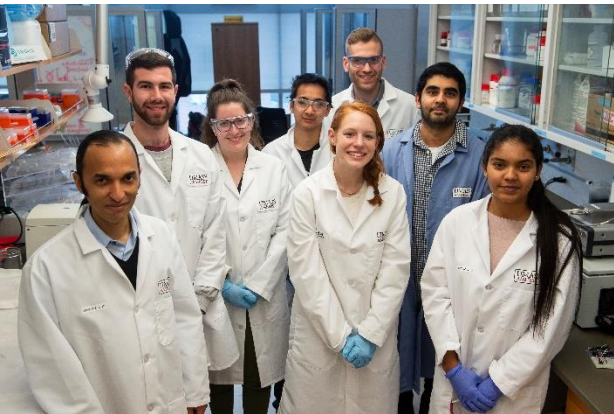




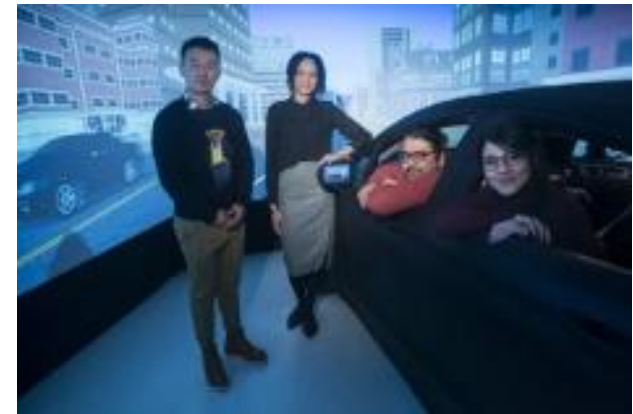
Sundar Krishnamurthy



Associate Director, Center for Personalized Health Monitoring
Professor and Department Head, Mechanical & Industrial Engineering
Site-Director, Center for e-Design



November 13, 2019
Future of Work: Bose & UMass Workshop



- The **Center for Personalized Health Monitoring (CPHM)**:
 - Started with the focus on wearable and wireless sensor systems for personalized health care and biometric monitoring.
 - Now:
 - Conducts basic and translational research across the technical roadmap for human-technology interface and interaction*
 - Trains the future and current workforce in key skills needed for the emerging digital health and manufacturing industries
 - Develops and integrates new technologies in collaboration with industry and clinical partners that pave the way to commercialize innovations and promote economic development
 - **Multidisciplinary**:
 - Engineering, Computer Science, Kinesiology, Nursing, Psychology
- Human-Technology Interface: Hardware and software through which humans interact with technology
- Human-Technology Interaction: Users interaction with technology

IALS is a broad interdisciplinary Institute to enable translational R&D

- ‘Thematic’ Translational Research, Industry Partnerships
- Faculty (>250) and professional staff (>30)
- 30 Core Equipment Facilities
- Company Start-Up Space and Venture Mentoring
- Opportunities for Student Experiential & Soft Skills Training



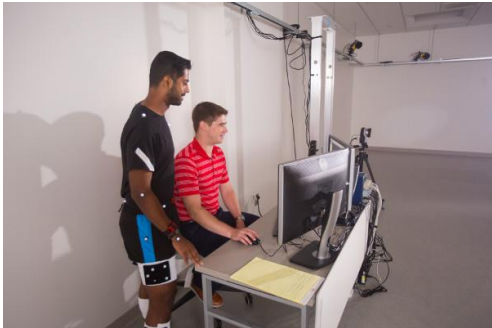
A New Type of Campus-Catalyst & Industry Partner



