



American Welding Society®

# 2022 WELDING TRACK

November 8 – 10



# 2022 WELDING TRACK

**TUESDAY, NOVEMBER 8**

## **2022 AWS/WELD-ED FABTECH EDUCATORS CONFERENCE AGENDA: ROBOTS AND AUTOMATION IN WELDING EDUCATION**

Since the early 1980s, robots have been used for a wide variety of applications. Resistance welding and arc welding are Among the most popular applications. Robot and automation programs have educated and trained operators, technicians, and engineers for the welding industry. Currently, with the shortage of manufacturing employees, robot sales are at record levels. In addition, the introduction of cobots has further increased industry interest in robots and automation. This education session will provide an overview of robot education and training strategies for use in classrooms and laboratories. The session will provide specifics to improve robot and automation education.

8:30 AM – 8:45 AM

### **WELCOME / INTRODUCTIONS**

Rick Polanin, *AWS President & Co-Principal Investigator, Weld-Ed*

8:45 AM – 9:15 AM

### **TEACHING WELDING STUDENTS ABOUT ROBOTS**

Rick Polanin, *AWS President & Co-Principal Investigator, Weld-Ed*

9:15 AM – 10:00 AM

### **PLUMMER LECTURE**

### **THE WRITTEN PROJECT PORTFOLIO: BENEFITS TO PRACTICAL WELDING TRAINING**

Jeff Carney, *Professor, Ferris State University*

10:00 AM – 10:15 AM

### **BREAK**

10:15 AM – 11:00 AM

### **ROBOT EDUCATION AT COC**

Tim Baber, *Professor, College of the Canyons*

11:00 AM – 11:45 AM

### **ROBOT SYSTEMS EDUCATION**

Joel Johnson, *Professor, North Dakota College of Science and Technology*

11:45 AM – 12:15 PM

### **LUNCH**

**Sponsored by Hypertherm Inc. – Betsy Van Duyne, Hypertherm**

12:15 PM – 1:00 PM

### **HYPERTHERM AUTOMATION**

*Hypertherm Inc.*

## **Register Today**





# 2022 WELDING TRACK

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## TUESDAY, NOVEMBER 8

1:00 PM – 1:45 PM

### **ENGAGING STUDENTS WITH ROBOTS**

*Lincoln Electric Inc.*

1:45 PM – 2:00 PM

### **BREAK**

2:00 PM – 2:45 PM

### **ROBOT EDUCATION AT MILLER ELECTRIC**

*Miller Electric Inc.*

2:45 PM – 3:15 PM

### **AWS FOUNDATION SCHOLARSHIP OPPORTUNITIES**

*Monica Pfarr, AWS Foundation Executive Director*

3:15 PM – 3:30 PM

### **VENDOR PRESENTATIONS**

3:30 PM

### **WRAP-UP, EVALUATIONS**

***Register Today***



# 2022 WELDING TRACK

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**TUESDAY, NOVEMBER 8**

## **WELDING PRODUCTIVITY TRACKS**

9:00 AM – 9:15 AM

### **WELCOME INTRODUCTION**

Steve Snyder, *Staff Welding Specialist, American Welding Society*

9:15 AM – 10:15 AM

### **COBOTS INCREASING WELDING & CUTTING PRODUCTIVITY**

Josh Pawley, *VP of Business Development, Vectis Automation*

In this track, you'll learn more about collaborative robots in welding applications, hear case stories of cobots boosting productivity in fab shops of all types and sizes, and learn the keys to successful implementation.

10:30 AM – 11:30 AM

### **ROBOTIC WELDING AUTOMATION: WELD A LOT OF PARTS FAST WITH CONSISTENT RESULTS**

Mike Monnin, *General Manager – Sales & Marketing, OTC Daihen, Inc.*

Robotic welding systems have grown over the last 40+ years to be a consistent, reliable solution for automating arc-welding production within metal fabrication operations. FAQs for those considering robotic welding will be addressed and return-on-investment analysis will be used to justify the expense. The high-mix / low-volume challenge facing contract fabricators will be quantified and solutions that address their unique requirements will be presented.

