

EVENT PREVIEW

FABTECH 2019
CHICAGO
NOV 11-14

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INSIDE:

EXHIBITOR LIST
SPECIAL EVENTS
SCHEDULE-AT-A-GLANCE
EDUCATION PROGRAMS
HOTEL AND TRAVEL
PLANNING TOOLS

FABTECH

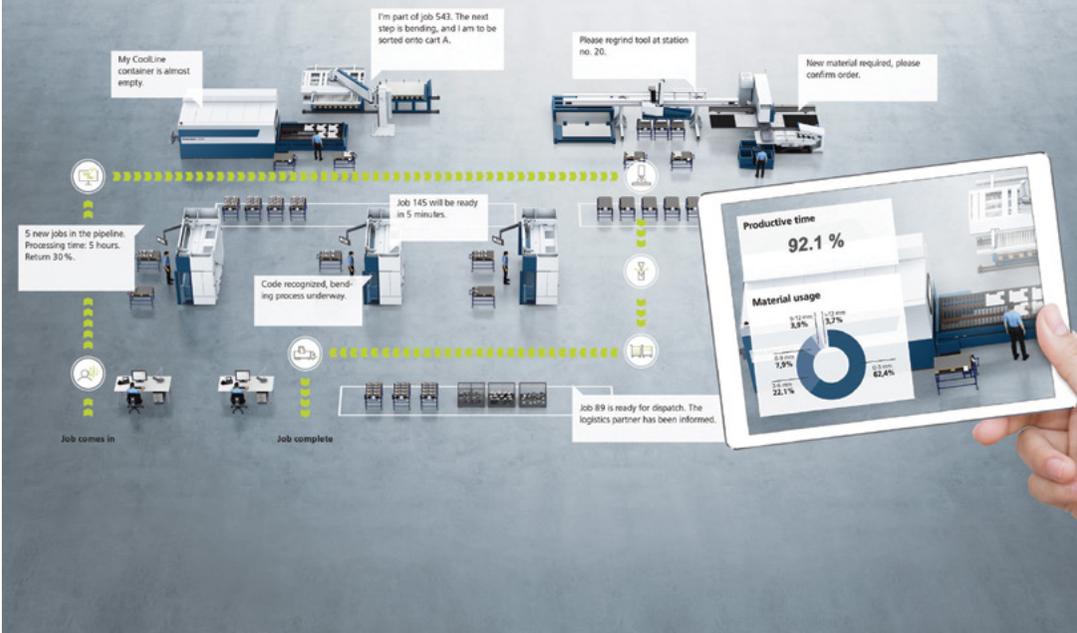
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LEARN

Gain valuable, can't-miss insights from best-in-class education and training programs that target technical, lean, operational, and managerial segments.

CONNECT

Visionary keynotes, expert panels, and other special events allow attendees to network with peers, exchange best practices, and learn about the latest industry advancements.

COMPARE

Discover advanced technologies that improve quality and productivity and compare innovative solutions from more than 1,700 exhibitors side-by-side.

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FABTECH 2019 FEATURES

- Over 1,700 Exhibitors
- 170+ Educational Programs and Workshops
- Live Product Demonstrations
- 500+ New Products
- Expert-Led Discussions

TECHNOLOGY ON DISPLAY

Additive Mfg/3D
Printing

Arc Welding

Assembly

Automation

Bending & Forming

Brazing & Soldering

Business Services

Coil Processing

Cutting

Fastening & Joining

Finishing/Paint &
Powder Coating

Finishing/Plating

Gases & Gas
Equipment

Hydroforming

Inspection & Testing

Job Shop/Contract
Mfg

Lasers

Lubrication

Maintenance & Repair

Material Handling

Metal Suppliers

Plate & Structural
Fabricating

Press Brakes

Punching

Resistance Welding

Robotics

Roll Forming

Safety & Environmental

Saws

Software, Machine
Controls

Stamping

Thermal Spraying

Tool & Die

Tooling

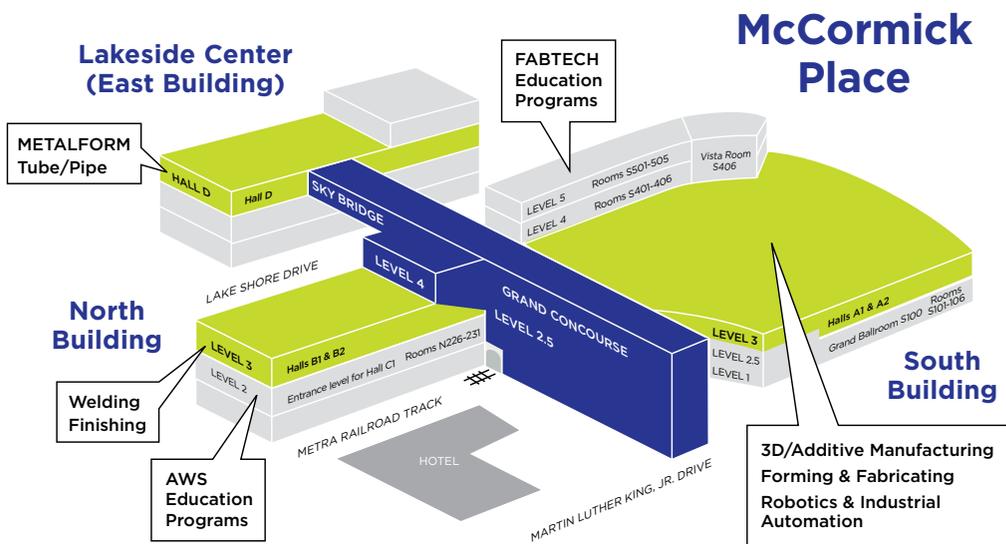
Tube & Pipe Fabricating
or Welding

Tube & Pipe Producing

Waterjet

Welding Consumables

Welding Machines



SHOW HOURS

Monday, Nov. 11
10:00 AM*–6:00 PM

Tuesday, Nov. 12
9:00 AM–5:00 PM

Wednesday, Nov. 13
9:00 AM–5:00 PM

Thursday, Nov. 14
9:00 AM–3:00 PM

*EAST BUILDING (LAKESIDE CENTER) OPENS AT 9 AM

REGISTER TO ATTEND

Avoid lines onsite and a \$50 admission fee by registering today at fabtechexpo.com.

SHOW ADMISSION

Exhibit-only attendance is **FREE** through November 8, 2019. Beginning November 9, the cost to attend the exhibits is \$50. AWS, FMA, SME, PMA, and CCAI members may always attend the exhibits for FREE with a valid member card.



EXPLORE EQUIPMENT AND SERVICES FROM LEADING COMPANIES

Exhibitor list by pavilion as of 07/01/19. Visit fabtechexpo.com for a complete exhibitor list.