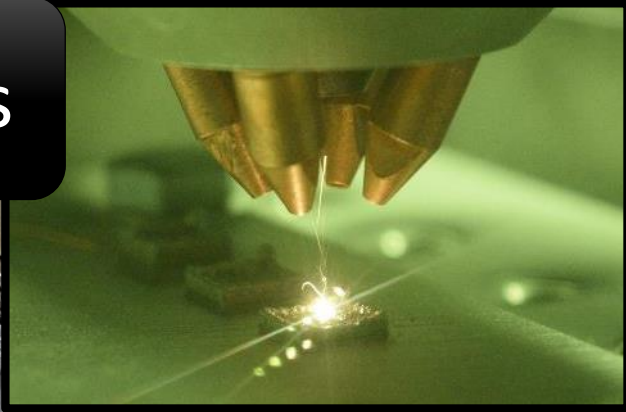
**UMASS
AMHERST**



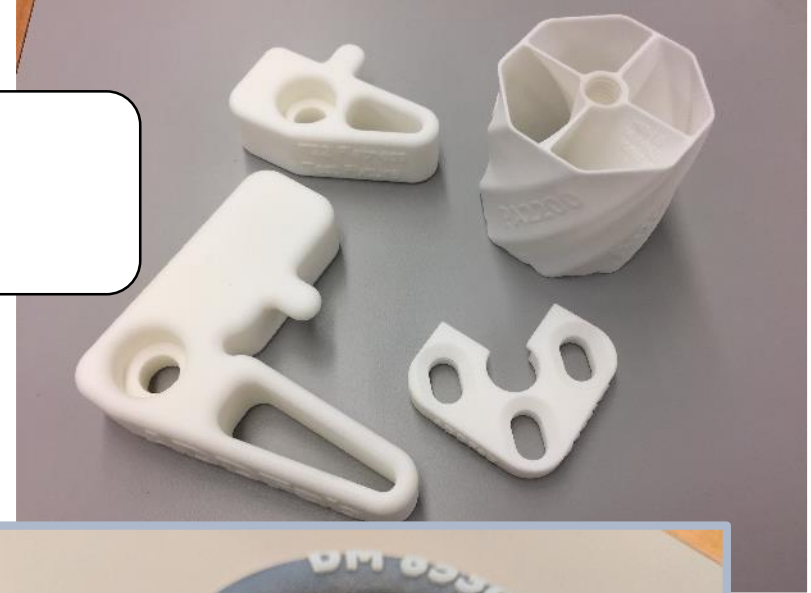
- Interdisciplinary Translational Research ‘Themes’ organized into 3 Centers
- >250 Translational Faculty
- ~30 Core Equipment Facilities
- ~20 Industry ‘Collaboratory’ Spaces
- >100 Industry Partnerships/Relationships
- Contributed to Student Engagement, Experiential Learning, and Soft-Skill training of students
- Virtual C-Suite Mentoring of ~30 Start-Ups
- Developing a Marketing/Social Media Capacity
- Contributed to >300 Translational Research Grants including Industry Alliances/Sponsorships



Stainless Steels



Nylon-12



Fiber reinforced



Multi-material





Background

The HIVE lab measures how people interact with healthcare information technology.

Problem

How to incorporate a Bluetooth motion sensor device into a prescription bottle to collect data on patient behaviors.

- Goal: Enclose and attach accelerometer to top and bottom of prescription medication bottle, build quantity 100.



Engineered Solution

- Battery replacement door
- Magnets to secure the bottle
- Mounting flange for clear plastic tubing. Printed with SLS nylon-12 (P110)
- Custom color dye





Dr. Adam Grabell
Assistant Professor
Department of Psychological and Brain Sciences

Background

The SEED lab studies how young children learn to understand and control their feelings.

Problem

How to design and build a “fun” wearable enclosure for a motion sensor device that kids will want to wear over the course of a research study.

Engineered Solution

- Multiple design concepts
- Fun and waterproof enclosure
- Compatible with Fitbit watch band
- Interchangeable faceplates with 42 character design options
- Printed in SLS nylon-12 (P110)