11:30 AM – 12:45 PM

### **LUNCH BREAK**

12:45 PM – 4:00 PM

### **WELDING PRODUCTIVITY FOR WELDING ENTHUSIAST**

Rob Tessier, *Airgas* and Steve Snyder, *Staff Welding Specialist, American Welding Society*

Understanding welding economics, productivity limitations and how to overcome them.

4:00 PM – 4:30 PM

### **Q&A PANEL DISCUSSION**

***Register Today***





# 2022 WELDING TRACK

## TUESDAY, NOVEMBER 8

### DIVERSE ROLES AND NEEDS WITHIN THE WELDING INDUSTRY TRACKS

8:00 AM – 9:00 AM

#### **WELDING FOR SANITARY APPLICATIONS**

William Roth, *President, Welding Engineering Consultants, LLC* and Richard Howard, *Director of Quality, Traylor Industrial*

This presentation covers basic reasons why sanitary design differs from ordinary fluid designs. It will include some weld joint design principles for sanitary applications as well as acceptance criteria for welded connections per AWS D18.

10:00 AM – 11:00 AM

#### **HIGH PURITY ORBITAL WELDING**

Richard Howard, *Director of Quality, Traylor Industrial* and  
Richard Campbell, *Bechtel Fellow & Welding Technical Specialist, Bechtel*

High Purity Orbital Welding, this presentation will describe and explain the importance of qualified practices and procedures, with an emphasis on daily production welding. In the high purity world there isn't any time for rework and rejection, it can adversely affect the schedule and cost of the project. That's why proven qualified welding procedures and practices are so important to this industry.

11:00 AM – 12:00 PM

#### **SEMICONDUCTOR HIGH-PURITY WELDING**

Richard Campbell, *Bechtel Fellow & Welding Technical Specialist, Bechtel* and  
Richard Howard, *Director of Quality, Traylor Industrial*

This presentation will describe and explain the importance of qualified practices and procedures, with an emphasis on daily production welding. In the high purity world there isn't any time for rework and rejection, it can adversely affect the schedule and cost of the project. That's why proven qualified welding procedures and practices are so important to this industry.

1:00 PM – 2:00 PM

#### **DESIGN ENGINEERS & WELD ENGINEERS – HOW THEIR ROLES DIFFER AND HOW THEY CAN WORK TOGETHER**

Joe Bailey, *Weld Engineering Manager, Vermeer*

Are you a manufacturing or weld engineer looking to be more effective in influencing and assisting your product design teams? Or, are you a product designer wanting to learn how understanding welding principles can help you improve your design? This talk is for you. Using D14 standards as a basis, this talk will consider the unique qualifications and responsibilities of design engineers and weld engineers and ultimately explore how these two roles can and should work together to make a robust product design and manufacturing process.

2:30 PM - 3:30 PM

#### **D1.6 - PROPER PURGING OF STAINLESS STEEL AND OTHER STAINLESS STEEL PIPE WELDING**

William F. Newell, Jr. *PE, Peng, IWE, Vice President, Engineering, Euroweld, Ltd.*

High integrity service usually requires purging the inside Diameter of stainless-steel piping and tubing with an inert gas to avoid the creation of deleterious oxides. Various purging and non-purging methods will be presented as well as advantages and disadvantages for each approach.

