.

Potential Employers

- Arborets
- Botanic gardens
- Municipalities
- Universities
- Colleges

Salary Range

$53,800 to $57,984

Employment Outlook and Trends

An average growth of employment opportunities is predicted due to demand for qualified candidates to replace those who retire, die, and change jobs or occupations.

Professional Organizations

- American Horticultural Society (AHS) www.ahs.org
- American Nursery and Landscape Association www.anla.org

Want to Learn More?

www.amenervation.com
www.greenhousegrowers.com
www.garden.org
www appré.org
www.ahs.org
www.anla.org

Published by Department of Economic & Community Development
AFNR STEM LE Partnerships

- Illinois Committee for Agricultural Education (ICAE)
- Illinois Leadership Council For Agricultural Education (ILCAE)
- Illinois TEAM AG ED
- Illinois Association Vocational Agricultural Teachers (IAVAT)
- Illinois Association Community College Agricultural Instructors (IACCAI)
- Illinois Ag In The Classroom (IAITC)
- Facilitating Coordination in Agricultural Education (FCAE)
- Illinois FFA Association
- Illinois Foundation FFA
- Illinois FFA Alumni
- Illinois American Water
- Midwest Engines
- Lincoln Welders
AFNR STEM LE Initiatives - Work-Based Learning and Professional Development

- Supervised Agricultural Experience (SAE) Mini-Grant
- SAE AgriScience Research Start-up Mini-Grant
- Illinois FFA AgriScience Fair Participation
- CTE Water, Food, Energy Challenge Project
- Mentor Program with “Career Cruising”
- Teacher Professional Development Workshops
- Internships for Secondary and Postsecondary Students
AFNR STEM LE Initiatives – Curriculum Resources and Assessments

- Common Core Math and Science Integration Activities
- End of Year Course Assessments
- Alignment of Existing Curriculum and Resources to Common Core Standards
- Agricultural Industry Certification Development
AFNR STEM LE Initiatives – Technology

- Illinois Agricultural Education Website Revision – Educational Resources, Professional Development, Career Development and Outreach, Data Collection Enhancement
- Align Various Agricultural Education Data Sources
FCAE Staff
Energy STEM Learning Exchange

William Hunter
Illinois Energy Learning Exchange

Dr. William J.F. Hunter
Director, Center for Mathematics, Science and Technology
Illinois State University
ELE Vision

V1. Promote STEM learning using Energy as the medium.
V2. To provide an introduction to energy-related careers (including Energy literacy expectations that everyone should achieve).
V3. To provide advanced education on energy related careers (so that those with talent and interest are able to make moves into careers).
V4. To compile a list of opportunities that exist, barriers to achieving the goals, and to identify low-hanging fruit in energy education that could be achieved in the next 12-18 months.
Energy Cluster: Developing, planning and managing the production of energy including renewable energy and clean coal technology and its distribution through smart grid technologies.

Select any Pathway to see related programs then click on any course, work-based learning, credentials/assessments, or shared pathway icon to see related lists.

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<th>Energy Pathways</th>
<th>Orientation (e.g. Middle &amp; High School)</th>
<th>Pathways (e.g. High School)</th>
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<td>Careers</td>
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Supply and Demand Reports
Collection of reports highlighting cluster occupation profiles and Illinois school programs and completers.
ELE Plans

1.1 Create a repository/clearinghouse, a master energy curriculum database/catalog
2.1 Develop a rating system
3.1 Adopt or modify the U.S. Department of Energy Literacy Standards
3.2 Specify at a minimum that all students be able to demonstrate the 6 energy literacy outcomes in various ways at various grade levels.
4.1 Address career readiness,
4.2 Formally adopt career orientated outcomes
3.1 What is Energy Literacy?
An understanding of the nature and role of energy in the universe and in our lives.
The ability to apply this understanding to answer questions and solve problems.
An energy-literate person:
1. can trace energy flows and think in terms of energy systems
2. knows how much energy he or she uses, for what, and where the energy comes from
3. can assess the credibility of information about energy
4. can communicate about energy and energy use in meaningful ways
5. is able to make informed energy and energy use decisions based on an understanding of impacts and consequences, and
6. continues to learn about energy throughout his or her life.
4.1 & 4.2 What is an energy-career ready person?

1. Has an increasingly sophisticated immersion in energy-career knowledge – progressing from courses, to site visits, to internships, to on the job training.