3D/ADDITIVE MANUFACTURING

3D Metal Printing Magazine
3DXTech
Alpha Laser - US
Altair Engineering Inc
ASM International
Baker Industries
BigRep America Inc
Bluestreak | Bright AM
BMF Material Technology Inc
CIDEAS Inc
Cincinnati Inc
Creaform
Desktop Metal
EnvisionTEC Inc
ExOne Company
Formlabs
Fraunhofer USA Center for Laser Applications
FreePoint Technologies Inc
Fusion3
Gentec Electro-Optics Inc
GKN Additive
Globe Metal
Han's Laser Smart Equipment Group
HP
InnovMetric Software Inc
Laserline Inc
MakerBot 3D Printers
Markforged
Matterhackers
Met-L-Flo Inc
MicroCare Corporation
Microtek Finishing LLC
New Imaging Technologies
Oak Ridge National Laboratory
ProManage
Protolabs
Raise3D
Sanken Industry Co Ltd
Shenzhen Industrial Man Rapid Prototyping & Manufacturing Co
Shining 3D
Siemens Industry Inc
Stacker LLC
Stratasys
SuNPc Prototype
Tethon 3D
The Additive Report
Trak Machine Tools
TRUMPF Inc
Ultimaker
Venton
Xact Metal
Xometry

FINISHING

Accudraft Paint Booths
Accu-Labs Inc
ACT Dust Collectors
ACT Test Panels LLC
ADF Systems Ltd
AFC Finishing Systems/Airblast AFC

FINISHING

AkzoNobel Powder Coatings
Alconox
Alliance Manufacturing Inc
American Industrial Sales LLC
Amiberica Inc
ANAEROBIA
Andreae Team
APEL International
Argon Masking Corp
Atotech USA LLC
Axalta Coating Systems
AZZ Metal Coatings
Baril Coatings USA
Bayco by Guspro Inc
BCI Surface Technologies (Bulk Chemicals Inc)
BEKO Technologies
Benko Products Inc
Bex Spray Nozzles
Bi-State Rubber Inc
Blast Cleaning Technologies
Blast Guru LLC
BlastOne
Brush Research Manufacturing Co
Burleigh Industries
Caldan Conveyor A/S
Calvary Industries Inc
Caplugs
Carbit Paint Co
Cardinal Paint and Powder
Cardinal Parts & Equipment LLC
Carlisle Fluid Technologies
Castrol
Catalytic Industrial Systems
CFCM Canadian Finishing & Coatings Magazine
Chemco Manufacturing
Chemetall US Inc
Chemical Coaters Association International
ChemQuest Inc
Chemtec North America LLC
ClearClad Coatings LLC
Clemco Industries Corp
Cold Jet LLC
Col-Met Engineered Finishing Solutions
Columbus Industries Inc
Combustion and Systems Inc
Coral Chemical Co
Cortec Corporation
CPR Systems
CTI Systems
Custom Fabricating & Supplies
Daifuku
Decoral System USA Corp
Defelsko Corp
Defin Industrial Corporation

FINISHING

Diamond H2O
Diamond Vogel – Industrial Coatings
Dinamec Systems
DMP Corporation
DuBois Chemicals Inc
Duroair Technologies Inc
Durr Systems Inc
DURUSA LLC
Dynabrade Inc
Echo Engineering and Productions Supplies, Inc.
Egyptian Coatings
Elcometer Inc
Emitted Energy
Engineered Paint Applications
Enhancement Technologies Inc/Sublitex
EPI
Ervin Industries
ESMA Incorporated
Euroimpianti Srl
Eurovac
FANUC America Corp
Fischer Technology Inc
Flex Trim USA
Fostoria Process Equipment div of TPI Corp
Frank Lowe
GAT Finishing Systems
Gema USA Inc
General Fabrications Corp
Global Finishing Solutions
Goff Inc
Graco Inc
HafcoVac
Hedson Technologies North America
Henkel Corp
Hertzen Coatings Inc
Heraeus Noblelight LLC
Herr Industrial Inc
Houghton International Inc
Hubbard-Hall Inc
IFS Coatings Inc
Integrity Metal Finishing Supplies
INTEK Corporation
IntelliFinishing
INTERTEK
Iowa Area Development Group
IPCM - International Paint & Coating Magazine
IST International Surface Technologies
IXS Coatings
Jamestown Coatings
KeepTheHeat
Keyland Polymer Material Sciences LLC
Klinger Paint Co

FINISHING

Koch Enterprises Inc
Kyzen Corporation
LDPI Inc
Lesta USA-Self Learning Painting Robots
LPI Inc
M L Filters
Magic Rack/Production Plus Corp
Marpol Parlati Sanayi ve Ticaret AS
Marvel Industrial Coatings
Master Finish Company
MAXAIR Systems
Michigan Metal Coatings Inc
Midco International Inc
Midwest Finishing Systems
Mighty Hook Inc
NikoTrack LLC
Nordic Air Filtration
Nordson Corp
Northern Coatings & Chemical
Novacel Inc
Parker Engineering of America
Patriot Metal Finishing Systems Inc
PEM Inc
PKG Equipment Inc
Pneu-Mech Systems Mfg
Pollution Control Products Co
Polymer Molding Inc
Porcelain Enamel Institute Inc
Powder Coated Tough
Powder Coating Institute
PPG
PrestiVac Inc
Proceco Ltd
Products Finishing Magazine
Quality Finishing Systems
Rapid Coating Solutions LLC
Richards-Wilcox Conveyor
Rohner
RollSeal Inc
RPB Safety LLC
Ruwac
SAMES KREMLIN
Sata Spray Equipment
Scientific Control Laboratories
Selas Heat Technology
Sherwin-Williams
Singer Safety Co
Southern Systems International LLC
Spray Systems Inc
Spray Tech/Junair
Sprimag Inc
Surface Engineering Alloy Co
SurTec Inc

FINISHING

SWECO
System Technologies
Tanis Inc
TCI Powder Coatings
Technotrans America Inc
The Blast Shop
The Electrocoat Association
Therma-Tron-X Inc
Thermion Inc
TIGER-VAC USA INC
Transmet Corp
Trimac Industrial Systems
UniCure Spraybooths
Uni-Spray Systems Inc
United Surface Solutions LLC
V&S Galvanizing LLC
Valmont Coatings
VaporTech
Venjakob / Nutro Inc
VentCor Systems
Vitraccoat America Inc
Vulkan Blast Shot Technology
W Abrasives
Wagner Systems Inc
Washington Mills Ceramics
Webb-Stiles Co
Wheelerbrator

FORMING & FABRICATING

360 Direct
3Arm - Roscamat Division of Eurolink Inc
3D Fab Light Inc
3DCap
889 Global Solutions
ABIS Inc
Accuracy Machine
Accurpress
Acrotech Inc
ACTY SYSTEM AMERICA INC
Advance Cutting Systems
Advanced Robotic Technology
Advanced Spiral Technology
AFFRI Inc
Air Products and Chemicals Inc
Ajan Elektronik Servis Sanayi Ve Ticaret Ltd St
AKS Cutting Systems Inc
Akyapak Uslulararasi Dis Ticaret Mak San Ve Tic A
ALA Industries Limited - Yuken & GRH Hydraulics
ALCOS Machinery Inc
Alliance For American Manufacturing
Alliance Steel LLC
Allied Machine & Engineering
Allor Manufacturing Inc/ Plesh Industries