## *Register Today*



# 2022 WELDING TRACK

**TUESDAY, NOVEMBER 8**

## 2022 AWS PROFESSIONAL PROGRAM

**ROOM: C208**

### SESSION 1: PLENARY SESSION

**Chair:** T.J. Lienert, *TJ Lienert Consulting*

8:00 AM

#### **ADDRESSING MATERIALS CHALLENGES AND OTHER BARRIERS TO THE FUTURE OF ADDITIVE MANUFACTURING**

*Todd Palmer, Pennsylvania State University*

9:00 AM

#### **EVOLUTION OF ANALYTICAL MODELLING APPROACHES FOR RESISTANCE SPOT WELDING: A HISTORICAL PERSPECTIVE**

*Jerry Gould, Edison Welding Institute*

**Room: C208**

### SESSION 2: AMERICAN COUNCIL OF THE IIW

**Chair:** R. Shaw, *Steel Structures Technology Center*

10:00 AM

#### **ROLE OF STANDARDS IN WELDING SAFETY**

*Bruce Cannon, Weld Australia*

10:30 AM

#### **KEEPING PACE WITH CHANGE**

#### **THOMAS MEDAL 2020, VINCENT VAN DER MEE**

*Vincent van der Mee, European Welding Association*

11:00 AM

#### **IIW COMMISSION | ACTIVITIES ON ADDITIVE MANUFACTURING**

*Doug Kautz, Leidos, Inc.*

11:20 AM

#### **THE INTERNATIONAL INSTITUTE OF WELDING: STRATEGIC DIRECTIONS FOR WELDING AND JOINING RESEARCH AND INDUSTRIAL APPLICATIONS**

*Robert Shaw, Steel Structures Tech Ctr*

11:40 AM

#### **MICROSTRUCTURE AND MECHANICAL PROPERTIES OF ELECTRON BEAM ADDITIVELY MANUFACTURED Ti-6Al-4V**

*Amber Black, Thomas Jungst, Samantha Lawrence, Michaela McKamey, Mary O'Brien, Robin Pacheco, Brett Preston, Nolan Regis, Mark Sandoval, Los Alamos National Laboratory*

***Register Today***





# 2022 WELDING TRACK

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## TUESDAY, NOVEMBER 8

**ROOM: C209**

### **SESSION 3: ARTIFICIAL INTELLIGENCE/MACHINE LEARNING**

**Chair:** Zongyao Chen, *Air Liquide*

10:00 AM

#### **AN AI-BASED VISION METHODOLOGY FOR SELF-GUIDED SEAM TRACKING IN GAS METAL ARC WELDING**

Mahyar Asadi, Amin Ghasemazar, *Novarc Technologies*

10:20 AM

#### **EVALUATION OF SPATTER PRODUCTION WITH DEEP LEARNING ALGORITHMS**

Zongyao Chen, *Air Liquide*

10:40 AM

#### **HOW TO ACCURATELY MONITOR THE WELD PENETRATION FROM DYNAMIC WELD POOL SERIAL IMAGES USING CNN-LSTM DEEP LEARNING MODEL?**

Joseph Kershaw, Peng Wang, Rui Yu, YuMing Zhang, *University of Kentucky*

11:00 AM

#### **MACHINE LEARNING-BASED PROCESS CHARACTERIZATION AND EFFICIENT ADAPTIVE CONTROL IN ROBOTIC ARC WELDING**

Joseph Kershaw, Peng Wang, Rui Yu, YuMing Zhang, *University of Kentucky*

11:20 AM

#### **PREDICTING OPERATION WINDOWS FOR HIGH-FREQUENCY INDUCTION ALUMINUM TUBE WELDING THROUGH MACHINE LEARNING**

Shao-Wei Cheng, *National Tsing Hua University* | Hongyan Zhang, *University of Toledo*

## ***Register Today***



# 2022 WELDING TRACK

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**TUESDAY, NOVEMBER 8**

## 2022 AWS PROFESSIONAL PROGRAM

**ROOM: C208**

### **SESSION 4: AUTOMATION, SENSING & CONTROL**

Chair: YuMing Zhang, *University of Kentucky*

2:00 PM

#### **DEVELOPING AN AUTOMATED DEFECT DETECTION TIG WELDING ROBOT WITH A FUTURE ADAPTIVE IMPLEMENTATION**

Shems-Eddine Belhout, John Codevilla, Devon Goodspeed, William Hamel, Bradley Jared, Dylan Lewis, *University of Tennessee* | Greg Frederick, David Hansen, John Tatman, *Electric Power Research Institute*