2. Can calculate, discuss, and work with energy on the sub-visible scale (Ohms, watts, resistance, hertz, joules, AC/DC, etc.).

3. Can calculate energy usage, energy efficiency for small and large applications – appliances, machinery, buildings, factories, municipalities, etc.

4. Has the people/soft skills to interact with consumers, industry representatives, government officials in energy related issues.

5. Has the technical skills to work safely, productively, and efficiently at an entry level for various energy-related industries.
Who is Part of the Energy Learning Exchange?
Energy Learning Exchange Members

Colleges and Universities:

- Illinois State University
- Northern Illinois University
- Richland Community College
- Western Illinois University
- Illinois Institute of Technology
- College of Lake County
- Eastern Illinois University
- Initiative for Sustainability and Energy at Northwestern
- Advancing Biofuels Research
- Kankakee Community College
Energy Learning Exchange Members

Schools:

- Adlai E. Stevenson High School
- Homewood-Flossmoor High School
- Pontiac Township High School
- Chicago Public Schools
Energy Learning Exchange Members

Companies:

Kestrel Development Company
Robert M. Fletcher Company
PROactive Strategies, Inc.
Sustainable Strategies
Energy Learning Exchange Members

Workforce Boards:

- Cook County
- McHenry County
- DuPage Workforce Board
- Lake County
- Workforce Investment Board of Will County

The Workforce Boards of Metropolitan Chicago
Energy Learning Exchange Members

Workforce Related:

Operation Green Jobs

SEIU Local 73
Representing 25,000 Public Service Employees in Illinois & NW Indiana

TEAMSTERS LOCAL 786

Local 18007
Energy Learning Exchange Members

More:

IBRT
The Illinois Business Roundtable

ILLINOIS CHAMBER
OF COMMERCE

IGEN
Illinois Green Economy Network
A Community College Partnership

ILLINOIS ENERGY ASSOCIATION
National and State Resources

Illinois Energy Workforce Consortium
Health Science STEM Learning Exchange

Dr. Bruce C. Neimeyer
Health Science Learning Exchange

Lead Entity – University of Illinois at Chicago
Dr. Bruce C. Neimeyer
Associate Vice Chancellor for Special Programs
Examples of Associated Coursework

- **Informatics/Health Information Technology**
  - Computer Information Technology
  - Medical Office Procedures – CTE Course
  - Office and Administrative Technologies

- **Biomedical Research and Development**
  - Bio-Medical Capstone
  - Bio-Medical Science
  - Medical Interventions

- **Support Services**
  - Central Supply Services
  - Health Support Service – Workplace Experience or Independent Study
  - Vocational Rehabilitation and Community Living Skills

- **Therapeutic and Diagnostics**
  - Clinical Lab Assistant Course
  - Dental Assistant
  - EKG Technician
  - Home Health Aid or Nursing LPN
Examples of Careers

**Informatics/Health Information Technology**
- Medical and Health Services Managers / Med Records and Health Info Technicians / Medical Assistants / Medical Transcriptionists / Administrative Services Managers / Healthcare Support Workers / Bill and Account Collectors / Receptionists and Information Clerks

**Biomedical Research and Development**
- Medical Scientists and Epidemiologists / Biological Scientists / Microbiologists / Biochemists and Biophysicists

**Support Services**
- Mental Health Counselors / Medical Health Social Workers / Rehab Counselors / Substance Abuse and Behavioral Disorder Counselors / Dietetic Technicians / Food Service Managers / 1st line Server and Managers Food Prep / Cooks in Institutions and Cafeteria

**Therapeutic and Diagnostics**
- Med and Clinical Lab Technologists and Technicians / Diagnostic Medical Sonographers / Nuclear Medicine Technologists / Radiologic Techs / Cardiovascular Techs
Health Science Learning Exchange

Current Partners

- Employers
- Industry Associations
- Labor Unions
- Professional Associations
- Secondary Educational Institutions
- Community Colleges
- Private and Public Universities
- State Education and Econ Development Agencies
- STEM Education Experts
- Local Workforce Investment Boards
- Museums
- Community Based Non-Profits
Health Science Learning Exchange

Resources Offered

- Resources to support personalized education plans & transit. to post-sec
- Access to classrooms, lab space and equipment
- E-Learning Curriculum Resources
- Support for Student Org.
- Work Based Learning Opps.
- Career Develop. and Outreach
- Project Challenges
- Assessment
- Prof. Develop. for Teachers
Contact Bruce Neimeyer at neimeyer@uic.edu or 312-996-8820 to add your name to the working membership of the HSLE.

