



Донбасская государственная машиностроительная академия



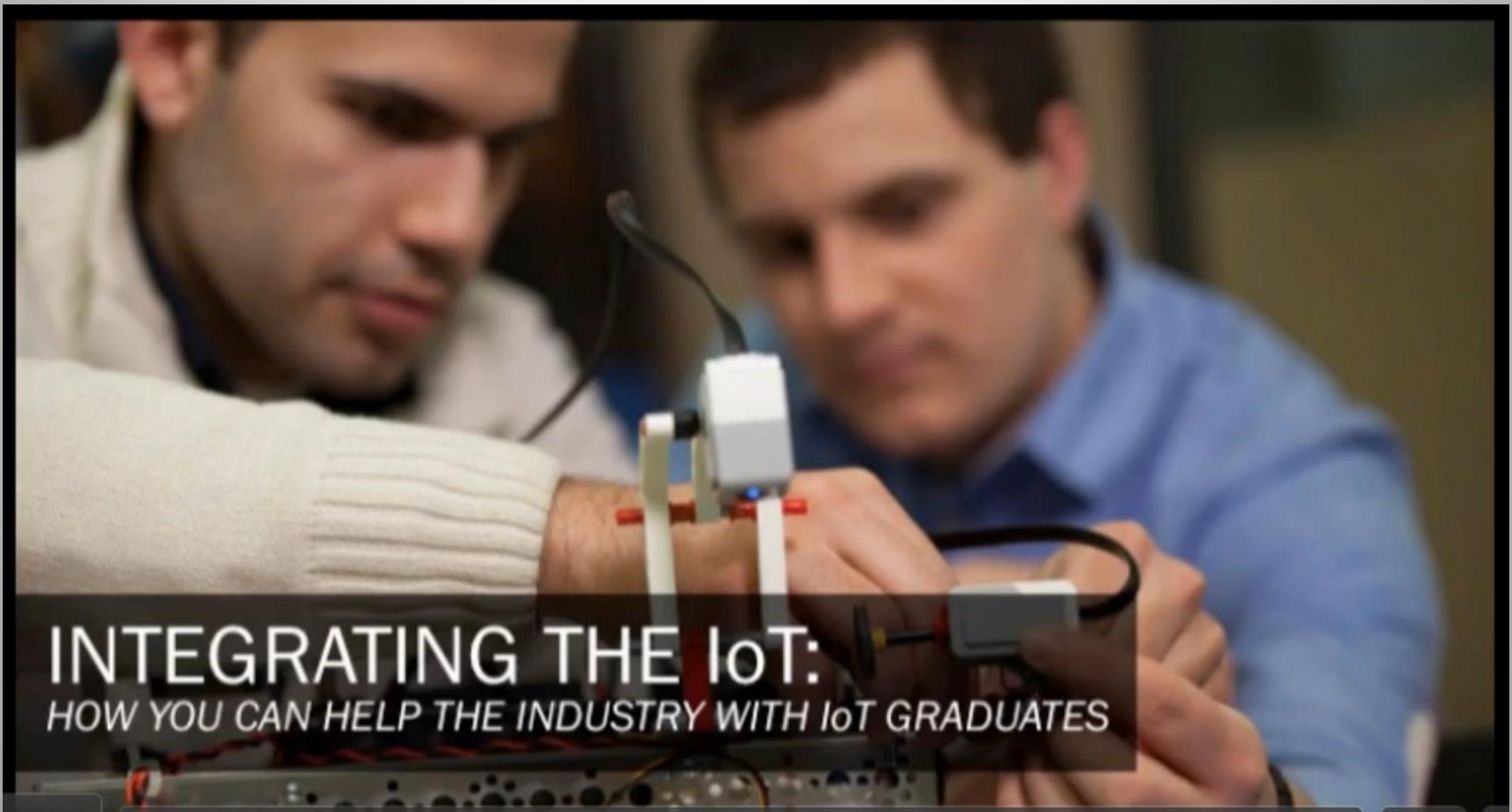
Интернет вещей

Проф. Тарасов А.Ф.

tarasov@dgma.donetsk.ua, kit@dgma.donetsk.ua

<http://itp.dn.ua>

Как образование может помочь предприятиям в области IoT





ThingWorx
by PTC

WHO'S ON THE LINE?