2:20 PM

#### **HIGH SPEED VIDEO (HSV) AND SYNCHRONIZED DATA ACQUISITION (DAQ) TO OBSERVE WELDING PROCESS STABILITY**

Michael Carney, Dennis Harwig, Jim Hansen, Nick Kaputska, James McNeil, *EWI*

2:40 PM

#### **REAL-TIME RECOGNITION OF ARC WELD POOL USING IMAGE SEGMENTATION NETWORK**

Joseph Kershaw, Peng Wang, Rui Yu, YuMing Zhang, *University of Kentucky*

3:00 PM

#### **MICRO CROSS WELD TENSILE TESTING OF DISSIMILAR METAL WELDS USING DIGITAL IMAGE CORRELATION**

Boian Alexandrov, William Siefert, *Edison Joining Technology Center (OSU Welding Engineering)*

3:20 PM

#### **MECHANICAL DESIGN AND DEVELOPMENT OF A FIVE DEGREE-OF-FREEDOM TIG WELDING ROBOT**

Shems Belhout, John Codevilla, Devon Goodspeed, William Hamel, Bradley Jared, Dylan Lewis, Josh Penney, Ethan Rummel, *University of Tennessee*

***Register Today***





# 2022 WELDING TRACK

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## TUESDAY, NOVEMBER 8

**ROOM: C209**

### **SESSION 5: WELDING PROCESS STUDIES**

**Chair:** Nick Kapustka, *EWI*

2:00 PM

#### **APPLICATION OF POLARITY SWITCHING CAPACITOR DISCHARGE WELDING TO ALUMINUM SHEET STRUCTURES**

Jerry Gould, Lindsey Lindamood, *EWI*

Patrick Lester, Julio Malpica, Dewei Zhu, *Novelis Global Research & Technology Center*

2:20 PM

#### **BURIED ARC GMAW FOR SINGLE PASS SINGLE SIDED ERECTION JOINTS ONBOARD SHIPS**

Paul Blomquist, Jim Hansen, Nick Kapustka, *EWI*

2:40 PM

#### **IMPACT OF BEAM DEFLECTION ON POROSITY DURING KEYHOLE MODE LASER WELDING OF ALUMINUM ALLOYS**

Tarasankar DebRoy, Todd Palmer, Abhirup Saha, *Penn State University*

Michael Maguire, Jeffrey Rodelas, *Sandia National Laboratories*

3:00 PM

#### **MICRO GTAW APPLIED TO A BATTERY PACK FOR RACING APPLICATIONS**

Faissal El Idrissi, Prashanth Ramesh, *Center for Automotive Research - Ohio State University*

Kaue Riffel, *Federal University of Santa Catarina* | Michael Johanni, *Venturi North America*

Antonio Ramirez, *Edison Joining Technology Center - Ohio State University*

3:20 PM

#### **WELDVAC – A QUIET, CLEAN METAL REMOVAL SYSTEM**

Paul Blomquist, Jason Rausch, *EWI*

## *Register Today*



# 2022 WELDING TRACK

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## WEDNESDAY, NOVEMBER 9

### POSTER COMPETITION

8:00 AM – 4:00 PM

#### **PRACTICAL WELDING METALLURGY**

Ben Pletcher, *Chief Welding Technologist, Bechtel*

Introduction to basic metallurgy concepts with practical applications of material properties from time of manufacturing through to welding fabrication. We will discuss crystal structures, grain size, effects of welding and how these change the mechanical properties of our engineering alloys. By understanding fundamental physical metallurgy concepts, we will evaluate scenarios of how and why we use preheat, PWHT, or place limitations on heat input. Our emphasis on this course will be carbon and low-alloy steels but introduce stainless and non-ferrous alloys for future more specialized study.