Provide your current projects that support the nine core functions of the HSLE so that we can demonstrate to potential financial supports the current level of work that can be expanded.

Be active in the HSLE so that you can help to inform the direction we take next.
Information Technology STEM Learning Exchange

Colleen White
A Career in Information Technology

- Knowledge and Skills Required
  - Foundational, entry-level skills for IT technicians

- Types of Credentials/Careers
  - CompTIA A+:
    - Technical support specialist
    - Field service technician
    - IT support technician
    - IT support administrator
    - IT support specialist
  - CompTIA Network+:
    - Network administrator
    - Network technician
    - Network installer
    - Help desk technician
    - IT cable installer
Current Partnerships
Working to Get Other Partners Like…

- Groupon
- Google
- Boeing
- BlueCross BlueShield of Illinois
- Northwestern University
3 Year Strategic Plan

• **2013 Focus**
  – Provide E-Learning Curriculum Resources
  – Provide Professional Development Resources for Teachers, Administrators, Guidance Counselors/Programmers
  – Provide Career Development and Outreach Resources for Students, Teachers, Administrator, Guidance Counselors/Programmers and Parents

• **2014 Focus**
  – Expand Access to Space, Equipment and Resources
  – Support Student Organizations and the Major Activities
  – Sponsor Challenges and Project Management Resources for Students
  – Provide Student Data and Assessment Tools and Resources on Students’ Performance on the IT POS

• **2015 Focus**
  – Connect Students with Adult Mentors
  – Provide Tools & Resources to Assist Implementation of Personalized Education Plans
Examples of Resources Support

- **Work-Based Experiences/Internships/Apprenticeships**
  - *Rico Enterprises, Inc*: Internships, work-based learning experiences, speakers and mentors for career development

- **Curriculum Resources**
  - *Microsoft*: e-Learning courses
  - *IL Institute of Technology*: on-line courses
  - *Pearson Education*: e-Learning content
  - *TEC Services Consulting*: e-Learning curriculum

- **Technology, Equipment, Training**
  - *IL Institute of Technology*: lab time, instructors teaching hours, course seats
Final Comments

• Major IT skills gap in U.S. today
  – Currently more than 350,000 open IT jobs with not enough qualified candidates to fill open positions

• IT companies highly value industry certifications
  – Validates knowledge and skills

• A+ prepares students for entry level jobs
  – IT Technicians are needed in every industry
Manufacturing STEM Learning Exchange

Jim Nelson
Manufacturers Education Initiative

A comprehensive approach to preparing students and adults for careers in Advanced Manufacturing
The Challenge

- At the height of the global recession, **four in five (82%)** manufacturing companies reported moderate to serious skills shortages in the hiring pool.

- Contributing to our workforce challenges are:
  - Demographics: We face a graying workforce coupled with a shrinking pipeline. In Illinois, **30,000 retiring production workers need replacements every year for the next 10 years**.
  - Technological advances in modern **manufacturing require more advanced skill sets**. We are inventing the jobs of the future.
  - Major **deficits in our education system hamper competitiveness** on the world stage: our global competitors continue to surpass our educational system in producing a high-volume, high-quality technical workforce.
Illinois’ P-20 Council recognizes the issues

- The goal of Illinois’ P-20 Council is "60% by 2025". Currently 43% have post-secondary degrees/meaningful certificates, goal is 60% by 2025.

- Businesses have boomer generation retirement problem, and we can’t wait until 2025 for it to be solved.

- Our initiative introduces students to jobs in manufacturing and TD&L so they know the options before them. Training can begin in High School and can engage a "learn while you earn" model (particularly helpful to kids of limited means).

- High school diplomas don’t have as much currency as they once did, and virtually all jobs in manufacturing today requires some post-secondary education.
How it works...