Aclarity

Background

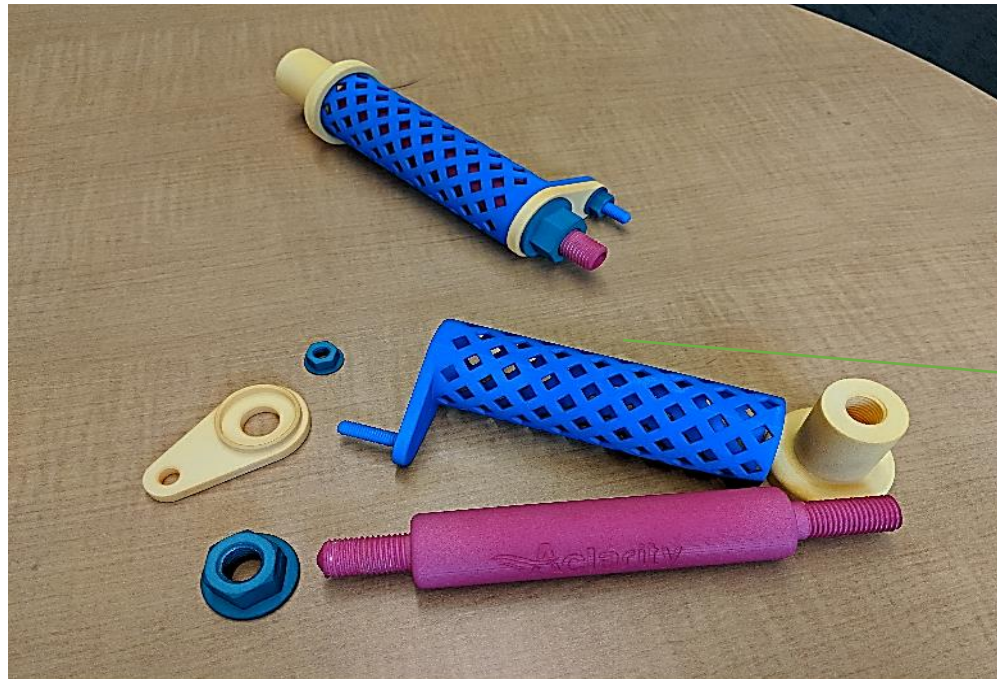
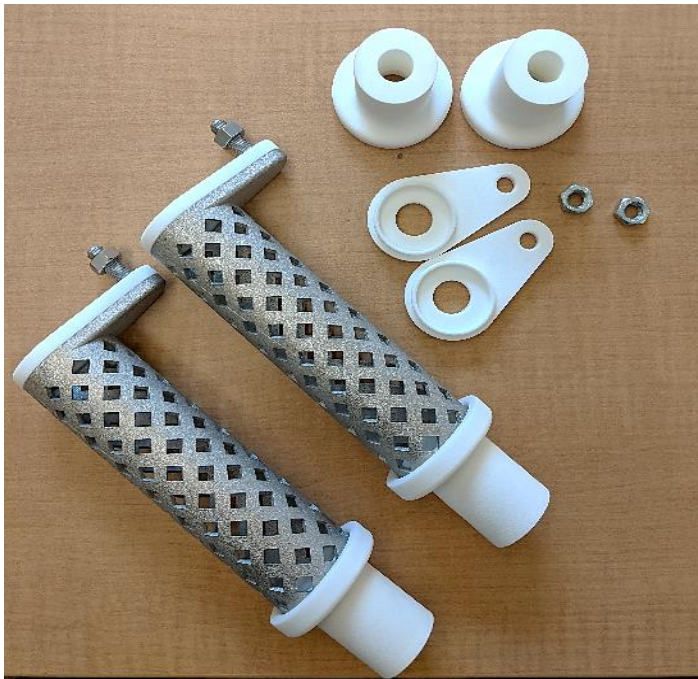
UMass Amherst startup with an advanced electro-chemical solution for water purification.

Problem

Traditional manufacturing methods could not deliver parts rapidly enough or provide sufficient design flexibility to meet Aclarity's needs.

Engineered Solution

ADDFab delivered two sets of metal (stainless steel) and plastic (nylon-12) parts in under two weeks to meet an urgent deadline. In addition, printed the metal parts in plastic and dyed them different colors to provide key visuals for a startup competition. DMLS stainless steel (M290) and SLS nylon-12 (P110).



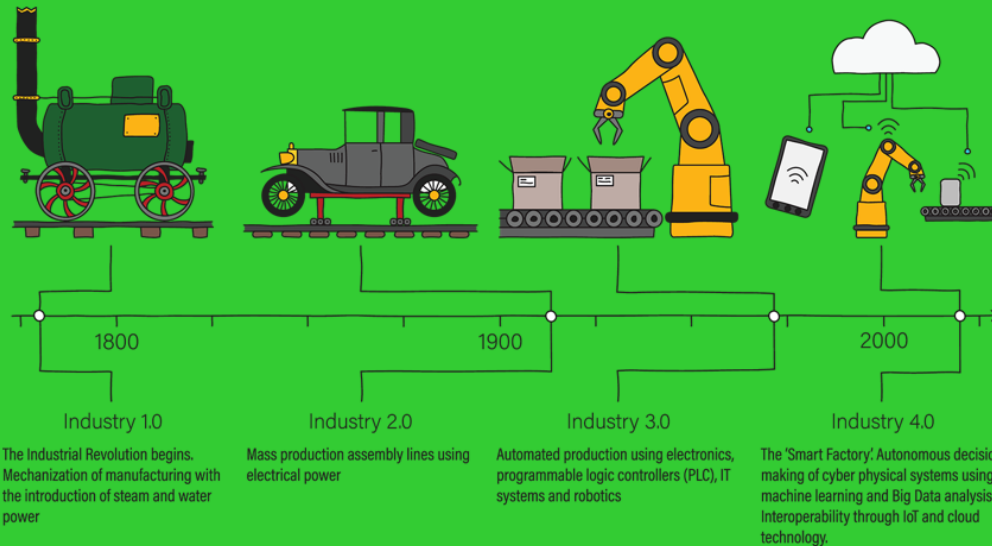
Only 5% of Mid-Size Manufacturers Are Implementing Industry 4.0

A new survey finds, in spite of competitive pressure, mid-size manufacturers are late in their build-out of smart manufacturing technology.