FORMING & FABRICATING

Allstrap Steel & Poly Strapping Systems
 Alma CAM USA LLC
 Alpha-Brush Aps
 Alternative Parts Inc
 Altrac USA
 AM Machinery Sales Inc
 Amada America Inc
 Amada Marvel Inc
 Ambrell Induction Heating Solutions
 American Cutting Edge
 American Manufacturing Inc
 American Photonics
 American Punch Co
 American Stress Technologies
 American Sweeping Solutions
 AMS Controls Inc
 ANDRITZ Herr-Voss Stamco Inc
 ANDRITZ Soutec & RWC Inc
 Apex Machine Group
 ARKU Inc
 Armstrong Kover Kwick Inc
 ARNTZ Inc
 Arro-Mark Co LLC
 Arrowhead Manufacturers & Fabricators Association
 Arvos Ljungstrom LLC
 ASC Machine Tools
 Ascentium Capital
 ASKO Inc
 Atlanta Drive Systems Inc
 Atlas Copco
 Atlas Machine & Supply Inc
 Automated Layout Technology
 Automated Machinery Inc (AMI)
 Automec Inc
 AWS Schäfer Technologie GmbH
 Axelent Inc
 Azarbud ERP Software
 b+s group
 Bad Dog Tools
 Baileigh Industrial Inc
 Barton International
 Baykal Makine A.S.
 Beagle I Inc
 Beckhoff Automation
 Behringer Saws Inc
 BesCutter
 Beta Tools
 Betenbender Manufacturing Inc
 Big Ass Fans
 Big Steel Rack
 Bissell Commercial
 Blastec Inc
 BLM Group
 Blue Water Engineering Pty Ltd
 boeck GmbH
 Bonal Technologies Inc

FORMING & FABRICATING

Boschert Precision Machinery Inc
 Boss Laser
 Boss Manufacturing Co
 Bossi
 Bowlin Manufacturing Inc
 Braner USA Inc
 BTM Company LLC
 Burr King Manufacturing Co
 Butech Bliss
 BUWW Coverings Inc
 Bystronic Inc
 Cagle Industrial Maintenance
 Cambco
 Cameron Mfg and Design
 Camlock Systems Inc
 Capital One Services LLC
 Carell Corporation
 Caster Works Inc
 CECO Environmental
 CH Steel Solutions Inc
 Chambrelan SAS
 Chase Cooling Systems
 Cheung Woh Technologies Ltd
 CIDAN Machinery Inc
 Cincinnati Inc
 Civan High Power Lasers
 Cle-Line by Greenfield Industries
 Cleveland Punch & Die Co
 Cleveland Steel Tool Co
 CMF
 CMS North America Inc
 CNC Machines
 COB Industries Inc
 Coherent Inc
 COLE-TUVE Inc
 Comblift USA
 ComEd IS
 COMEQ Inc
 Controlled Automation Inc
 Convergent Photonics
 Cosen Saws
 Costa Sanders
 Cowles Tool Co
 CTD Machines
 Custom Quality Manufacturing
 Cy Laser America
 Daito Seiki Co Ltd
 Dallan America Corp
 Dalmec Inc
 Danobat Goiti S Coop
 Darex LLC
 data M Sheet Metal Solutions GmbH
 DAVI Inc
 DAWN Vices & Clamps
 DCM Tech Inc
 DeeTee Industries Ltd
 Dener Makina San Tic Ltd Sti
 Design 2 Part
 Diamond Saw Works Inc
 Dimeco Coil Technologies Inc

FORMING & FABRICATING

Dirinler Makina AS
 Diversified Transportation Services
 DoALL Sawing Products
 Doringer Cold Saws
 Doucet Machineries Inc
 Dr. Shrink Inc
 Dreistern Inc
 Dude Solutions
 Durma North America Inc/ Durmazlar/DURMA
 Dynatec Manufacturing Inc
 Eagle Laser
 Eastern Metal Supply
 Ebbco Inc
 Eberle America
 EBK Laser/Reservoirs
 Depres
 EBS Ink-Jet Systems USA Inc
 ECI Software Solutions
 Econco/CPI
 EHRT North America
 ELG Metals Inc
 Elmali Makina Sanayi VE Ticaret Ltd Sti
 Elumatec North America Inc
 Emmegi USA Inc
 Entasco Inc
 EOS Business Surveillance Solutions
 Epicor Software Corp
 Epilog Laser Corp
 Epner Technology Inc
 Ercolina - CML USA Inc
 ErectaStep
 Ergo Advantage
 Ergotronix
 ERIEZ
 ErmakUSA/Ermaksan
 ERS Engineering Corp
 Exact Metrology
 ExhibitForce
 Fab Line Machinery LLC
 Fab Supply Inc
 Fabricating & Metalworking Magazine
 Fabrication Solutions & Technologies Inc
 Fabricators & Manufacturers Association Intl (FMA)
 Fabricator's Hot Line
 Faccin USA Inc
 Factory Cat
 Fagor Arrasate
 Family Business USA
 FARO Technologies Inc
 FASPAR SpA
 Fehr Warehouse Solutions Inc
 Ferrato Davide SAS
 FF Journal/Modern Metals
 Ficep Corporation
 Fladder-Hansen & Hundebol Inc
 FlashCut CNC
 FlexArm Inc
 Flow International Corp

FORMING & FABRICATING

Flowdrill Inc
 FMT
 FomUSA
 Formdrill USA Inc
 Formtek Inc
 Foshan Beyond Laser Technology Co Ltd
 Franklin Mfg Inc
 Friedrich August Picard GmbH & Co KG
 Fromm Packaging Systems
 G.I.S Mfg Inc
 Gasparini SpA
 GE Mathis Co
 Genius ERP
 Glen Dimplex Thermal Solutions
 Global Shop Solutions
 GMA Garnet
 GMC Machine Tools Corp
 GMATA- Arnold Laser Systems
 Gorbel Inc
 Graphic Products
 Gripnail - Fastening Systems
 Grotnes Inc
 H2O JET Inc
 Haas Automation Inc
 Haco-Atlantic Inc
 Haeger Inc
 HAEUSLER AG Duggingen
 Hafendorfer Machine Inc
 Hamilton Caster
 Hangzhou Grand Imp & Exp Co Ltd
 Hangzhou Sikan Technology Co Ltd
 Hangzhou Xiangsheng Abrasive Machine Manufacturing Co Ltd
 Han's Laser Corp
 Han's Laser Smart Equipment Group
 Hans Weber Sales and Service Corp
 Hanson Rivet & Supply Co
 Heck Industries
 Help Lighting Inc
 HEM Inc
 Hennig Inc
 Hexagon Manufacturing Intelligence
 HK Laser & Systems
 Hornet Cutting Systems
 Hougen Manufacturing Inc
 HUB Industrial
 Husky Rack & Wire
 HVR Magnetics Co Ltd
 Hyd-Mech Group Ltd
 Hydren Systems LLC
 HYMSON
 Hypertherm Inc
 igus Inc
 II-VI Infrared
 IMO USA Corp
 Imperien LLC
 IMS USA LLC
 Industrial Machinery Digest