8:00 AM – 4:00 PM

#### **PRICING FOR PROFITABILITY OF WELDED STRUCTURES**

Scott Helzer, *Technology Enabled Welding & Inspection- AWS: CWI, CWE, ASNT: PT, RT, VT*

Introduction to the Micro and Macro Economics of Welding Using Cost / Volume / Profit Relationships for the Best Practices in the Economics & Marketing of Welded Fabrications

10:00 AM – 12:00 PM

#### **WELDING PERFORMANCE QUALIFICATIONS**

Scott Witkowski, *Republic Testing Labs.*

What the attendee will learn is how to successfully create, weld, test, report, & write a successful PQR over multiple codes.

1:00 PM – 3:00 PM

#### **SECRETS TO A SUCCESSFUL PQR**

Scott Witkowski, *Republic Testing Labs.*

What the attendee will learn is how successfully perform, test, report, and write certs for welder qualification

## *Register Today*





# 2022 WELDING TRACK

## WEDNESDAY, NOVEMBER 9

### 2022 AWS PROFESSIONAL PROGRAM

**ROOM: C208**

#### **SESSION 6: MECHANICAL PROPERTIES**

**Chair:** P.W. Hochanadel, *LANL*

9:00 AM

#### **AN INVESTIGATION INTO THE EFFECTS OF STIR ZONE CHEMISTRY ON FRACTURE TOUGHNESS IN FRICTION STIR WELDED PIPELINE GRADE STEEL**

Michael Eff, Jerry Gould, Hyeyun Song, Tim Stotler, *EWI*

9:20 AM

#### **DEVELOPMENT OF A TEMPERATURE-DEPENDENT MATERIAL PROPERTY DATABASE FOR DH36 STEEL**

Daniel Bechetti, Charles Fisher, Jennifer Semple, *Naval Surface Warfare Center, Carderock Division*  
Wei Zhang, *Ohio State University*

9:40 AM

#### **EVALUATING THE CARBIDE PRECIPITATION BEHAVIOR DURING SHORT TERM TEMPERING AND ITS INFLUENCE ON IMPACT TOUGHNESS**

Boian Alexandrov, Eun Jang, *OSU Research*

10:00 AM

#### **FATIGUE PROPERTIES OF DISSIMILAR ALUMINUM TO STEEL WELDS JOINED BY ULTRASONIC INTERLAYERED RESISTANCE SPOT WELDING PROCESS**

Luke Walker, Wei Zhang, *Ohio State University* | Anoop Samant, Craig Vanderbilt2, *KTH Parts Industries*  
Daniel Paolini, *Honda Development & Manufacturing of America*

10:20 AM

#### **HARDNESS PREDICTION BY INCORPORATING HEAT TRANSFER AND MOLTEN POOL FLUID FLOW IN A MULTI-PASS, MULTI-LAYER WELD FOR ONSITE REPAIR OF CSEF GRADE 91 STEEL**

Aryan Aryan, Desmond Bourgeois, Obinna Onwuama, Wei Zhang, *Ohio State University*

10:40 AM

#### **USE OF LOW TRANSITION TEMPERATURE STEEL ALLOYS IN WELDED OVERLAYS FOR HIGH WEAR APPLICATIONS**

Patricio Mendez, Carter Trautmann, *University of Alberta*

11:00 AM

#### **META-ANALYSIS OF FATIGUE PROPERTIES IN ADDITIVELY MANUFACTURED 316L AUSTENITIC STAINLESS STEEL**

David Driggers, Todd Palmer, Ian Wietecha-Reiman, Stephen Sabol, *Pennsylvania State University*

## *Register Today*



# 2022 WELDING TRACK

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**WEDNESDAY, NOVEMBER 9**

## 2022 AWS PROFESSIONAL PROGRAM

**ROOM: C209**

### **SESSION 7: PROCESS MODELING AND SIMULATION**

**Chair:** P.F. Mendez, *CCWJ University of Alberta*

9:00 AM

#### **ANALYSIS OF TEMPERATURE AND VELOCITY FIELDS IN THE GTAW ARC FOR ARGON**

Alfredo Delgado, Patricio Mendez, Marco Ramírez, Alberto Velazquez, *Universidad Nacional Autónoma de México*  
Stefano Sacco, *University of Alberta*