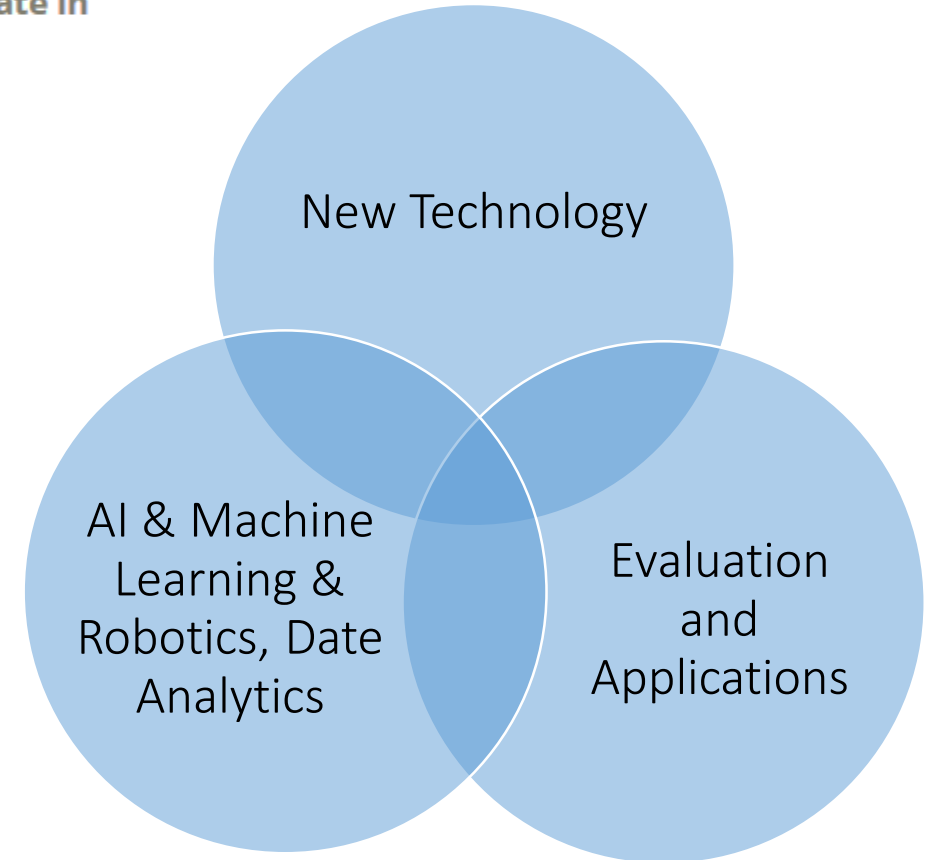
by: Rob Spiegel in Automation & Motion Control, IoT on April 12, 2019

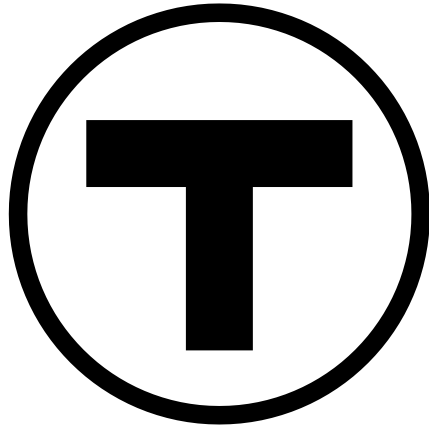
zettagrid

Journey to Industry 4.0



source: simio.com





‘T-shaped’ students with:

- Disciplinary depth
- Interdisciplinary capacities
- Purpose-driven engagement



- An Ecosystem to Collaboratively Advance Applied Science & Technology:
 - Provide resources to integrate and translate fundamental research into innovative products and services
 - Establish innovative models for collaborations between academia, industry, and government
 - Contribute to next generation workforce development through:
 - A holistic education that includes **experiential training** in the discovery, development, and manufacture of products and services
 - A pipeline for **lifelong learning** between vocational schools, community colleges, industries and higher education