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Industrial Magnetics Inc
 InfoSight Corporation
 Innovative Components
 Inovatech Engineering
 International Knife & Saw Inc
 International Technologies Inc
 Into-N2 LLC
 IQMS
 ISB
 Italmac USA Inc
 Jacquet
 JD Squared Inc
 Jepson Power Inc
 Jet Edge
 JETCAM/NestONE Solutions/The Aquila Group
 JHP Fasteners Inc
 Jiangsu Tone Machine Co Ltd
 Jinan Bodor CNC Machine Co Ltd
 Jinan Xintian Technology Co Ltd
 JMR Industrial
 Jobscope ERP
 Johnson Bros Roll Forming Co
 JPW Industries
 KAAST Machine Tools Inc
 Kalamazoo Machine Tool
 Karmetal San Tic LTD STI
 Kasto Inc
 KD Capital Equipment LLC
 Keller USA Inc
 Ken Bergman & Assoc LLC
 Kennametal Inc
 Kern Laser Systems
 Keyence Corp of America
 Kinetic Cutting Systems Inc
 King Forging Co Ltd
 Kipp Inc
 Klingelhofer Corp
 KMT Waterjet Systems Inc
 KNUTH Machine Tools USA Inc
 Kolev Engineering Inc
 Laguna Tools
 Lantek Systems Inc
 LAP Laser LLC
 Lapham-Hickey Steel
 Laser Experts Inc
 Laser Mechanisms Inc
 LaserStar Technologies Corp
 laserservice USA
 Lazer Safe Pty Ltd
 Leasing Resources Inc
 LENOX®
 LINSINGER
 LISSMAC Corp
 Lockformer
 LS Industries Inc
 LT Ultra Precision Optics
 Lucescent Bearing Corporation
 Lumentum
 LVD Strippit

FORMING & FABRICATING

Lyon Metals LLC
MachineMetrics
Machinery Dealers National Assoc
MachineTools.com
Manufacturing News
Marando Industries Inc
Marketing Essentials LLC
Masteel America Corp
Master Magnetics
Master Roll Manufacturing
Mate Precision Tooling
Mazak Optonics
MB Metal Technologies LLC
MC Machinery Systems Inc
Meccanica Ronzani Srl
MECCO
Meltric Corp
Messer Cutting Systems
Mestek Machinery Inc
Metal Supermarkets Service Company Inc
MetalFinish LLC
MetalForming Inc
Metalix CAD/CAM Ltd
MetalMizer
Metalphoto of Cincinnati Inc
Metamation Inc
Metform International Ltd
MetSaw Systems Inc
Metreel Inc
Metronor Inc
MG Srl
Microsoft Dynamics 365 / Turnkey Technologies
Midwest Automation
Midwest Tool Inc
MIE Solutions Inc
Ming Ping Machinery Co Ltd
Minnesota Department of Employment and Economic Development
Modula Inc
Mohawk Machinery Inc
Morton Machine Works
MultiCam Inc
Murata Machinery USA Inc
MVD Makina Sanayi A.S.
Nadella Inc
Nanjing Prima CNC Machinery Co Ltd
nano-purification solutions
naturalLED
Neuman Aluminium Impact Extrusion Inc
New London Engineering
Newcastle Systems Inc
Nitto Kohki USA Inc
NKT Photonics
nLIGHT Inc
NN Inc Power Solutions
Nordfab Ducting
Norlok Technology Inc
North Alabama Industrial Development Association
Nukon USA

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NUM Corporation
Oasis Scientific Inc
O'Brien Steel
Ocean Machinery Inc
Ohio Laser LLC
OMAX Corp
OMCO Rollforming Plus
OmegaCube Technologies
Oncor
Ophir Optonics Solutions LTD/MKS Instruments
Oriental Casting Inc
Orion Machinery North America Inc
Pacific Press Technologies
Packsize International LLC
Palmer Associates Inc
Palmgren
Pangborn LLC
Pannier Corporation
Paperboard Packaging Solutions
Park Industries
Parker Hanifin Industrial Gas Filtration & Generation Division
Pat Mooney Saws
Patterson Fan Company
Peak Scientific Instruments LTD
Peddinghaus Corporation
PennEngineering
PEP Technology
Perfection Global LLC
Permadur Industries Inc
Peter Prinzing GmbH
Phillips Saw & Tool Inc
Philpott Rubber/Lankhorst Mouldings
Phoenix Metals Co
Pinnacle Systems Inc
Piranha \ MegaFab
PM SAS
PMF Industries Inc
Polyurethane Products Corp
PRC Laser Corp
Press Brake Repair
Press Brake Safety
Presto Lifts Inc
Prima Power North America Inc
Prodevco Robotic Solutions Inc
Production Products Inc
Production Tube Cutting Inc
Profile Cutting Systems USA Inc
Project Tool & Die Inc
Qingdao Puhua Heavy Industrial Machinery Co Ltd
Qnect LLC
Quality Vision International
Quantum Machinery Group
R&M Manufacturing Co LLC
Radan
Radian Laser Systems

FORMING & FABRICATING

RAS Systems LLC
Raytech Measuring Systems
RDI Laser Blanking Systems
RealSTEEL Software
Red Bud Industries
Reibus International
Replacement Brush Tables
Revolution Machine Tools
Rice Lake Weighing Systems
Richardson Electronics Ltd
Rigaku Analytical Devices
Rigidized Metals Corp
Riteway Brake Dies Inc
Rocklin Manufacturing Co
Rocky Mountain Instrument Co
Rolled Alloys
Rolled Metal Products
Roller Die + Forming Co
Rolleri USA
Rousseau Metal Inc
RUF Briquetting Systems
Ruijie Laser
Ryerson
SafanDarley BV
Sahajanand Laser Technology LTD
Salvagnini America Inc
Samco Machinery Ltd
Sawblade.Com
SB Whistler & Sons Inc
Schelling America Inc
Schmidt
Schneider Electric
Scotchman Industries Inc
SDS/2
Semyx
Sen Fung Rollform Machinery Corp
Senfeng CNC Laser Technology USA Inc
Service Lamp Corp
SES Salico Finishing and Processing LLC
Shanghai Shuheng Cutlery & Mould Manufacturing Co Ltd
ShopBot Tools Inc
ShopData Systems Inc
Shoptech
SIC Marking USA
Sideros Engineering Srl
SigmaTEK Systems, SigmaNEST
Sinto America
Slatpro LLC
SMART Sheet Metal Air Rail and Transportation Workers Union
SME ZONE
Smith & Wesson Precision Components
Smith Metal Products
Snap On Industrial
Sortaaba USA Inc
South Tek Systems
SP Air Corporation