Stacie Kaufman

Senior Education Marketing Specialist
PTC Academic Program



Alister Fraser

Senior Education Program Manager, Americas
PTC Academic Program



PTC

96%

of senior business leaders expect their business to be using the IoT in some way in the

61%

of respondents believe that companies too slow to integrate the IoT into their business will fail

TOP OBSTACLE TO USING/PLANNING TO USE THE IoT?

— A lack of IoT-related talent —

76%

use it internally
(products or processes)

of respondents believe that companies either actively exploring or using the IoT

75%

use it externally
(products or services)



ThingWorx

Нажмите кнопку Esc, чтобы выйти из полноэкранного режима.

DISTINGUISHED GUEST SPEAKERS



Paul Newman

Divisional Innovation Champion:
New Ventures & Innovation at Caterpillar, Inc.



Shiny Abraham, Ph.D.

Assistant Professor of Electrical and
Computer Engineering at Seattle University





PTC

2 Million 

IT & Communication jobs will be left unfilled in the next 10 years¹

~200,000 

People needed with deep data analytics skills each year³

 1.5 Million

Managers and analysts needed to make business decisions based on data scientist findings⁴

 2 Million

Cyber security jobs will be unfilled by 2017²



One powerful future.

Caterpillar Inc. Connected Microgrid Capstone Project 2015/16

Paul Newman
March 31, 2016



• Caterpillar Inc.

- Automation
- Remote Monitoring
- Autonomous Machines
- GPS Positioning
- Hybrid Machines
- Data Analytics
- **Clean Energy**
- **Renewable Energy**

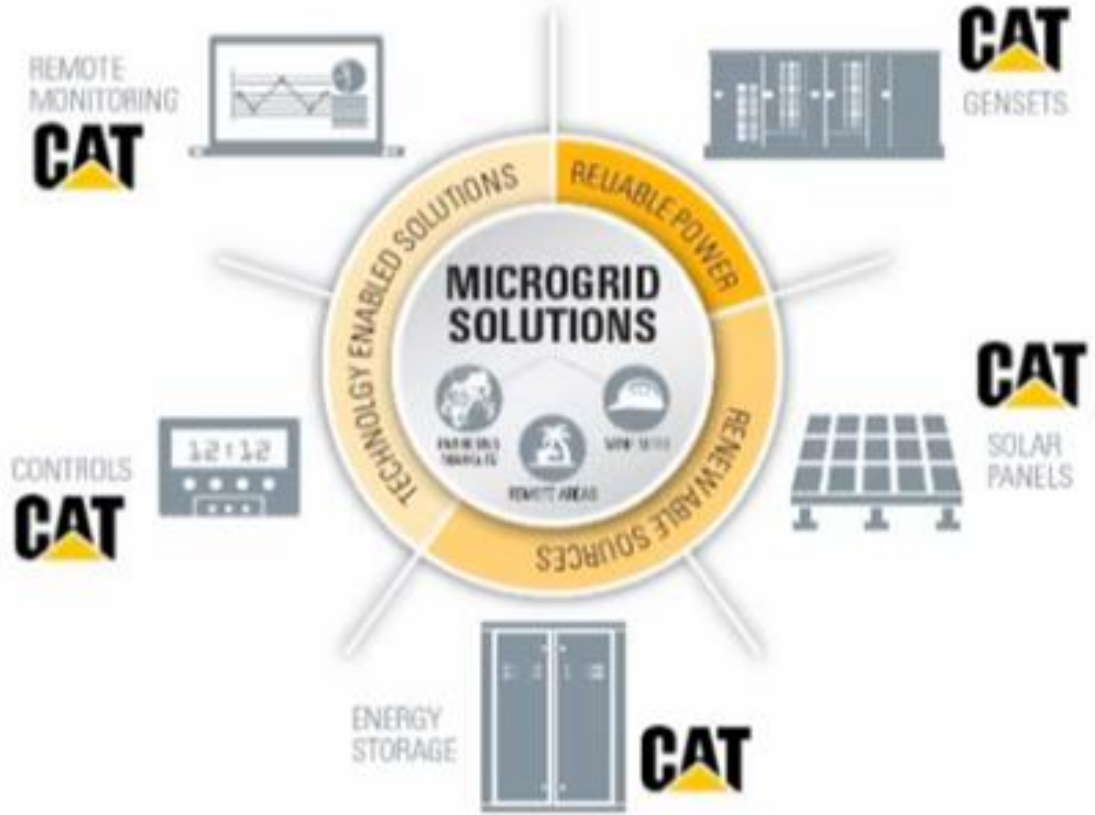




New Ventures

One powerful future.

