

Dennis Duane Harwig Jr., Ph.D.
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Education and Training

Ph.D. Welding Engineering Technology, Cranfield University, England
MS Welding Engineering, The Ohio State University
BS Welding Engineering, The Ohio State University

Research & Professional Experience

The Ohio State University **May 2018 - Present**
Welding Engineering Group, Materials Science & Engineering (MSE) Department
Research Associate Professor

Research position focused on leading graduate and applied research projects for industry on advanced arc welding processes, laser materials processing, high integrity materials joining applications, and metals additive manufacturing. Significant experience developing projects focused on process innovation, optimization, and automation. Developing a range of new lab capabilities for laser cladding, laser directed energy deposition (DED) additive manufacturing (AM), advanced waveform controlled gas metal arc (GMA) DED AM, advanced GMA methods for shipbuilding and heavy manufacturing, computer aided robotics for welding, computer aided robotics for additive manufacturing, arc physics, and narrow groove methods.

The Ohio State University **May 2018 - Present**
EWI (50% Appointment)
Senior Technical Advisor – Arc Welding & Directed Energy Deposition Processes

Lead arc welding and directed energy deposition (DED) additive manufacturing process team in business development; Lead major technical initiatives for DOD clients, especially with NSRP, NSWCCD, AFRL, ARL and GVSC; Develop strategic plans to modernize EWI arc welding and additive manufacturing facilities and capabilities; Develop major proposals with cross-functional teams utilizing a broad range of EWI technologies; As a founding partner in LIFT, coordinate projects between EWI and LIFT and especially for managing projects at LIFT using the linear friction welder, multi-process robot cell and other joining project to be jointly developed. Develop university initiatives between OSU and other universities to develop talent and technology, and establish new EWI capabilities to serve EWI's members.

The Ohio State University (founding partner) **Jan 2016 - Present**
Lightweight Innovation for Tomorrow (LIFT)
Senior Technical Advisor (10% Appointment) (Feb 2019 – Present)
Chief Innovation & Transition Officer (Jan 2016 – Feb 2019)

Support business development and commercialization opportunities for the LIFT program, a Manufacturing USA innovation institute. Develop strategies and initiatives to position LIFT to become sustainable technology resources to industry. Lead technical projects in the facility, especially projects involving materials joining equipment including the linear friction welder, multi-process multi-robot flexible manufacturing cell, formability systems, and powder metallurgy processing systems.

American Welding Society (AWS), Miami, FL **Jan 2013 – Aug 2015**
Chief Technology Officer

Managed business operations for three AWS departments; Standards Development, Education Development, and Education Operations which represented about a third of total AWS operations. Prepared strategic plans and reports for executive team and AWS Board of Directors.

Edison Welding Institute (EWI), Columbus, OH

Dec 2007 – Jan 2013

Center Development Director – (6/11 – 1/13)

Navy Joining Center (NJC) Director – (6/10 – 12/12)

Business Development Director – (12/07 – 6/11)

Directed team of Business Development Managers (BDMs) who managed Aerospace, Automotive, Advanced Energy, Heavy Manufacturing, Oil Gas & Petrochemical, and Government (State and Federal) market segments. Collected and analyzed market trend data from EWI customers to guide investment strategy, and develop market and technology roadmaps. Provided value to EWI customers by deploying new products and services. Developed large complex proposals with teams of engineer using the full range of EWI's materials joining and allied technologies.

Thermadyne Industries, Brand Management, West Lebanon, NH

Aug 2004 – Oct 2007

Vice President Global Engineering (3/05 – 10/07)

Director Global Engineering (9/04 – 3/05)

Managed engineering teams for four product lines: gas apparatus, arc accessories, welding equipment, and plasma equipment. Developed expert product engineering knowledge encompassing advanced development, product development, product data management systems, and sustaining engineering. Implemented a Stage Gate new product development process that drove change and assure cross functional alignment with operations, marketing and sales. Implemented advanced engineering and Design Validation Testing (DVT) methods including numerical modeling of electronics, die casting, injection molding, and plasma torch fluid flow.

