



Sustainable Global Technology Development, Transfer, and Commercialization for Small/Midsize Enterprise through GATTE: Two Technology Show Cases

- 1) A Corrosion Monitoring System with Innovative Sensor for Early-Stage Warning of Environmental Corrosion of Structures and Infrastructures, Max Yen, Paul I-Hai Lin, and Dong Chen
- 2) An Integrated Energy Harvesting System Using Solar Power and Thermal Electric Generators, Paul I-Hai Lin, MengWei Li, and Gary K. T. Lin

Presented by Paul I-Hai Lin
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 - Brandon Hsieh, Technology Transfer Center, IP Consulting Division
- This presentation is a collection of efforts of an interdisciplinary team of IPFW and Northeast Indiana leaderships who are dedicated to help improving the current regional (if not global) economic challenges.

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Sustainable Global Technology Development, Transfer, and Commercialization for Small/Midsize Enterprise through GATTE

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Topics

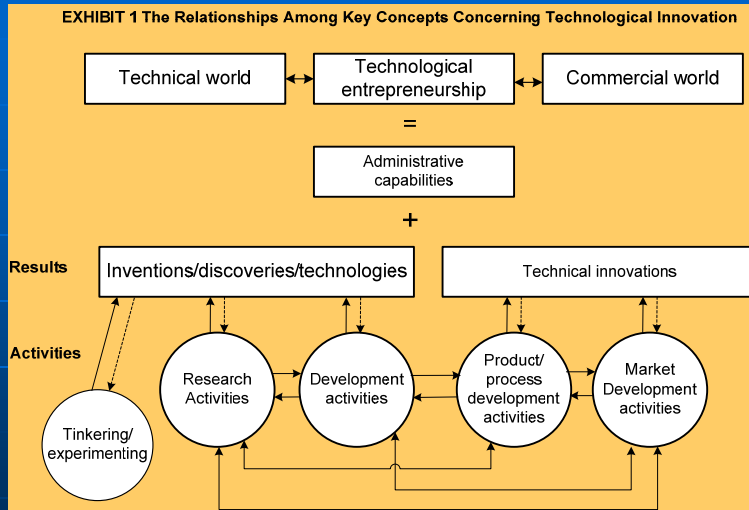
- Technology Show Case 1:
 - A Corrosion Monitoring System with Innovative Sensor for Early-Stage Warning of Environmental Corrosion of Structures and Infrastructures, Max Yen, Paul I-Hai Lin, and Dong Chen
- Technology Show Case 2:
 - An Integrated Energy Harvesting System Using Solar Power and Thermal Electric Generators, Paul I-Hai Lin, MengWei Li, and Gary K. T. Lin
- Technology Development, Transfer & Commercialization: Sustainable Global Perspective – Taiwan/U.S. Indiana
 - Global Alliance for Technology Transfer & Entrepreneurship (GATTE)
 - NIIC Innovation Center, www.niic.net
 - The Alliance (Fort Wayne-Allen County Economic Development Alliance), <http://www.theallianceonline.com/default.aspx>
 - Northeast Indiana Regional Partnership (10 counties), <http://www.neindiana.com/home>
 - Focused Technology Areas at Indiana University-Purdue University Fort Wayne

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Interrelations Among Key Concepts Concerning Technological Innovation¹



¹Robert A. Burgelman, Clayton M. Christensen, and Steven C. Wheelwright, *Strategic Management of Technology and Innovation*, 5th edition, McGraw-Hill, ISBN 0073381543, 2009.

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Technology Show Case 1

- A Corrosion Monitoring System with Innovative Sensor for Early-Stage Warning of Environmental Corrosion of Structures and Infrastructures, Max Yen, Paul I-Hai Lin, and Dong Chen
- Pictures of Patent/Technology



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Technology Show Case 1

■ Description of Patent/Technology

This corrosion monitoring system provides such capabilities as automatic data collection, processing and evaluation of the early-stage environmental corrosion which is very important to maintain the integrity and safety of the structures and systems that were built with such metal materials as carbon steel, aluminum, zinc and copper. Main modules and functionalities of this system include innovative micro-nano structure sol-gel and cylindrical corrosion sensors, analog signal processing circuitry, RS-485 and/or wireless sensor data acquisition modules, and cloud-based remote access and management functionalities.