FORMING & FABRICATING

Spanco Inc
Spraying Systems Co
SSC Controls Co
SSI Schaefer
Stainless Structural LLC
STAM SpA
Starrett Company
Staub Manufacturing Solutions
Steel King Industries Inc
Steel Plate Akron Atlanta
Steel Storage Systems Inc
Stopa
Stop-Painting.com
Stor-Loc Corp
Striker Systems
Strong Hold
STRUMIS LLC
Sugar Steel Corp
SUNS International LLC
Super Duty Fans
Supra Machine Tool
SYSPRO USA
TapeCase Ltd
Tapeswitch Corporation
Team Texas
Techflex Inc
Techni Waterjet A GMM Group Company
Tekfab Inc
Tennsmith/Roper Whitney
Texas Right Corner
The Bradbury Group
The Fabricator Magazine
The M.K. Morse Company
Thermal Care
Three D Metals Inc
TigerStop LLC
Timesavers LLC
Tinius Olsen
Toolmen Corp
Travelers Insurance
Trilogy Machinery Inc
Trimble Solutions USA Inc
Tri-Mer Corp
Trim-Lok Inc
Tru-Cut Saw Inc
TRUMPF Inc
TST Tooling Software Technology LLC
Tsune America LLC
TYKMA Electro
Ultra Tech Industries Company Inc
Unibor
UniPunch Products Inc
United Lens Co
Ursviken Inc
US Industrial Machinery Co
Valgro India Limited
Various Machining Solutions LLP
Vartek Machinery
Verisurf Software Inc
Versatility Professional Tool Storage

FORMING & FABRICATING

Viking Blast & Wash Systems
Viretek Vision International
VKS - Visual Knowledge Share
Voortman USA
Vytek Laser Systems
Walker Magnetics
WARDJet
Water Jet Sweden AB
Waterjet USA LLC
WDM Bending Rolls
Welsor Inc
Wemo Netherland B V
West Virginia Development Office
Wila USA
Willbanks Metals Inc
Wilson Tool International
Wisconsin Metal Parts Inc
WM Caster
Workshops For Warriors
World Economic Development Alliance
Wyndham Hotels & Resorts
Wysong Parts & Service
Xinxiang Tianfeng Machinery Manufacture Co Ltd
xTuple — Open Source ERP+CRM + Web Portal
YESTOOL / Aloris USA
Zapp Precision Strip
Zund America Inc

METALFORM

ABC Metals Inc
Accra-Wire Controls Inc
Accurate Die Design Software Inc/Logopress3
Admiral Steel LLC
Agathon Machine Tools Inc
AIDA-America
AIM Computer Solutions, ERP and EDI Software
AKH Inc
Alma Machinery Co
Almco Inc
Alro Steel Corporation
AMADA ORII AMERICA INC
AP&T North America Inc
ART Metals Group
Asmith Manufacturing Company
AutoForm Engineering USA Inc
Automated Tapping Systems
Azimuth Machinery
Balluff Inc
Beckwood Press Co
Berg & Co GmbH Spanntechnik
BesTech Tool LLC
Biele S A
Bihler 4 Slide-NC
Bruderer Machinery
BTD Manufacturing Inc
C2AE
Christy Metals

METALFORM

CIECO Inc
 Clayton Metals
 CM Diagnostics
 COACT Associates Ltd
 COE Press Equipment Corporation
 CoilTech Machinery Inc Co
 Colt Automation LTD
 Combined Metals of Chicago
 Daubert Cromwell
 DAYTON Lamina Corporation
 DDI Inc
 Dees Hydraulic Industrial Co Ltd
 Delta Computer Systems Inc
 Delta Industrial
 DENN - Industrias Puigjaner, sa - Global Metal Spinning Solutions
 DESCH USA Inc
 Die Cad Group a Tooling Tech Group Company
 Dongguan City Yalu Industry Co Ltd
 Dongguan Gooming Mechanical Co Ltd
 Dongguan Sunyuu Automotive Equipment Co Ltd
 Dongguan Topway Tool & Die Co Ltd
 Dongguan Wisdom Tool & Die Co Ltd
 Dongguan Zerostart-tool Co Ltd
 DTC Products Inc
 Dubuque Stamping & Mfg Inc
 Durable Superior Casters
 Eagle Press & Equipment Co Ltd
 EAS Mold & Die Change Systems Inc
 EBway LLC
 EIGEN
 Elizabeth Carbide Components
 Engineered Lubricants Co
 Enprotech Industrial Technologies
 Erickson Metals Corporation
 Excelsior Hardware & Plastic Co Ltd
 F&G Tool and Die Co
 Fagor Arrasate
 Feed Lease Corp
 Fibro Inc
 Flight Industrial Co Limited
 FluidForming Americas
 FORMTEK-ME
 Fortech Products Inc
 Fuchs Lubricants Co
 Fuzhou YIN TOU Precise Metallurgy Industry Co Ltd
 Gibbs Metals
 Goanwin USA Inc
 Green Valley Manufacturing Inc
 Greenerd Press & Machine Company Inc

METALFORM

Gruber Tool & Die Inc
 Guangdong TopZone Tooling Co Ltd
 Hammer Presses
 Hebei Matson Metal Tech Co Ltd
 Hefei Metalforming Intelligent Manufacturing Co Ltd
 Heim Group, The
 Helm Instrument Co Inc
 Heyco Metals Inc
 Hify Tool
 Hilma By Carr Lane Roemheld
 Hindustan Pressings Pvt Ltd
 Hitachi Metals America
 HLC Metal Parts Ltd
 HTM Sensors
 Hutchison Tool Sales Co
 Hydraulic AS
 IHI Ionbond Inc
 Impax Tooling Solutions® a Division of Wilson Tool International
 Industrial Innovations Inc
 Inno-Spin LLC
 Jarvis Cutting Tools
 JET-SET
 JIER North America
 Jinghong Precision Industrial Co Ltd
 JIT Automation Inc
 J-Tech
 Kaeser Compressors Inc
 Kent Corporation - Dietronic
 Kingyu Tool & Die Co Ltd
 Komatsu America Industries LLC
 Kovinoplastika Loz D.D.
 Kunshan Dersun Precision Mould Co Ltd
 Kunshan Eagle Precision Tooling Co Ltd
 Kyntronics
 Latrobe Specialty Metals Distribution
 Lee Industrial Contracting
 Leifeld Metal Spinning AG
 Lien Chieh Hydraulic Industrial Co Ltd
 Lincoln Electric
 Linear Transfer Automation Inc
 LINK Systems
 LSP Industries Inc
 Lucky Harvest Co Ltd
 M.S. Willett
 Machine Concepts Inc
 Macrodyne Technologies Inc
 Manitowoc Tool & Manufacturing LLC
 Marposs Corp
 Mayfran International Inc
 MD Metals
 Metalloid Corporation
 MetPro Group
 Meyer Aluminium Blanks Inc