Edison Welding Institute (EWI), Columbus, OH

Oct 1994 – Oct 2004

Technology Leader – Arc Welding, Materials & Automation (8/01 – 9/04)

Core Research Program Manager (9/01 – 6/03)

Team Manager – Arc Welding & Automation (99 - 8/01)

Principal Engineer - Arc Welding & Automation (10/94 – 98)

Babcock & Wilcox Company, Alliance & Barberton, OH

June 1985 – Oct 1994

Lead Welding Engineer, Nuclear Equipment Division (1992 – 10/94)

Lead manufacturing welding process development for Naval steam generator programs; Developed narrow groove techniques using hot wire gas tungsten arc welding.

Research Engineer III, Alliance Research Center, Alliance, OH (9/89 – 1992)

Research Engineer I, Alliance Research Center, Alliance, OH (6/85 – 6/86)

General Electric, Astrospace Division, San Jose, CA

Mar 1988 – Sept 1989

Welding Engineer, Space Power 100KW System

Professional Expertise and Research Interests

Laser additive manufacturing
Gas metal arc additive manufacturing
Gas metal arc metal transfer & waveform control
Plasma arc welding
Parameter optimization methods
Adaptive welding procedures
Shipbuilding manufacturing processes
Shipbuilding distortion control
Personnel & Facilities qualification standards

Hybrid (laser-arc) processes
Narrow groove arc method
Arc Physics
Arc melting rate analysis
Portable automation
High speed welding processes
Titanium arc welding processes
Titanium weld inspection
Workforce development

Professional Service

North American Die Casting Association (NADCA)

Current

Welding Standards Task Force - Chair
Additive Manufacturing Die Materials Task Force

American Welding Society (AWS)

Current

HEC-E, Higher Education Subcommittee – Engineering
D20 - Specification for Fabrication of Metal Components using Additive Manufacturing
C7 - High Energy Beam Welding and Cutting
C7B - Subcommittee on Electron Beam Welding and Cutting - Chair
G2 - Committee on Joining Metals and Alloys - Chair

American Welding Society (AWS)

Jan 2013 – Aug 2015

ANBCC – Authorized National Body for Company Certification
ISAC - International Standards Activities Committee
TAC – Technical Activities Committee
EC – Education Committee, Secretary
HEC-E, Higher Education Subcommittee – Engineering, Secretary
HEC-T, Higher Education Subcommittee – Technical, Secretary
PFQC – Personnel & Facilities Qualification Committee
D20 – Additive Manufacturing, Structural Committee
WR&D – Welding Research & Development Committee

International Institute of Welding (IIW)

Jan 2013 – Aug 2015

IAB – International Authorization Board, USA Alternate Delegate
Commission XIV – Training & Education, USA Delegate
ISO/TC 044/SC 11/WG 02 "Revision of ISO 14731 – Welding Coordination"

Awards

American Welding Society, Fellow, 2013
Society of Naval Architects and Marine Engineers, Elmer L. Hann Award, 2005

Certifications

American Welding Society, Certified Welding Inspector, ID# 14020011 **Not Active**

Babcock & Wilcox Patents

Method And Apparatus For Weld Joining Pipe Sections, U.S. # 5,624,067
Manual Arc Welding Speed Pacer, U.S. # 5,464,957.
Method For Defect Free Keyhole Plasma Arc Welding, U.S. # 5,225,654.
Reduced Heat Input Keyhole Welding Through Improved Joint Design, U.S. # 5,183,989.
Method And Apparatus For Controlling Weld Bead Shape to Eliminate Microfissure Defects When Shape Melting Austenitic Materials, U.S. # 4,782,206.

EWI Patents

Bulb-Flat Cutting Tools, US #10/285,945
Adaptive and Synergic Fill Welding Method and Apparatus, US 6,909,066 B2