9:20 AM

#### **DROPLET TEMPERATURE IN GMAW**

Patricio Mendez, Rishiekesh Ramgopal, *Canadian Centre for Welding and Joining*

9:40 AM

#### **ENERGY BALANCE IN GAS METAL ARC WELDING**

Patricio Mendez, Vicente Núñez Sánchez, *CCWJ*

10:00 AM

#### **INTEGRATED MODELING OF DEFECT FORMATION DURING DEEP PENETRATION LASER WELDING OF CREEP RESISTANT NICKEL BASE ALLOYS**

Tarasankar Debroy, Mingze Gao, Barnali Mondal, Todd Palmer, *Penn State University*

10:20 AM

#### **SCALING ANALYSIS OF THERMAL AND MECHANICAL PROCESS IN FRICTION STIR WELDING**

Xinrui Liu, Patricio Mendez, *University of Alberta*

10:40 AM

#### **THE INFLUENCE OF DYNAMIC BEHAVIORS CHARACTERISTICS OF MOLTEN POOL ON THE WELD FORMATION DURING THE HIGH SPEED LASER WELDING**

Yuewei Ai, *Central South University*

***Register Today***



# 2022 WELDING TRACK

## WEDNESDAY, NOVEMBER 9

**ROOM: C208**

### **SESSION 8: ADDITIVE MANUFACTURING**

**Chair:** Michael Eff, *EWI*

2:00 PM

#### **CARBONITRIDE DEVELOPMENT AND HEAT TREATMENT RESPONSE OF ADDITIVELY MANUFACTURED 17-4 PH STAINLESS STEEL WITH VARIATIONS IN COMPOSITION**

Derek Shaffer, *Pennsylvania State University*

2:20 PM

#### **CHARACTERIZATION OF DISSIMILAR MATERIALS 410 MARTENSITE STAINLESS STEEL AND MILD STEEL COMPONENT PRODUCED BY WIRE ARC ADDITIVE MANUFACTURING**

Sudarsanam Babu, Michael Kirka, Chris Masuo, Luke Meyer, Peeyush Nandwana, Andrzej Nycz, Sougata Roy, Wei Tang, Derek Vaughan, Yukinori Yamamoto, *Oak Ridge National Laboratory* | Obed Acevedo, *University of Tennessee*

2:40 PM

#### **DELETERIOUS PHASE AVOIDANCE IN ADDITIVELY MANUFACTURED FUNCTIONAL GRADIENTS THROUGH PATH PLANNING**

Olga Eliseeva, *EWI*

3:00 PM

#### **LARGE-SCALE HYBRID MANUFACTURING USING WIRE ARC ADDITIVE MANUFACTURING**

Aaron Cornelius, William Hamel, Bradley Jared, Joshua Penney, Tiffany Quigley, Tony Schmitz, Ross Zamerowski, *University of Tennessee*

3:20 PM

#### **PROCESS-FEATURE-MICROSTRUCTURE-PROPERTY RELATIONSHIPS FOR A9628 DIRECTED ENERGY DEPOSITION ADDITIVELY MANUFACTURED STEEL COMPONENTS**

Boian Alexandrov, Dennis Harwig, Nikolas Vega Michalak, *Ohio State University*

3:40 PM

#### **THE EFFECTS OF POST-WELD PROCESSING ON FRICTION STIR WELDED ADDITIVELY MANUFACTURED ALSI10MG**

Michael Eff, *EWI* | Harvey Hack, *Northrop Grumman*

4:00 PM

#### **HYBRID MANUFACTURING: COMBINING ADDITIVE FRICTION STIR DEPOSITION, METROLOGY, AND MACHINING**

Sudarsanam S (Suresh) Babu, Joshua Kincaid, Tony Schmitz, Ross Zamerowski, *University of Tennessee*

