Topics

- EWI Overview
- Founding and transition from I/UCRC
- Ongoing university collaboration
- Ongoing private/public partnership examples
EWI Overview

- Independent non-profit 501(c)(3) corporation
  - Most extensive materials joining expertise and capabilities in US
  - 140 staff; 132,000 sq. ft. facility; >$25M in Capital Equipment
  - > $25M annual revenue

- Member based
  - > 200 member companies; thousands of plant locations
  - Industry Advisory Board identifies needs and research priorities

- Core business is customer sponsored projects
  - > 500 projects / year
  - Focus on technology development and insertion

- Strong industrial relationships:
  - Advanced energy, automotive, aerospace, heavy manufacturing, defense, oil & gas, etc.

- Government-funded technology development:
  - DOE, NASA, DOT, Navy, Army, Air Force, etc.
EWI Mission

Advance Our Customers’ Manufacturing Competitiveness through Innovation in Joining and Allied Technologies

Innovation is Our Product
Translational R&D

University

EWI

Industry

Concept | Feasibility | Development / Validation | Implementation | Continuous Improvement

EWI Overview
Extremely Abbreviated History

- 1977:
  - American Welding Society (AWS) strategy conference identifies need for a US welding institute
- 1980:
  - NSF I/UCRC Center for Welding Research established at The Ohio State University
- 1983:
  - Ohio Edison Technology Center program in response to manufacturing down-turn
- 1984:
  - Edison Welding Institute incorporated
- 1985:
  - Business begins to take off; Growth in membership, staff, and technical capability
- 1993:
  - First major federal program; Navy Joining Center (NJC)
- 1996:
  - EWI moves into new purpose-build facility in OSU Research Park
  - Also home to OSU’s Welding Engineering laboratories
- 2007:
  - Private / public partnerships becomes strategic focus
- 2010:
  - EWI / AWS strategy conference to explore new public/private collaboration approaches
EWI Start-up Success Factors

- **Champion with a Vision**
  - OSU WE Department Chair, Dr. Karl Graff (later EWI’s second Executive Director)

- **Separate Corporate Entity**
  - Outside of the university structure
  - Focus on commercial business growth and financial sustainability

- **Location**
  - Located in manufacturing heartland within 450 miles of over 70% of US manufacturing
  - Proximity to OSU supported talent attraction

- **Timing**
  - Need for a US welding institute had been identified
  - US exiting from the last great recession
EWI Start-up Success Factors

- **Key Private/Public Partnerships**
  - Battelle Memorial Institute, The Ohio State University, Ohio Department of Development, The Welding Institute (UK)

- **Facility**
  - OSU acquired and renovated a facility for EWI

- **Credible Capabilities**
  - BMI, TWI, and OSU contributed staff, equipment, research base, and other support; provided “critical mass” of capabilities

- **Start-up Funding**
  - State of Ohio Edison Technology Center program provided major start-up funding

- **Customers**
  - 85 TWI US members transferred to EWI
  - OSU-WE alumni network helped expand customer base
On-going EWI / OSU Collaboration

- OSU representatives on EWI boards
- EWI facility houses OSU-WE laboratories
- Access to technical capabilities
- EWI is a member of three OSU centers and contributes to many more
- Jointly host conferences and workshops
- Joint EWI staff / OSU faculty appointment
- EWI support for undergraduate and graduate student projects
- Joint proposals and EWI subcontracts

EWI on-line weld modeling tools hosted by OSU super computer center
EWI Today: Leading many public/private partnerships

- Targeted technology development efforts
  - Friction stir welding
  - Ultrasonic additive manufacturing
  - Hybrid laser-arc welding

- Centers
  - Navy Joining Center
  - Ohio Edison Center
  - DOE Advanced Energy Manufacturing Center

- Consortia
  - Nuclear Fabrication Consortium
  - Additive Manufacturing Consortium (new)
Friction Stir Welding (FSW):

- Emerging solid state welding process
- EWI leveraged Ohio Edison Center and internal funding to develop initial capability
- Series of multi-million dollar programs to advance the technology
  - Navy program with amphibious vehicle manufacturer
  - Air Force program with aircraft engine manufacturer
  - Army program with armored vehicle manufacturer
  - Army contractor implements large FSW machine into production in 2009
- EWI is a leader in FSW of hard metals with many commercial and defense applications
Targeted Technology Development

Ultrasonic Additive Manufacturing (UAM):
- Novel technology to build net-shapes by solid-state deposition
- Leveraged internal funding to develop initial capability
- Multi-year program to develop next generation high-capacity system
  - $2.5M Ohio Wright Project
  - Multiple industry / federal government partners providing cost match
  - University collaboration to understand fundamental bonding mechanisms
  - Working with partner to commercialize
- EWI global leader in high-power UAM
Targeted Technology Development

Hybrid Laser-Arc Welding (HLAW):
- Emerging high-productivity welding process
- Leveraged internal funding and Ohio funding to develop initial capability
- Multi-year program for pipeline welding
  - 11 commercial sponsors plus US Department of Transportation
  - Designed, built and successfully demonstrated a system for fiber laser hybrid pipe welding
- EWI is a global leader in high-power HLAW with programs in multiple industry sectors
Navy Joining Center

- Operated by EWI since 1993
- Addressing Navy needs for materials joining technology
- Improving life-cycle affordability and mission capability of Navy platforms
- Leveraging close relationships with shipbuilders / aircraft manufacturers
- Delivering advanced manufacturing technology solutions to industry
Ohio Edison Center

- Lead Center for “Advanced Energy and Environmental Technologies”
- Helping manufacturers improve competitiveness and create new products
- Commercialization Example:
  - Transformational thin sheet laser welding technology to dramatically increase productivity
  - 2007-2008: Built unique prototype and demonstrated capabilities for a variety of materials
  - 2008-2009: >$2M in follow-on client funding for specific battery and fuel cell applications
  - 2010: Commercialization partner building equipment for battery manufacturer
Nuclear Fabrication Consortium

- Objectives:
  - Reduce cost, improve quality, and enhance safety through insertion of modern fabrication technologies
  - Stimulate the creation of a vibrant U.S. nuclear equipment supply chain
- >20 consortium partners (and growing) leveraging DOE-Nuclear Energy funding
- $2M project portfolio
Additive Manufacturing Consortium (Emerging)

- Advancing manufacturing readiness of metal AM technologies through collaborative technology development
- Involving industry, suppliers, academia, government, standards bodies
2010 Strategy Conference

- Future of Materials Joining in North America
  - August 2010 in Columbus, Ohio
  - Partnering with AWS and commercial sponsors
  - Involving leaders from industry, academia, government, and non-profits
  - Assess global competitive technology position
  - Identify critical technology needs
  - Explore new approaches to public/private partnerships to advance technology
Summary

- EWI’s success is a result of a series of public-private partnerships, from our initial founding right through to the present.

- Made possible by
  - Being an independent entity
  - Close relationships with industry, government, and academia
  - Focus on developing and implementing technologies to impact client challenges
  - Support from commercial clients, the State of Ohio, and federal programs to expand capabilities
Questions?

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