METALFORM

Midwest Industrial Metals Corp
 MISCO Refractometer
 Misumi
 MJC Engineering & Technology Inc
 Moeller Precision Tool
 MPI Magnetic Products Inc
 Multipress Inc
 National Kwikmetal Service LLC
 Neff Press Inc
 NGK Metals Corp
 Nidec Press & Automation
 Norgren Automation Solutions LLC
 NOXON Automation USA LLC
 Oerlikon Balzers
 OGS Industries
 Ortech Inc
 Overton Tool & Die
 P/A Industries Inc
 Pacesetter Systems
 Pascal Engineering Inc
 Pax Products Inc
 Penn United Technologies Inc
 Pepperl+Fuchs Inc
 Plant Engineering Services Inc
 Plex Systems
 Pottiez America LP
 Precious Plate Inc
 Precision Metalforming Association
 Precision Punch Corp
 Premier Tooling & Manufacturing LLC
 Prescor LLC
 Press Room Equipment Co
 Pressix North America
 Pressroom Electronics Inc
 Pronic Inc
 Punch Industry USA Inc
 Quality Wire EDM Inc
 Quintus Technologies LLC
 Raffin Construction Co
 Ramcel Precision Stamping and Manufacturing LLC
 Rapid-Air Corp
 Ravne Presses DOO
 Ready Technology Inc
 Rock Valley Oil & Chemical Co Inc
 Ross Controls
 Samson Roll Formed Products Co
 Sangiacomo Presses Americas LLC
 Sankyo Automation
 Sasahara Kanagata Co Ltd
 SB Specialty Metals LLC
 SC Fastening Systems
 Schuler Inc
 SelfLube
 Serapid Inc
 SEVI America Inc
 Shenzhen Huayuanda Technology Co Ltd

METALFORM

Shenzhen Manyes Precision Metal Co Ltd
 Shenzhen Zhuotai Precision Tooling
 SHOPEdge Software Inc
 SIMPAC America Co Ltd
 Solar Atmospheres
 Solar Manufacturing
 Soph Inc
 Southern Copper & Supply
 Special Springs LLC
 Stamtec Inc
 Steel Craft Technologies
 STEINEL Normalien AG
 Superior Die Set Corp
 Sutherland Presses
 TDS Automation - A Doerfer Company
 Tecnomagnete Inc
 The David Round Company
 Thomas Industrial Rolls Inc
 Toledo Integrated Systems
 Tooling Tech Group
 Toptime Precision Electronics Co Ltd
 Torque Incorporated
 Torque Technologies Inc/Goizper
 Tower Metalworking Fluids
 TOX Pressotechnik LLC
 Trans-Matic
 TST Tooling Software Technology LLC
 Tsubaki - Kabelschlepp
 UEI Tool and Die/Jacar in Die Transfer Systems
 Uelner Precision Tools & Dies
 Ulbrich Stainless Steels & Special Metals Inc
 UltraLox
 Ultratech Tool & Design Inc
 Unico Inc
 Unisorb Installation Technologies
 Unist Inc
 United Aluminum Corp
 United Machine Corporation
 United Performance Metals
 United Wire Co Inc
 Unittool Punch & Die Company
 Vaccari SPA
 Vekttek LLC
 Vibro Dynamics LLC
 Victory Tool
 Vidir
 voestalpine eifeler Coatings
 Voith Turbo Inc
 Wilco Inc
 Wintriss Controls Group LLC
 Wolfgang Loch GmbH & Co KG
 WorkWise Software
 Xinyongxu Metal Mould (Shenzhen) Co Ltd
 Yamada Dobby America LLC
 Yangli Group Co Ltd

METALFORM

Yih Shen Machinery Co Ltd (YSM)
 Yunsing Industrial Co LTD
 Zerust Corrosion Solutions

ROBOTICS & INDUSTRIAL AUTOMATION

Accu Tech USA
 Bilsing Automation North America
 Binder USA
 Canon USA
 Design Storage & Handling Inc
 Dispatch
 Ekide SL
 Fagor Automation Corp
 Festo Corp
 Fremont Automation
 Harmonic Drive LLC
 Hiwin Corporation
 IKO International Inc
 ILME S.p.A.
 JobPack Inc
 Kosmek USA
 Lasermet Inc
 Leadec Industrial Services
 Mayer USA Inc
 Murplastik Systems Inc
 Nabtesco Motion Control Inc
 Neugart USA Corp
 OnRobot US Inc
 Onshape Inc
 OPERA
 PrimeTest Automation Inc
 Promess Inc
 Shop Floor Automations Inc
 Sigma DT Robotics
 SIS Corp
 SMC Corporation of America
 THK America Inc
 TURCK Inc
 Two Technologies Inc
 Veo Robotics
 Welker Engineered Products
 Zeiss Carl Zeiss Industrial Metrology LLC

TUBE & PIPE

5 Star Engineering and Maintenance
 Accurate Technology Inc
 Accurex Measurement Inc
 Addison Machine Engineering Inc
 Addition Manufacturing Technologies
 Advanced Fabricating Machinery
 Advanced Tubular Technologies Inc
 AFM Advanced Manufacturing Technologies
 AIM Inc
 Ajax Tocco Magnethermic Corp