4:20 PM

#### **IN-SITU LIQUID NITROGEN CRYOGENIC COOLING FOR INTERPASS CONTROL IN HIGH-DUTY CYCLE WIRE ARC ADDITIVE MANUFACTURING OF LARGE COMPONENTS FOR NAVY APPLICATIONS**

Carolyn Fink, Dennis Harwig, Alexey Kuprienko, *Ohio State University* | Michael Carney, *EWI*

## ***Register Today***



# 2022 WELDING TRACK

**WEDNESDAY, NOVEMBER 9**

## 2022 AWS PROFESSIONAL PROGRAM

**ROOM: C209**

### **SESSION 9: WELDABILITY/WELDING METALLURGY**

**Chair:** Daniel Bechetti, *NSWC Carderock Division*

2:00 PM

#### **INFLUENCE OF MICROSTRUCTURE ON THE MECHANISM OF HYDROGEN-ASSISTED CRACKING IN DISSIMILAR METAL WELDS FOR REFINERY APPLICATION**

Boian Alexandrov, Abbas Mohammadi, *Ohio State University* | Jorge Penso, *Shell Global Solutions US Inc.*

2:20 PM

#### **INVESTIGATION OF FE-10 WT.% NI STEEL WELD METAL HYDROGEN INDUCED CRACKING SUSCEPTIBILITY USING THE GAPPED BEAD ON PLATE (GBOP) TEST**

Daniel Bechetti, Tyler Christ, *NSWC Carderock Division*

2:40 PM

#### **MATERIAL CHARACTERIZATION OF GRADE 91 STEEL WELDS USING MICRO-RESOLUTION ULTRASONIC IMAGING SYSTEM**

Aryan, Desmond Bourgeois, Obinna Onwuama, Wei Zhang, *Ohio State University, Dept of MSE*  
Jeong Na, *Kellogg Brown & Root LLC*

3:00 PM

#### **OPTIMIZING PRODUCTIVITY OF HYPER DUPLEX STAINLESS STEELS OVERLAY WHILE AVOIDING SIGMA PHASE FORMATION**

Andres Acuna, Antonio Ramirez, *Ohio State University*

3:20 PM

#### **PHASE TRANSFORMATION BEHAVIOR OF FE-10WT.% NI STEEL WELD METAL**

Daniel Bechetti, Jennifer Semple, Matthew Sinfield, *Naval Surface Warfare Center, Carderock Division*

3:40 PM

#### **THE INFLUENCE OF BORIDE PHASE TRANSFORMATIONS ON HEAT-AFFECTED ZONE LIQUATION CRACKING SUSCEPTIBILITY IN LASER WELDED 304L STAINLESS STEEL**

Erin Barrick, Johnathon Brehm, Ryan DeMott, Peter Duran, Khalid Hattar, Jack Herrmann, James (Tony) Ohlhausen, Charlie Robino, Jeffrey Rodelas, Kathryn Small, *Sandia National Labs*

4:00 PM

#### **WELDING INVESTIGATION OF WROUGHT FEMNAL STEEL**

Tao Dai, *LeTourneau University* | Zhili Feng, *Oak Ridge National Laboratory*

***Register Today***





# 2022 WELDING TRACK

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**THURSDAY, NOVEMBER 10**

## **POSTER COMPETITION**

8:00 AM – 4:00 PM

### **STAINLESS STEEL FABRICATIONS DO'S & DON'TS, AND WHY NOT(S)**

Scott Helzer, *Technology Enabled Welding & Inspection- AWS: CWI, CWE, ASNT: PT, RT, VT*

Introduction to the properties of stainless steels: corrosion resistance, weldability, joint designs, base and electrode compatibility & the estimating of costs as compared to carbon steels.

***Register Today***



The American Welding Society is the worldwide authority in the development of standards, certifications, and educational programming for the welding community. We are committed to connecting the welding industry to our extensive collection of resources, informing our members of technological advancements, and developing the next generation of welding professionals.