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Technology Show Case 2

- An Integrated Energy Harvesting System Using Solar Power and Thermal Electric Generators, Paul I-Hai Lin, MengWei Li, and Gary K. T. Lin
- Picture of Patent/Technology



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Technology Show Case 2

■ Description of Patent/Technology

This integrated energy harvesting system includes green energy generation resources, secondary power reservoir subsystem (super capacitor, battery) and consumption devices; related energy source monitoring; and energy/power management and dispatching subsystems for residential, automobile, and a wide array of potential applications. It can harvest solar power and wasted heat energy through a combination of thermoelectric generator (TEG) and solar cells to produce the power to charge, energy output for powering thermoelectric coolers, air fan, and LED lighting devices.

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Research & Technology Focused Areas (Paul Lin)

- Cloud Computing & IT Technology
- Mobile Apps
- Environmental Infrastructure Monitoring
- Wireless Sensor Networks
- System Integration Technology
- Energy Harvesting Technologies (Wasted heat & Thermoelectric generator; Solar power & Thermoelectric cooling)
- SmartGrid Technology

Prof. Lin's Web site:
<http://www.etcs.ipfw.edu/~lin>

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Global Alliance for Technology Transfer & Entrepreneurship (GATTE)

- GATTE, <http://www.niic.net/services/global-alliance-on-tech-transfer-entrepreneurship-gate>
- **Vision:** “To connect innovative ideas to opportunities.”
- **Mission Statement:** “To inspire Globally-Centered Student Learning”
 - **Mutually beneficial economic development activity**
 - IP sharing
 - Technology transfer & licensing
 - Commercialization activities between and among Alliance partners
 - Launching of innovative technologies and ventures contributing to economic development goals of a region or country

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Global Alliance for Technology Transfer & Entrepreneurship (GATTE)

- **Mission Statement:** “To inspire Globally-Centered Student Learning”
 - Mutually beneficial economic development activity
 - **Launching of innovative technologies and ventures contributing to economic development goals of a region or country**
 - In some cases, partners may wish to form the venture and to globally launch in US with local partners, or to establish a sales/distribution office
 - In other cases, the professor or university may wish to be involved in commercialization of technology, or simply license the technology for commercialization elsewhere without ongoing involvement.

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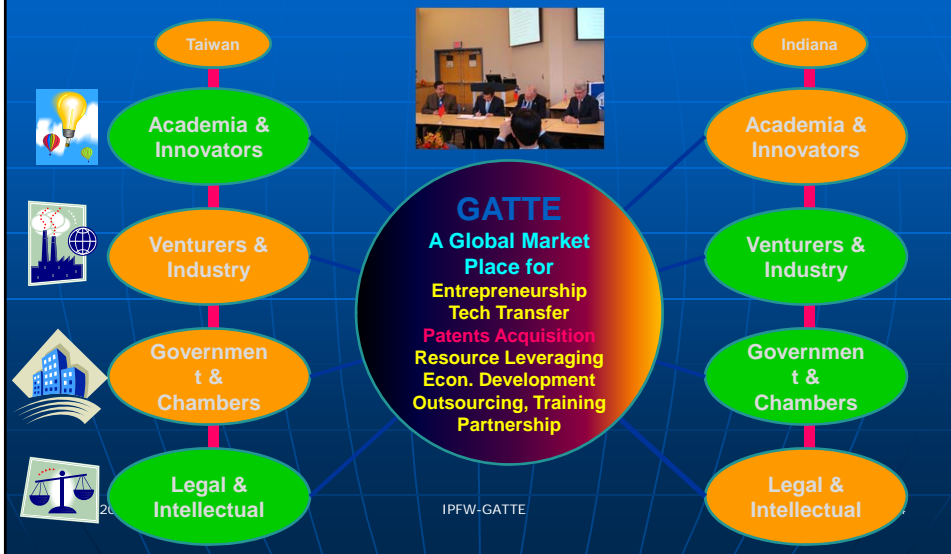


Global Alliance for Technology Transfer & Entrepreneurship (GATTE)

- Focus on three key interrelated priorities:
 1. It will make an international market for “orphaned” intellectual property (IP)
 2. It will engage international business and educational resources in commercialization of international IP
 3. Member universities and incubators throughout the world will help form new companies to commercialize international IP in their locales.