TUBE & PIPE	TUBE & PIPE	TUBE & PIPE	WELDING	WELDING	WELDING
Alpine Bender Machinery	Mumalliance Inc	Winton Machine Company	Attollo Lift	Clean Air Consultants	FSU Welding Engineering Technology
AM Industrial Group	Olimpia 80 Srl	World Machinery & Saw Inc	Auburn Manufacturing Inc	CleanSpace Technology Pty Ltd	FumeVac
AMPSCO Metal Inc	OMNI-X USA	Ying Chivan Corp	Automation International Inc	Cloos Robotic Welding Inc	Fusion Inc
ASMAG USA Inc	OP USA Inc		AVS Industries LLC	Closed Loop Recycling	Gas Lens Galore
Bend Tech	Overton Tube Forming Systems	WELDING	AWS Bookstore	CM Industries Inc	GAWDA
Beverlin Specialty Tube	Passline Performance	3M	AWS Welding Competition 2019	Computers Unlimited	GE Schmidt Inc
BLM Group	Pensa Labs	ABB Inc	AXXAIR USA	Continental Abrasives	Genesis Systems IPG Photonics Company
Chiyoda Kogyo-Maruka USA	PHI	Abicor Binzel	Baoji Taimei New Material Technology Co Ltd	Coral SPA	Genstar Technologies Co Inc (GENTEC)
Clark Fixture Technologies	Proto-1 Manufacturing	Above Material Technology Co Ltd	Ace Industrial Products	COR-MET INC	Genstar Technologies Co Inc (GENTEC)
Comblift USA	PT Peroni Karya Sentra	Air Cleaning Specialists Inc	ACT Automotive NA	Cougartron Inc	Genstar Technologies Co Inc (GENTEC)
Comco USA Inc	Quaker Chemical Corporation	Airflow Systems Inc	ADDere	Coxreels	Genstar Technologies Co Inc (GENTEC)
Continental Pipe & Tube Cut-Off Machines	Rafter Equipment Corp	Airgas Inc	AGT Robotics	CRC Industries	Genstar Technologies Co Inc (GENTEC)
Copier Pipe Machinery	RbSA Industrial	Aketek Industries	AIMTEK Inc	CS Unitec Inc	Genstar Technologies Co Inc (GENTEC)
Creative Safety Supply	REA JET US	Alabama Laser	Air Cleaning Specialists Inc	CWI WELDING Generation4	Geswein Corp
Crippa SPA	Roll Machining Technologies & Solutions	Alllegro Industries	Air Purification Inc	D/F Machine Specialties Inc	Geswein Corp
Current Tech	Rust Release (Safe Industrial Rust Remover)	Allied Powers LLC	Airflow Systems Inc	Dahching Electric Industrial Co Ltd	Geswein Corp
Design Storage & Handling Inc	Saar Hartmetall USA LLC	ALM Positioners Inc	Airgas Inc	Dataweld Inc	Geswein Corp
Eddytech Systems Inc	Sanderson Machines	ALS Maverick Testing Laboratories Inc	Aketek Industries	Dedeco International Inc	Geswein Corp
EFD Induction Inc	Schwärze-Robitec GmbH	AlumaReel USA	Alabam Laser	Dengensha America Corp	Geswein Corp
EJP Maschinen GmbH	SST Forming Roll Inc	Amada Miyachi America	Allegro Industries	Denray Machine Inc	Geswein Corp
Electrex Industrial Solutions	T&H Lemont	American Society For Nondestructive Testing	Allied Powers LLC	Dentec Safety Specialists	Geswein Corp
FD Machinery	Taloc USA	American Technical Publishers	ALM Positioners Inc	Diagraph	Geswein Corp
FENN	T-Drill Industries Inc	American Torch Tip Co Inc	ALS Maverick Testing Laboratories Inc	Diamond Ground Products Inc	Geswein Corp
Fives	Tenryu America Inc	American Welding Society	AlumaReel USA	Dino-Lite Scopes (BigC)	Geswein Corp
Gem Tool Corporation	Thai German Products PCL	American Weldquip LLC	Amada Miyachi America	Disse Inc	Geswein Corp
George A Mitchell Co	Thermatoool Corp	AMET Inc	American Society For Nondestructive Testing	Direct Wire & Cable	Geswein Corp
Grazioli Cesare Srl	Thermo Fisher Scientific	Anand Arc Ltd	American Technical Publishers	Diversitech	Geswein Corp
Guild International	Tools for Bending	Andersen Industries Inc	American Torch Tip Co Inc	Donaldson Torit - Donaldson Company Inc	Geswein Corp
Haas Saw & Supply	Transfluid Maschinenbau GmbH	Andritz Powerlase	American Welding Society	DualDraw LLC	Geswein Corp
Han Jie Machinery Co Ltd	Tru-Cut Saw Inc	Angle-Rite® Clamping System	American Welding Society	Dynatorc Inc	Geswein Corp
Haven Manufacturing Corp	Tube & Pipe Technology	Anthony Welded Products Inc	American Weldquip LLC	E.H. Wachs/Orbitalum	Geswein Corp
Heiko GmbH & Co	Tube 2020 Messe Dusseldorf North America	Antra Technologies Co Ltd	AMET Inc	EASYKleen Pty Ltd	Geswein Corp
Heiko Machine Tools LLC	Tube Bending Concepts Inc	Arxan Abrasives Co Ltd	ANAD ARC LTD	Ecogate Inc	Geswein Corp
Horn Machine Tools Inc	Tube Form Solutions	Applied Technical Services Inc	Anand Arc Ltd	Eidos Ergonomics	Geswein Corp
Huth Ben Pearson International LLC	Tube Flex Solutions	Aquasol Corp	Andersen Industries Inc	elder LLC	Geswein Corp
Hydro Tube Enterprises Inc	Tubex Technology Machinery	Arc Solutions Inc	Andritz Powerlase	Elderfield & Hall/ Pro-Fusion	Geswein Corp
Ikra Makina San Ve Tic AS	Ultraflex Power Technologies Corp	ARC Specialties Inc	Angle-Rite® Clamping System	Electron Beam Technologies Inc	Geswein Corp
Innerspec Technologies	Unison LTD	ArcBoss	Anthony Welded Products Inc	Encompass Machines Inc	Geswein Corp
Innovative Tube Equipment Corp	United Industries Inc	Arch Value Solutions	Antra Technologies Co Ltd	Ensitech Inc	Geswein Corp
INNOVO Corporation	Universal Tool & Engineering	ArcOne	Arxan Abrasives Co Ltd	ESAB Welding & Cutting Products	Geswein Corp
INSPECTECH	Universal Tube & Rollform Equipment Corp	Arc-Zone.Com Inc	Applied Technical Services Inc	ESCO Tool Co	Geswein Corp
IP Automation Inc	Viega	Arkansas Elite Welding Academy	Aquasol Corp	Euroboor USA	Geswein Corp
J&S Machine Inc	ViewTech Borescopes	Armor Tool	Arc Solutions Inc	FANUC America Corp	Geswein Corp
Julia USA	Vinston US Corp	Artotic	ARC Specialties Inc	Fastenal Company	Geswein Corp
Kent Corp	WAFIOS Machinery Corp	Astro Arc Polysoude Inc	ArcBoss	FEIMEC 2020	Geswein Corp
Kinkelder USA	Wauseon Machine & Manufacturing Inc	ATA Tools Inc	Arch Value Solutions	Fein Power Tools Inc	Geswein Corp
Lomar Machine & Tool Co	Wecotech AG	ATI Industrial Automation	ArcOne	Fireball Tool Works LLC	Geswein Corp
Mair Research SpA	Weil Engineering North America		Arc-Zone.Com Inc	FIT RITE Systems LLC	Geswein Corp
Manchester Tool & Die Inc	Wilmington Precision Machining		Arkansas Elite Welding Academy	Flame Technologies Inc	Geswein Corp
Matter Srl			Armor Tool	Flange Wizard Inc	Geswein Corp
Metalloid Corporation			Artotic	Flexovit USA Inc	Geswein Corp
MiC OPTON (USA) Inc Mill Masters			Astro Arc Polysoude Inc	Forney Industries Inc	Geswein Corp
New-Form Tools			ATA Tools Inc	FPT Industrie SpA	Geswein Corp
			ATI Industrial Automation	Fronius USA LLC	Geswein Corp
					JAZ Brush USA Inc

