



UW E-Business Consortium  
University of Wisconsin-Madison

# Welcome to the UW RFID Lab Inauguration

[www.uwrfidlab.org](http://www.uwrfidlab.org)



# Overview of UW RFID Industry Workgroup & UW RFID Lab

[www.uwebc.org](http://www.uwebc.org)

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# RFID at UW-Madison

## Three-pronged mission

1. Knowledge-sharing amongst companies
2. Education and training
3. Research



# (1) Knowledge-sharing amongst companies

- Occurs through the UW RFID Industry Workgroup; Formed in September 2003, part of the UW E-Business Consortium
- Companies participating in the UW RFID Industry Workgroup meet monthly to share lessons learned and best practices regarding RFID strategy and implementation.
- Meetings include educational presentations, tours and case studies by RFID subject-matter experts and practitioners, as well as results from experiments conducted in the UW RFID Lab.
- Meetings address
  - the true capabilities and limitations of RFID technologies,
  - the practicality and potential business benefits associated with RFID application,
  - the keys to successful deployment and adoption of RFID
  - the future evolution of RFID and related technologies
- Members can access rich-media (video) recordings of presentations, decision-tools, best practice guidelines, etc.



# RFID Industry Workgroup Members

- 3M
- Alaris Consulting
- American Girl, Inc.
- Appleton
- Avocus Group
- Bemis Flexible Packaging
- Brady Corporation
- Brunswick Corporation
- Case New Holland America
- ConnecTerra
- Endries International
- GENCO
- Grainger
- Green Bay Packaging
- Harley-Davidson
- HK Systems
- J.J. Keller & Associates
- Kohler Company
- Kraft Foods, Inc.
- Lands' End
- Master Lock
- Menasha Corp.
- Pacific Cycle
- Panatrac, Inc.
- Printronix
- Promega
- RedPrairie
- Rockwell Automation
- Sargento Foods
- SC Johnson & Sons
- Schneider National
- Skyline Technologies
- Stora Enso
- Sub-Zero Freezer Company
- Tamarack Products
- The Swiss Colony
- TIBCO Software
- Virchow Krause & Company
- Wausau Coated Products
- Whirlpool Corporation
- Zebra Technologies



# Steering Committee

- The RFID Industry Workgroup is guided by a Steering Committee
- Current members of the Steering Committee are:
  - Sujeet Chand, VP & CTO, Rockwell Automation (**Co-Chair**)
  - Michael Burnham, President, Panatrack (**Co-Chair**)
  - Bruce Beihoff, Director of Innovation & Technology, Whirlpool
  - Larry Casper, Asst. Dean, Research & Tech Transfer, UW-Madison, College of Engrg
  - David Douglas, SVP, ConnecTerra
  - Todd Fischer, VP & CIO, Endries International
  - Bob Grawien, VP of Application Development, Schneider National
  - Jack Kahler, President, Avocus Group
  - Dave Matthias, RedPrairie
  - Mike O'Shea, Corporate Director of AutoID/RFID, Kimberly-Clark
  - Ken Rustici, RFID Lead, SC Johnson
  - Harry Schutte, VP of Operations and Distribution, Lands' End
  - Udo Troitzsch, Director, Supply Chain Program, Case New Holland
  - Raj Veeramani, Professor & Director, UW E-Business Consortium
  - Alfonso Gutierrez, Director, UW RFID Lab



## (2) Education on RFID

- New RFID Course for students developed and taught in Spring 2005
- Course designed to provide students a good foundation in RFID technology, strategy and applications as well as hands-on experience with RFID systems in the lab.
- This new RFID course complements other courses taught by faculty in Electrical and Computer Engineering that focus on antenna design, RF communications, etc.
- A new 2-day hands-on workshop for industry has also been developed (September 22-23, 2005) in which you “learn by doing”, not by watching demos.



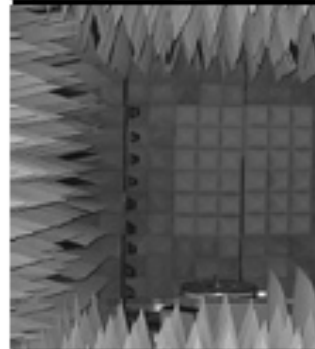
THE UNIVERSITY  
**WISCONSIN**  
MADISON

COLLEGE OF ENGINEERING ■ DEPARTMENT OF ENGINEERING PROFESSIONAL DEVELOPMENT

# Two-day hands-on workshop for industry

Discounted registration fee for  
UWECB members

<http://www.epd.engr.wisc.edu/brochures/H103.pdf>



## **RFID: From Strategy to Implementation**

A hands-on, objective,  
practical workshop

- Radio frequency identification (RFID) fundamentals
- Hands-on lab exercises
- Case studies of real-world applications
- Systematic methods to assess, justify and deploy RFID