Global Alliance for Technology Transfer and Entrepreneurship



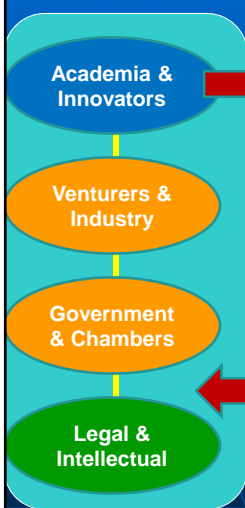


The GATTE Members in Taiwan

- Chung Yuen Christian University: <http://www.cycu.edu.tw>
- Feng Chia University: <http://www.fcu.edu.tw>
- I-Shou University: <http://www.isu.edu.tw>
- National Cheng Kung University: <http://www.ncku.edu.tw>
- National Formosa University: <http://www.nfu.edu.tw>
- National Taipei University of Technology: <http://www.stutu.edu.tw>
- National Taipei University: <http://www.ntpu.edu.tw>
- Southern Taiwan University of Technology: <http://www.stut.edu.tw>



GATTE Technology-Market Profile



Yes	No	Maybe	
x			License technology to U.S. investors/businesses
x			Establish U.S. sales and marketing office
		x	Create a U.S.-based business start-up with Taiwanese investment
		x	Develop a strategic manufacturing partnership
x			Sales and distribution of product to U.S

Yes	No	Maybe	
		x	Legal services (intellectual property and commercial law)
x			Business valuation
	x		Technical support (including testing, engineering and prototyping)
	x		Regulatory compliance
		x	Marketing and Market Survey
		x	Business planning
x			Investment capital and financing



Northeast Indiana Core Industry

- Core Industry, <http://www.neindiana.com/regional-initiatives>
 - Advanced Manufacturing
 - Defense/aerospace
 - Insurance
 - Food Processing
 - Medical Devices and Logistics

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DEFENSE

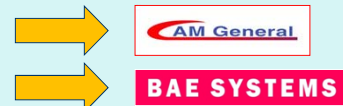
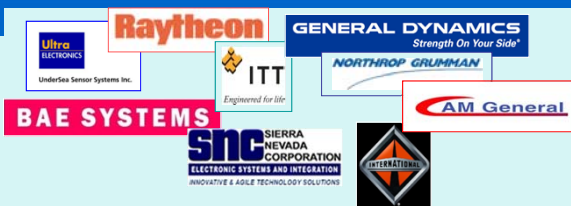
Suppliers



Universities



Government Agencies



Centers of Excellence

- Systems Engineering
- Wireless Communications
- Visualization and Analytics



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MEDICAL DEVICES


Businesses

Universities

Innovation



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Major Industries at NE Indiana

Company	FTE		
	2011	2012	Changes (%)
Parkview Health Systems	3,933	5,395	+37.2
Lutheran Health Network	4,156	4,667	+11.8
General Motors	3,341	3,880	+16.1
Steel Dynamics	2,435	2,254	-7.4
Lincoln Financial Group	1,750	1,970	+12.6
BF Goodrich Tire Manufacturing	1,584	1,580	0
ITT Corporation (Exelis)	1,581	1,203	-23.9
Nucor	1,525	1,550	0
Raytheon	1,200	950	-20.8

* Data from the Northeast Indiana Regional Partnership and the Community Research Institute

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Major Industries at Fort Wayne & NE Indiana

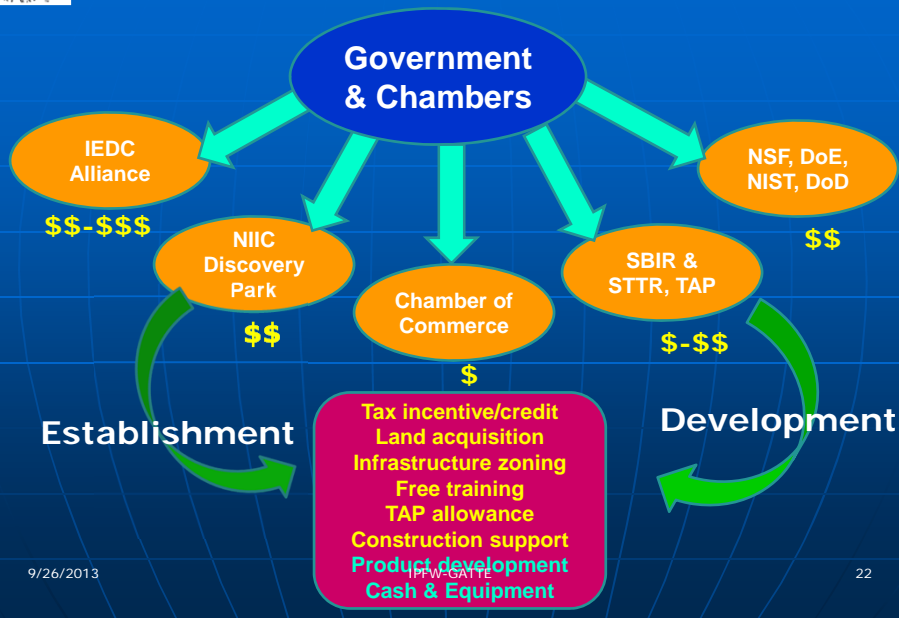
Company	FTE		
	2011	2012	Changes (%)
Frontier Communication	1,200	1,564	+30.3
Fleetwood RV	1,199	1,105	-7.8
Norfolk Southern	1,150	784	-31.8
BAE Platform Systems	899	1,150	+27.9
United Technologies	648	682	+5.2
Fort Wayne Metals	491	539	+9.8
Vera Bradley	407	955	+135