Powering Sustainable Progress. Everywhere. All the time.



Hybrid-Microgrid Economics



Energy Storage
 10 Min 250 kW
 Lithium Ion and
 15 Sec 250 kW
 Ultra-Cap

PV - 250 kW Fixed-tilt
- 250 kW Single-Axis Tracker



Project – Connected Microgrid

- **Scope** – Utilize PTC/ThingWorx to create a multiple user-based GUI's that connects 500kW Microgrid system and various Widgets to provide component data and information useful to the customer , Caterpillar and Dealer.

- **Deliverables**

- Market Research
 - Microgrid Industry overview
 - Voice of Customer to drive GUI design, layout and styling.
- Functional GUI
 - Gather real-time system data
 - Access ThingWorx Things (widgets)
 - Suggest sensors (demand side monitoring) to provide information valuable to customers, dealers and Cat.
- 10 Business scenarios highlighting the features of the GUI/AR
 - Examples - Outlining financial impact to the customer (\$ saved w/PV, Service model, Real-time calculation and tracking ROI), Dealer (Service Model - Access, Inform, Advise, Support, Manage) and Caterpillar (Sales leads and subscriptions)

One powerful future.





Project – Connected Microgrid

- **Skills:** ThingWorx, design, engineering, marketing/business, IT
- **Majors:** Engineering, Business Administration, Computer Science, Information Technology Management, Marketing
- **Support Needs** – ThingWorx software/training, Microgrid system interface, Microgrid Strategy overview, OPACC training, Dealer/customer contact,



ThingWorx
PLM



Introduction:

Assistant Professor

Department of Electrical and Computer Engineering
Seattle University

Research interests:

- Wireless Communication Systems
- Internet of Things
- Vehicular Communications
- Optimization using Game Theory
- Engineering Education Research



IOT IN UNDERGRADUATE EDUCATION

SEATTLE
UNIVERSITY

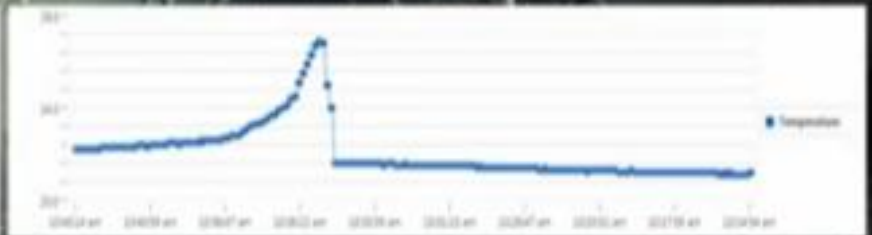
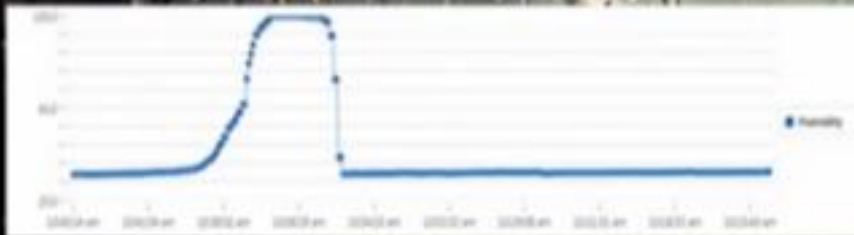


- Curriculum enhancement using IoT in the context of core and elective ECE courses.
- Programmable devices, microprocessor design, embedded systems.
- Recruitment and retention in ECE programs.
- Data acquisition using sensors on an Android phone, a beginner-level activity designed by the PTC IoT Academic Program.