- HIGH SCHOOL DIPLOMA
- DIPLOMA + SPECIALTY
- ASSOCIATE DEGREE WITH SPECIALTY
- ASSOCIATE DEGREE WITH MULTIPLE SPECIALTIES
- APPLIED INDUSTRY BACHELOR’S DEGREE
- GRADUATE DEGREE
- OPERATOR
- CERTIFIED PRODUCTION TECHNICIAN
- ENGINEERING TECHNICIAN
- ENGINEER, MANAGER
- BUSINESS MANAGER

Society of Manufacturing Engineers

niMs
MSSC
National Career Readiness Certificate™
The Manufacturers Education Initiative

- Industry-driven
- Aligned to the Manufacturing Competency Model
- Nationally Portable
- Third-Party Validated (ISO/ANSI)
- Data-based and Supported
Nationally recognized organizations see the challenge…and offer certifications
What Manufacturers Want
(Requirements for every job)

- Workers who have obtained the skills necessary to fulfill the requirements of the job
- Acceptable soft skills - Attendance, proper attire, ability to communicate, ability to work as part of a team, etc.
- The successful passing of drug screening
- Disclosure of any criminal background
- Reliable Transportation/Child Care
What educators want from employers

- Worthwhile Internships for students that put into practice what is taught in the classroom
- Between-term Externships for faculty to make sure students are being taught the latest techniques and processes and...
- ...help with obtaining up-to-date equipment
- A guarantee for interviewing students successfully completing certificates
- An ongoing dialogue to assure continuous improvement
How can we get started?

Thank you for your time
Research and Development

STEM Learning Exchange

Jane Fischer
Overview

Research & Development (R&D)
Science, Technology, Engineering and Math (STEM)
Learning Exchange
The Illinois Science & Technology Institute (ISTI) leads the R&D STEM Learning Exchange as part of Illinois Pathways Race to the Top program.

The mission of the ISTI is to advance scientific understanding and technological innovation in Illinois through discovery, education, invention and partnership.

The ISTI is an affiliate of the Illinois Science & Technology Coalition (ISTC), a statewide leader that cultivates and attracts research and technology-based economic development in Illinois.
# About Our Partners

## The R&D STEM Coalition

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<td>Hinsdale Central High School</td>
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<td>Motorola Solutions</td>
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<td>Kraft Foods Inc.</td>
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<td>Northwest Educational Council for Student Success</td>
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<td>Wm. Wrigley Jr. Company</td>
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<td>Walter Payton College Prep</td>
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R&D STEM Learning Exchange
Strategic Plan

- Completed January 2013
- Steering committee of diverse partners led strategic planning process
- Gathered feedback from Coalition members and many teachers
- Focus on improving secondary school student access to authentic research and development experiences in and out of school
<table>
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<th>Online STEM Learning Tools</th>
<th>Electronic Mentor Matching</th>
<th>STEM Events and Challenges</th>
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<td>• R&amp;D-focused resources and services</td>
<td>• Links students with industry/university mentors</td>
<td>• Supports industry-led challenges using real world problems</td>
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<tr>
<td>• Aligned to Next Generation Science and Common Core Math Standards</td>
<td>• Supports meaningful research collaboration within mentoring relationship</td>
<td>• Enhances industry and career awareness through statewide events</td>
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Examples

**Integrate standard-aligned, quality R&D STEM experiences**
- Teachers use hands-on learning tools and professional development from the Shedd Aquarium, FermiLab and Argonne that are reviewed and aligned to standards

**Engage students and teachers in real-world problems**
- Eaton Corporation and Baxter provide electronic mentoring to students across the state around real-world challenges

**Encourage innovation through partnership**
- Together NanoInk, Oakton Community College and Wheeling High School are changing the field of nanotechnology
Opportunities to Engage

• Consider Research & Development as program of study

• Contact us to discuss how to make the most of current programs and relationships

• Provide feedback: Participate in our upcoming asset map/program inventory of existing resources
Contact Us

**Erin Lane**
Director, STEM Initiatives
elane@ISTCoalition.org

**Jane Fischer**
Strategic Consultant
jane.fischer@trygvellc.com

312.239.0350
www.ISTCoalition.org
Transportation, Distribution, and Logistics STEM Learning Exchange

Ben Brockschmidt
46 Railroads
7,000+ miles of track

North American ports

High-Speed Rail
CREATE Program

Illinois is top THREE for rail in

• Carloads carried
• Carloads terminated
• Carloads originated
• Tons originated
• Tons terminated
• Tons carried
2010
• 1.26 billion tons of goods
  • Trucks carried 63
  • Rail carried 26 percent
• Waterways transported 11 percent
  • Air, a tenth of one

2040
• 1.7 billion tons of goods
• Trucks will carry 67%
• Rail will carry 24%
• Water will carry 9%
• Air will carry 0.2%

Increase of
Trucks - 334.2 million tons
Air freight - 3 million tons
Rail - 79.5 million tons
Water - 13.9 million tons
Thank You!