* Data from the Northeast Indiana Regional Partnership and the Community Research Institute; <http://www.neindiana.com/data/regional-profile>

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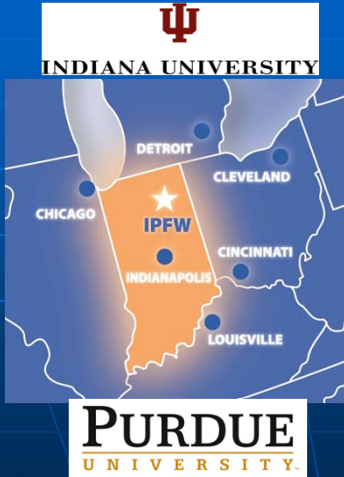
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Indiana University-Purdue University Fort Wayne (IPFW)



- ❖ Largest and most comprehensive public university in Northeast Indiana
- ❖ Opened in 1964 as a combined campus of Indiana and Purdue Universities
- ❖ Indiana University and Purdue University degree programs
- ❖ IPFW has grown into a multi-campus community with over 20 buildings
- ❖ Graduates over 1,700 students per year at all degree levels

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Indiana University-Purdue University Fort Wayne (IPFW)

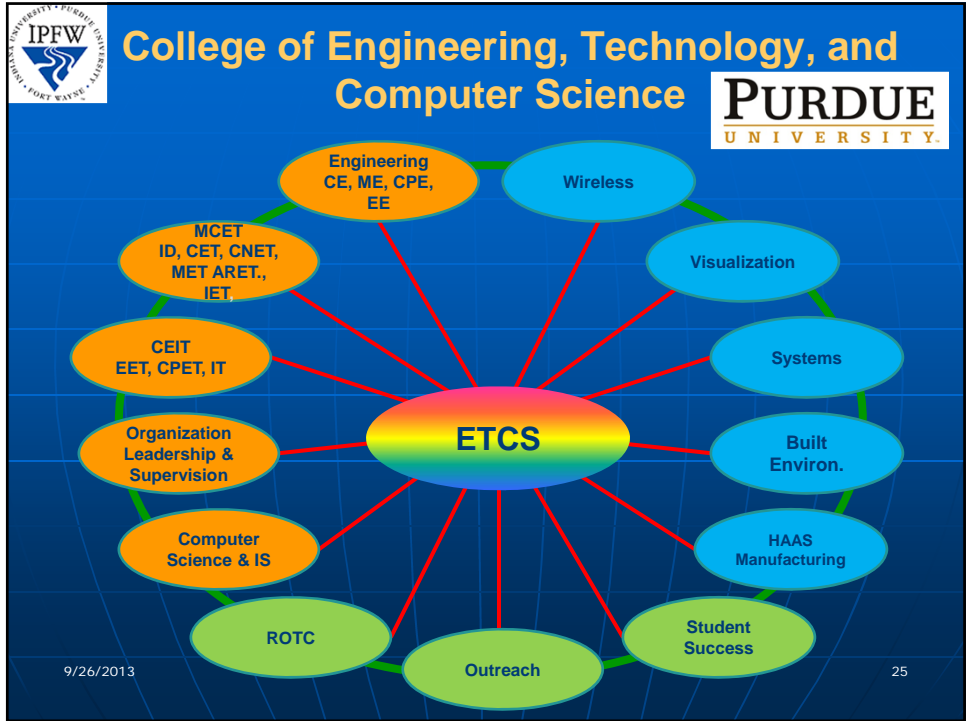


- ❖ Over 14,000 students
- ❖ Diversity of students with 45 states and more than 67 countries represented
- ❖ Additional 24,000 students pursue non-credit opportunities through Continuing Studies
- ❖ Nine academic units offer more than 200 academic degree programs
- ❖ Students can earn Associate, Bachelor, and Master's degrees, undergraduate and graduate-level certificates