**September 22-23, 2005  
Madison, Wisconsin**



## (3) Research on RFID

- Leverages the UW RFID Lab
- Faculty interest & involvement from multiple disciplines
  - Electrical and Computer Engineering
  - Industrial and Systems Engineering
  - Mechanical Engineering
  - Biomedical Engineering
  - Civil & Environmental Engineering
  - Operations & Information Management
- Strong industry collaboration
- Enables us to conduct research on issues at various levels in a holistic manner



# Research at all levels

RFID-enabled Process Level

e.g., supply chain & healthcare

RFID Application Level

e.g., RFID embedded packaging

RFID Communication Level

e.g., RF interference issues

RFID Device Level

e.g., tag antenna design & sensor tags

Our research capabilities and lab infrastructure related to **RFID physics and engineering** set us apart from other RFID labs in the nation.

We can demonstrate not only **HOW** RFID performs, but also answer **WHY** and **WHAT** to do to optimize performance



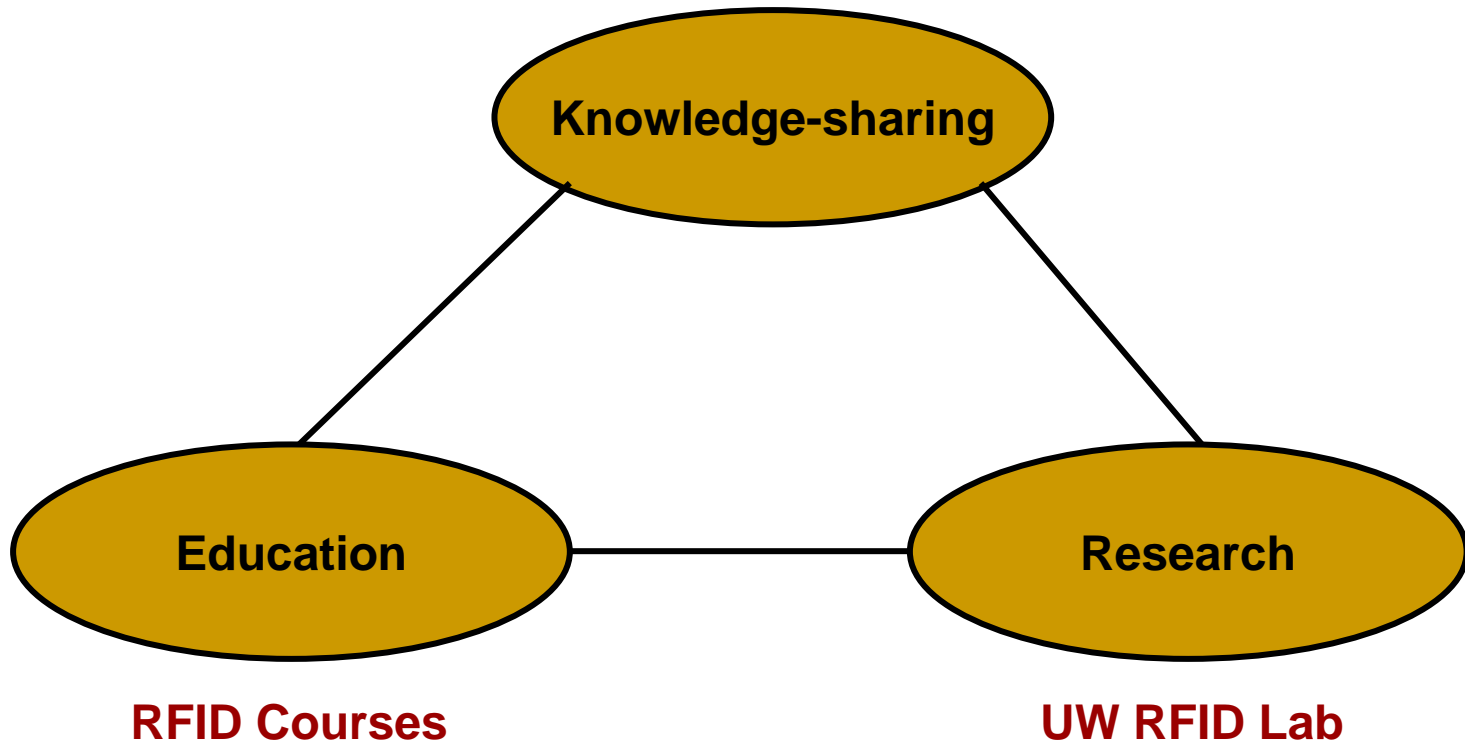
# RFID research projects

- We have already conducted several applied research projects e.g., related to
  - readability,
  - ROI models,
  - RFID-enabled supply chain processeswith companies in various industry sectors.
- Currently engaging in projects addressing RFID in transportation and healthcare, and assessment of conductive ink based RFID tags
- We are also conducting basic research on embedding RFID in plastics products and packaging



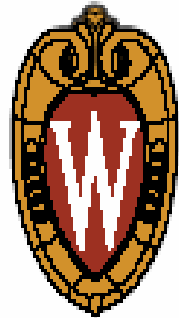
# Summary: RFID at UW-Madison

## UW RFID Industry Workgroup





# RFID Lab Stations – Founding Partners



## UW RFID Lab

University of Wisconsin-Madison

[www.uwrfdilab.org](http://www.uwrfdilab.org)

The UW RFID Lab would not have been possible without the generous support from our Founding Partners.