IOT IN UNDERGRADUATE RESEARCH

SEATTLE
UNIVERSITY



- Building and deploying smart, connected sensors.
- Humanitarian Engineering using IoT: A Smart Smoke and Gas sensor.
- Remote environmental monitoring using IoT.
- Infrastructure independence in IoT.





SEATTLE
UNIVERSITY

WHY THE INTERNET OF THINGS?

- Training the future engineering workforce
- Understanding enabling technologies in the context of IoT
- IoT is the confluence of 'Electrical' and 'Computer' Engineering



THE CHALLENGE

Internet of Things: The 3rd IT driven revolution
Broadening the skills gap



University of Michigan Multidisciplinary Design Center. Extra-Curricular projects on the IoT, Rapid Manufacturing etc.



ThingWorx

PTC® IoT Academic Program



Student

Educator

Udemy
IoT MooCs

ThingWorx Developer Zone

PTC IoT Academic Program

Where to start?



Below are a variety of IoT application projects to give you and your students experience in working with the ThingWorx IoT Platform. Click on the project title to access all the information you'll need to get started.

Getting Started with Android Smartphones and ThingWorx



A quick tutorial on how to use your Android Phone with ThingWorx to collect and displays data from your phone sensors, including also step-by-step instructions for how to send an alert and use a Google Map.

FIELD: Mobile Applications
LEVEL: Beginner
TIME: 1 Hour

Enhanced ThingWorx Android App



A tutorial that builds on the Getting Started with Android Smartphones and ThingWorx and guides you through different use-cases that give added-value to the data collected by your smartphone.

FIELD: Mobile Applications
LEVEL: Beginner - Advanced
TIME: 2-3 Hours

Simple Weather App



Step-by-step instructions that teaches the basic concepts of ThingWorx and how to create a mash-up with data entered by the user.

FIELD: Weather
LEVEL: Beginner
TIME: 1.5 hours

Weather Application with Intel Galileo



Step-by-step instructions on how to create an application that displays data collected by a temperature and humidity sensor connected to a Intel Galileo including how to send an alert.

FIELD: Weather
LEVEL: Intermediate
TIME: 2-3 Hours

Weather App with Arduino Yun



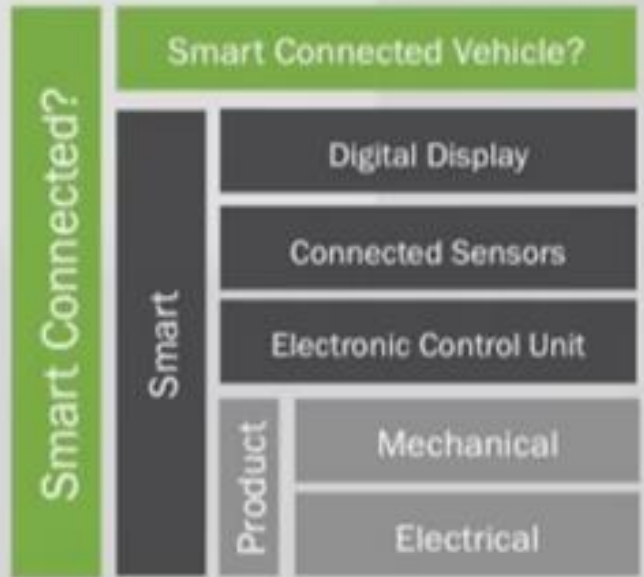
Step-by-step instructions on how to create an application that displays data collected by a temperature and humidity sensor connected to a Raspberry Pi including how to send an alert.

FIELD: Weather
LEVEL: Intermediate
TIME: 2-3 Hours



RESOURCES FOR STUDENTS

ThingWorx





Projects available at [Thingworx.com/Academics](https://www.thingiverse.com/thing:1111111)



udemy

A Simple Framework for Designing IoT Products





udemy New Business Markets in the Internet of Things



ThingWorx is IoT
<http://www.thingworx.com/>



GET STARTED TODAY: THINGWORX DEVELOPER ZONE

ThingWorx

Thingworx.com/developer

ThingWorx Developer Zone



ThingWorx is the most widely adopted IoT technology platform. Why? It allows developers to quickly connect their ecosystems, create & deploy applications, analyze their “things” and deliver powerful user experiences across different devices – all from one, integrated platform.



Спасибо за внимание