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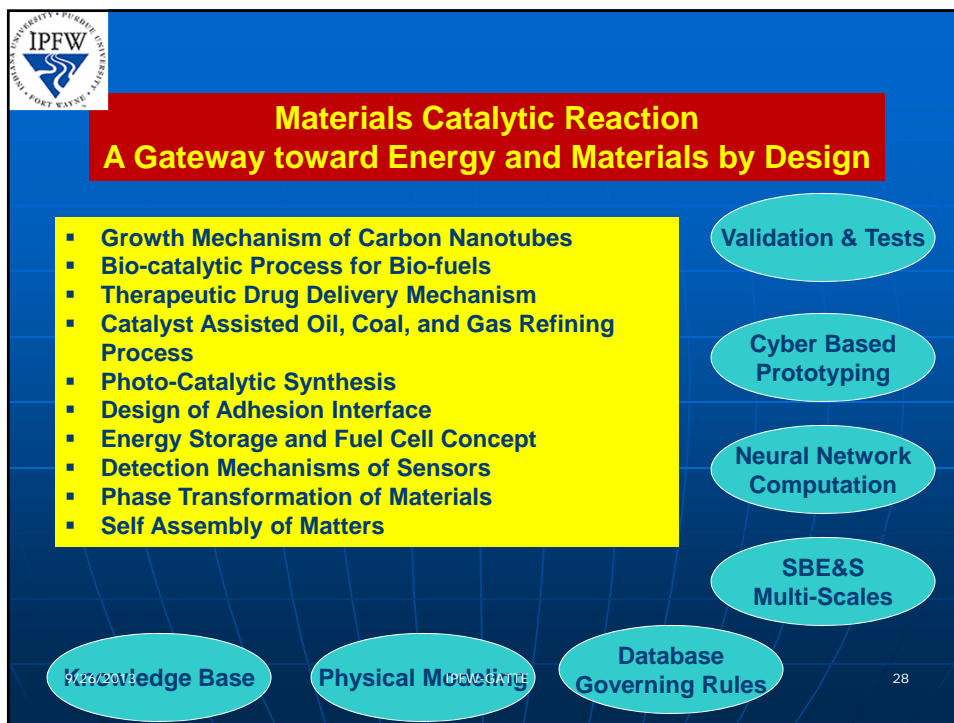
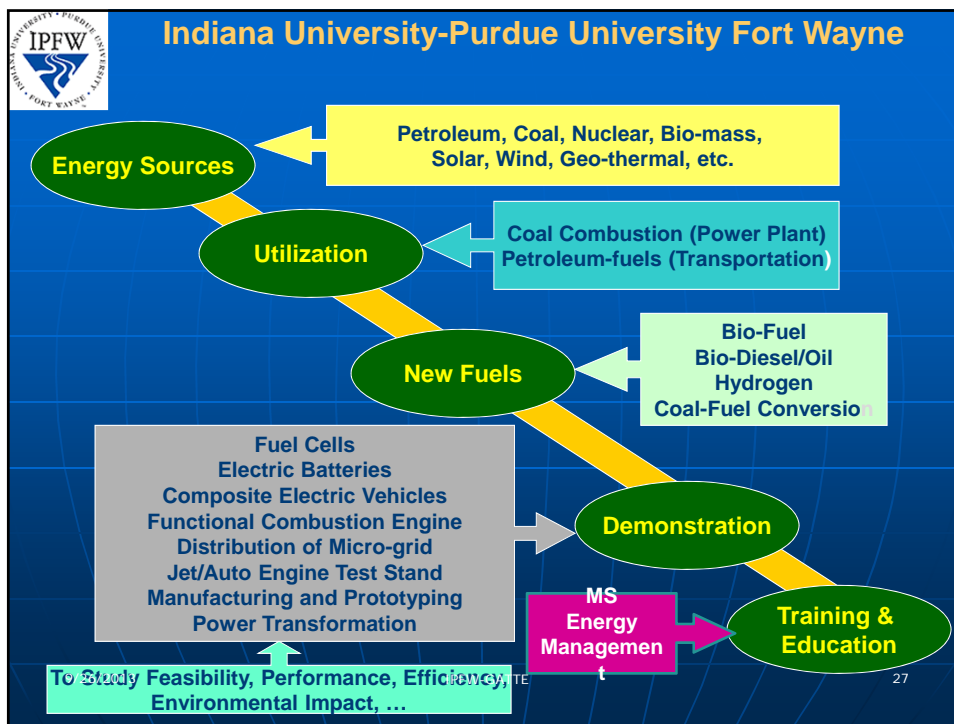