**DORNER**<sup>®</sup>

**Autologik**  
A DORNER COMPANY

*Thank you!*

**Rockwell  
Automation**





# Other Strategic Partners

- **Alien Technology**
- **Appleton**
- **ConnecTerra**
- **Habasit**
- **Holt Electric**
- **Kraft Foods**
- **Lands' End**
- **NiceWare**
- **Panatrack**
- **Richardson Electronics**
- **SAMSys**
- **Symbol Technologies**
- **Weber Marking Systems**
- **Zebra Technologies**



# *College of Engineering*

*University of Wisconsin-Madison*

- **\$62,000 funding towards UW RFID Lab**
- **Space for the lab**



**Paul S. Peercy**  
Dean,  
College of Engineering



# Patrick Sweeney

CEO,

ODIN Technologies



# UW RFID Lab

The UW RFID lab will serve as a center of excellence in RFID and will focus on:

- Basic and applied research, demonstration and education of RFID technology and applications to industry
- Providing an unbiased experimentation "sandbox" to promote learning and application of RFID
- Working with individual companies on sponsored company-specific projects
- Compiling best practices and lessons learned regarding RFID applications



# RFID Lab Stations

## 1. Portal/dock-door station

## 2. Conveyor system station

- Loop with diverter, capable of 600 fpm operation

## 3. Antenna design and performance analysis station

- A large anechoic chamber with state-of-the-art RF field measurement and analysis instrumentation and simulation software



# UW RFID Lab – Research Focus

- **How the product contents, packaging and media affect RFID system performance?**
  - Readability
    - Single tag
    - Multi-tag
  - Write-ability
  - Packaging re-design guidelines
- **How external environmental conditions affect RFID system performance and ways to overcome these effects?**
  - Interferences
  - Durability
- **How individual RFID system components affect the overall system performance and how to improve it?**
  - Tag design: antenna & substrates
  - Reader design: antenna and controller
  - Network architecture and communication
- **How RFID can transform business and supply chain processes?**
  - Simulation models of RFID-enabled supply chain processes



# Thank you – Industry Collaborators

## Dorner Manufacturing / Autologik

- Tom Wolfe
- Rod Farver
- Mike Hosch
- John Nosbisch

## Rockwell Automation

- Lou Duzyk
- Larry Krueger
- Matt Lehtinen
- Joe Owen
- Andreas Somogyi

## Lands' End

- Jeff Berken

## RedPrairie

- Dave Matthias
- Matt Wagner
- Matt Balthasar

## ConnecTerra

- Chuck Thompson

## Zebra

- Paul Baboian

## Weber Marking

- Mike Soloway
- Ann Marie Phaneuf
- Rich Russert

## Appleton

- Tony Larsen

## Alien Technology

- Pat Finn

## Symbol Technologies

- Chris Warner

## NiceWare

- Lee Patty

## Panatrack

- Mike Burnham



# Thank you – UW Students and Staff

## UW Students:

- Arick Groth
- Chih-chuan Yen
- Chongsun Oh
- Mark Wagman
- Caitlin Braithwait
- Alex Bredemus
- Matt Waldron
- Brad Geiger
- Brad Pate
- Sri Poundari
- Samik Raychaudhuri
- Tom Noda

## UW Staff:

- Steve Limback
- Nancy Gores
- Christina Paschen
- Shawn Helwig



- **Lab tour logistics**
  - **Lab station locations:**
    - Portal = basement
    - Antenna Lab = first floor (1058)
    - Conveyor = second floor (2025)
  - **3 groups – color coded (red, blue, green)**
  - **See your name tag for group color**
  - **Follow your group guide**
  - **45 minutes rotation per station**
- **At the end of the tour, return to the Tong Auditorium for further Q&A**
- **Also, win a Door Prize**
  - **Two tickets to UW Badgers Football game**
  - **Must be present to win!**



# Next Meeting: RFID Industry Workgroup

Date: September 9<sup>th</sup>, 10am-3:30pm

Place: Waukesha County Technical College

## Agenda:

- RFID standards update
- Escort Memory Systems
- Promega Corporation
- Results from UW RFID Lab experiments
- Plus one other company