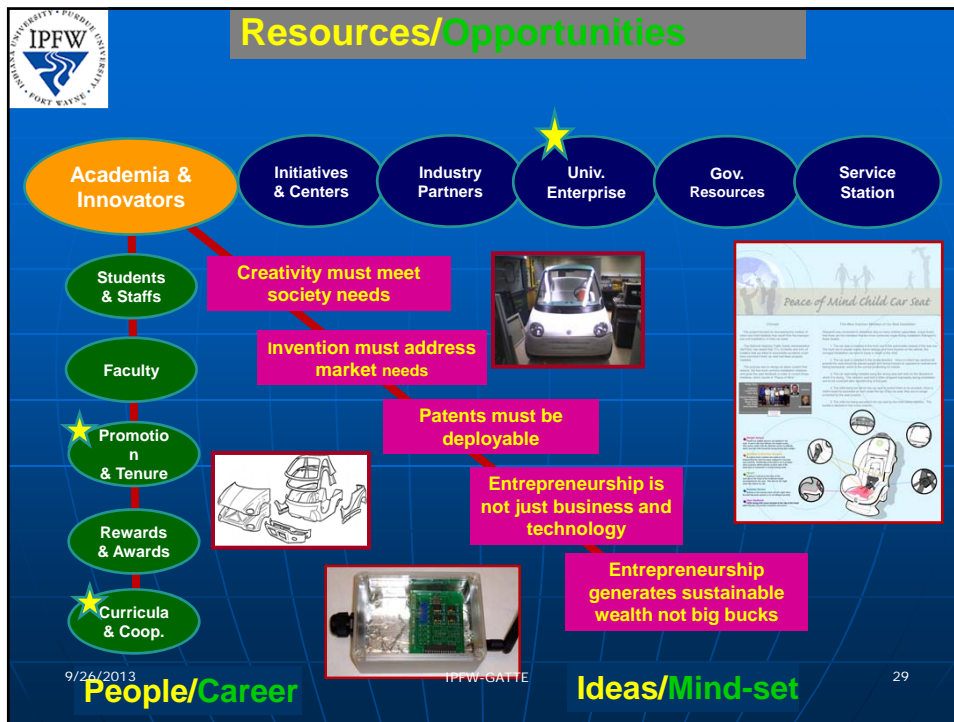
ETCS Centers of Excellence

- Wireless
- Visualization
- Systems
- Built Environ.
- HAAS Manufacturing

- Embedded systems, sensors & sensors network, wireless communication, RFID, software defined radio
- Integrated visualization and simulation, 3-D virtual navigation, mobile education (STEM and beyond), apps development
- Bridge health monitoring systems, cyber physical systems, autonomous robot systems
- Energy economy and new industrial revolution, renewable energy, core facility, green technology
- Rapid prototyping
- IT Cloud Computing

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IPFW Office of Engagement

- Key contact for access to IPFW, Purdue and Indiana University programs for businesses, government and community partnerships
- **Facilitate access to:**
 - *Research capabilities (Government Grants & Industry Research)*
 - *Technical expertise (Faculty and Student Projects)*
 - *Intellectual property (Purdue, Indiana University and NSWC Crane)*
 - *Educational services & training opportunities*
 - *Internship/co-op/student hiring programs*
- Provide representation for regional businesses to the universities in the development and enhancement of programs.

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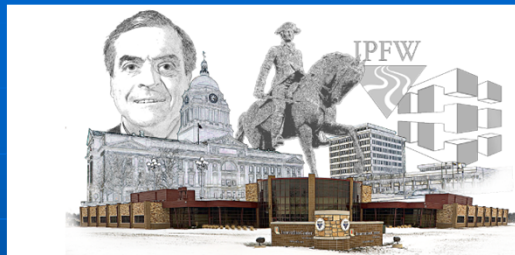






IPFW Office of Engagement

- Engagement Office
 - *Serves to focus the resources of multiple complementary institutions to a single geographic region*
 - Launched in January 2006



INNOVATION PARK PROFILE

Founded.....	December 1999
Temporary Incubator Operational	August 2001
Innovation Center Occupied / Innovation Park Established	September 2005
Park Total Square Footage	73,403 (2009)
Park Site.....	55-Acre Greenfield Campus
Organization Type.....	Community Non-Profit
Organization Focus.....	Higher quality, higher paying jobs/companies
Host Institution	Indiana University / Purdue University Fort Wayne (IPFW)
Full-Time Employees (FTEs)	10
Number of On-Campus Client Companies	39
Indiana CTP Certifications	2004 / 2009
Outreach	11-County Region

ISO 9001:2008
CERTIFIED

INDIANA
CERTIFIED TECHNOLOGY PARK

HUBZone
Historically Underutilized Business Zone

nbia
National Business Incubation Association

Northeast Indiana
Innovation Center
High Technology
Business Incubator

Emerging Growth Center

Our new home for NIIC graduates & 2nd-stage ventures

Cole Foundation
Conference & Training Center
In the
Emerging Growth Center



NORTHEAST INDIANA INNOVATION PARK

A synergy of Northeast Indiana's assets generating innovation, entrepreneurship, technology, and knowledge

Growth of Existing Companies

Creation of New Companies

Commercialization of New Ideas & Intellectual Property

Increases In
Technology Cluster Jobs & Companies
Average County Wage Rates
Innovation Park Payroll Base

Innovation Center Performance through 12/31/2009:

AVERAGE PARK WAGE = \$52,875

TOTAL PARK PAYROLL = \$8.1 MM

\$71 MM OF INVESTMENT

458 JOBS CREATED

99.1% OF PARK CLIENTS STAY IN OUR REGION

91.8% OF PARK CLIENTS ARE STILL IN BUSINESS AFTER 5 YEARS

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Venturers, Investors, Patent Services

- Ruffalo & Benson LLC
- Baker and Daniels
- Huron Group
- Chase Bank
- Lincoln Financial Group
- Bank of America
- Wells Fargo
- Independent Venture Firms
- Innovation Centers (NIIC, PU Discovery Park)

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GATTE Purposes/Priorities

- 1. It makes an international market for intellectual property.**
- 2. It engages international business and educational resources in the commercialization of international IP.**
- 3. It helps member universities and incubators throughout the world to form new companies to commercialize international IP in their locales**

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GATTE Related NE Indiana Institutions and Their Services

- IPFW – for intern, faculty consulting, lab facilities support, Office of Engagement technology transfer support**
- NIIC – for incubator office and lab space**
- NIIC LEAP Fund, Elevate Ventures, and other venture or angel groups - for capital**
- Regional economic development agencies – for expansion space**
- Local service providers (banks, accountants, attorneys, marketing agencies) as necessary**

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Portfolio of Programs/Services Six Revenue-Producing Services

1. List/inventory IP available to license
2. List/broker entities interested in licensing IP
3. Soft Landings program to help international entities from a U.S. company
4. Soft Landings program to help local international students starts a company
5. Annual Global Showcase and Conference
6. Licensing Agency (TTO/TLO) for International Entities

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Summary

- **Technology Innovation Requires Developing a Roadmap for Product Development and Commercialization at the Inception Stage; Analogous to the Concept of Virtual Prototyping or Can be Referred to As Virtual Systems Engineering.**
- **The Best Practices of Technology Innovation, Commercialization, and Entrepreneurship Requires a Team Approach from the Very Beginning; Partnership, Trust, Communication, Marketing, and Ability to Harvest Resources are the Keys to Success; Analogous to Concurrent Engineering.**

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Summary

- **The Role of Academia and Researchers is to Continue Pursuing Innovative Ideas/Technology and Let the Entrepreneurs, Industry, and Economic Development Sector to make it happened.**
- **A Global Common Market Place for Intellectual Properties, Entrepreneurship, Economic Development, and Resource Leveraging is Needed.**



Thank
You!

Questions?