WELDING	WELDING	WELDING	WELDING	WELDING
Jiangsu Meixin Optoelectronics Technology Co Ltd	Miller Electric Mfg LLC, Hobart Brothers, Bernard, Tregaskiss	plasma USA LLC	SMA Abrasives USA LLC	Uweld Technologies Co Ltd
Jiaxing MTB Machinery Co Ltd	MITUSA Inc	Plymovent Inc	Southern Stud Weld Inc	Vanterm Isi Ve Makina San Tic AS
JLC Electromet Pvt LLC	MK Products Inc	Pollstar	SPI Lasers	VDM Metals
John Tillman Co	Morris Precision Technology Company Limited	Powermig	Stabila Inc	Victory CNC Plasma Systems
Joyson Abrasives Co Ltd	MSC Software	Praxair Distribution Inc	Stanley Black & Decker Inc	Vitronic Machine Vision
JR Automation	MTA-USA LLC	Precitec Inc	Steel Vision Tools	voestalpine Bohler Welding USA Inc
Kalas Wire Inc	NASA Technology Transfer Program	Preston Eastin	Steelmax Tools	VSM Abrasives Corp
Kanca El Aletleri Dovme Celik Ve Makina Sanayi AS	Nation Wide Products	Pro Spot International	Steiner Industries	W Weldpro
Kawasaki Robotics (USA) Inc	National Standard	proAutomation LLC	Strong Hand Tools	Walter Surface Technologies
Kayo Products Co Ltd	Nederman LLC	Proceq USA Inc	STUAA Automation Co Ltd	Washington Alloy Co
Kemper America Inc	Nelson Stud Welding Inc	PROFAX / LENCO	Suhner Industrial Products Inc	Watts Specialties Inc
Kempii	New Fire Co Ltd	Pulsa	SumDumWelder Apparel	WD-40 Company
Kennametal Stellite	Newland (Tianjin) Welding Material Co Ltd	PushCorp Inc	Sumig Usa Corp	Weiler Abrasives
Kent Stud Welding	Ningbo Dabu Welding Technology Co Ltd	Pyramex Safety Products	Sumner A Southwire Company	Weld Engineering Co
Keystone Fastening Technologies	Ningbo Janson Machinery Manufacturing Co Ltd	Quantum Machinery Group	Sunstone Welders	Weld Pride USA For Weldbrush
Kistler Cutting and Welding (Kistler GmbH)	Ningbo Jintian	Radyne Corp	Superflash Compressed Gas Equipment	Weld Systems Integrators Inc
Kiswel USA Inc	Ningbo Kimpin Industrial Pte Ltd	Rasco	Superflash Compressed Gas Equipment	Weldas Co LLC
Klimawent USA LLC	Ningbo Powerway Alloy Material Co Ltd	Resistance Welding Controls LLC	Surewerx USA Inc	WeldComputer
KLINGSPOR Abrasives Inc	Ningbo Starex Welding & Cutting Technologies	Resistance Welding Machine & Accessory	Surface Flow Technologies Inc/LSN Diffusion LTD	Weldcote Metals
Kobelco Welding of America Inc	Ningbo Yihe Refrigeration Equipment Co Ltd	Rex-Cut Abrasives	T. J. Snow Company	Welder Training & Testing Institute
Koike Aronson Inc	Ningbo Zehen International Trade Co Ltd	RIDGID	Taylor-Winfield Technologies Inc	Welding Alloys USA
Konzen Company	Nodha Industrial Technology Wuxi Co Ltd	Rite-Hite	Team Industries Inc	Welding Consultants LLC
KUKA Robotics Corporation	Norton Saint-Gobain	Robotmaster a Hypertherm Company	TEC Welding Products	Weldobot Technologies Inc
LA-CO Industries Inc	Novarc Technologies Inc	Rocoon LLC	Techniweld USA	Weldsale LLC
Laizhou Hongyuan Bench Vise Manufacture Co Ltd	Nuova CMM Srl	RoMan Manufacturing Inc	Technogenia Lasercarb Technology	Wendt USA LLC
Laser Manufacturing Technologies LLC	Octopuz Inc	Roy Smith Company	TECMEN Electronics Co Ltd	West Chester Protective Gear
LeTourneau University	Olympus America Inc	RWMA - Resistance Welding Alliance	Termmei Torch & Tip Company	West Warwick Welding Co
Levitade Technologies Inc	Opretl Inc	Saf-T-Cart Inc	THE ROUCHE CO LLC	Winnox Industries Ltd
Lianyungang Orientcraft Abrasives Co Ltd	Osborn	Sakura of America	Thermacut Inc	Wire Wizard Welding Products
Liburdi Automation Inc	OTC DAIHEN Inc	Saldatore Distribution Inc	Thermco Instrument Corp	Wisconsin Wire Works Inc
LinAn Da Yang Welding Material Co Ltd	Otto Trading Inc	SanRex Corporation	Threaded Fasteners Inc	Wise Welding Technology & Engineering Co Ltd
Lincoln Electric Co	Oxylance Inc	SciAps Inc	Thred Taper	WITT Gas Controls
Luvata Ohio Inc	Pador Marketing Group	Selectrode Industries Inc	Tip Tig USA LLC	Wrefs Welding LLC
Magnatech LLC	Panasonic Systems Solutions Industries Inc	Serimax North America LLC	Top Cat Air Tools	Wuhan Welhel Photoelectric Co Ltd
Manufacturing Solutions Industries Inc	Pandjiris Inc	Servro-Robot Inc	Top Manufacturing Inc	Wuxi Datang Welding & Cutting Mechanical Equipment Co Ltd
Matsumoto US Technologies Inc	Path Robotics	Shandong Aotai Electric Co Ltd	Trafimet Group S.p.a.	Wuzhou Ally Protect Co Ltd
Matuschek Welding Products Inc	PDS BarTech Inc	Shandong Maike Tungsten Molybdenum Technology Co Ltd	Trendex Information Systems Inc	Xiris Automation Inc
Maxxeon Inc	Pearl Abrasive Company	Shanghai Huawei Welding & Cutting	Tri Tool Inc	Yaskawa America Inc
McDantim Inc	Pemamek LLC	Shanghai Kaisen Environmental Technology Co Ltd	Tru-Cutt Inc	York Portable Machine Tools
MCR Safety	Penny Weld LLC	Shanghai TAYOR Heavy Industry (Group) Co Ltd	TRU-FIT Products TRU-Weld	Zhejiang Changzheng Project Carbon Electrodes Co Ltd
Mercer Industries	PFERD INC	Shanghai Wti Welding Equipment Manufacture Co Ltd	Tru-Inc	Zhejiang Jingwei Welding & Cutting Technology Co Ltd
Metabo Corp	Phoenix International Inc	Shaver Industries	TSI Inc	Zhejiang Poney Electric Co Ltd
Mianyang Zhongyan Abrasive Co Ltd	Pihcr	Sigma Steels	TSS Worldwide	Zhengzhou Research Institute of Mechanical Eng Co Ltd
Michigan Pneumatic Tool Inc	Pinnacle Colors	SISMA USA Inc	TWI North America LLC	
Micro Air	Pittarc Welding Wires	SKM Industries Inc	UltraTech International Inc	
Midalloy	Plasma Automation Inc		U-Mark Inc	
			UNIARC	
			United Abrasives Inc/SAIT	
			United States Welding Corp	
			Universal Robots USA Inc	
			Uniweld Products Inc	
			Urrea Professional Tools	
				ZJ Industries

SPECIAL EVENTS ARE FREE AND OPEN TO ALL ATTENDEES UNLESS OTHERWISE NOTED

MONDAY, NOVEMBER 11**KEYNOTE PRESENTATION****8:30 AM - 9:45 AM****FABx TECH TALKS**

In honor of Veterans Day, this year's FABx will feature a powerful lineup of visionary veterans. These are heroes with incredible stories who have gone on to excel in leadership, business, advanced manufacturing, and workforce development. Drawing on their unique experiences, speakers will captivate and inspire audiences with their frontline stories focused on motivation, team building, innovation, and how to achieve excellence in the business battlefield.

FEATURED SPEAKER:**CHAD HENNINGS**

Through a nine-year NFL career and three Super Bowl Championships, 45 successful combat missions with the Air Force, and as one of the most decorated college football players in NCAA history, Chad represents the philosophy that he lives by — that excellence is not a destination, but an identity.

FABx SPEAKERS:

Hernán Luis y Prado,
Founder and CEO,
Workshops for
Warriors



Jason T. Ray, Co-
Founder and CEO,
Paperless Parts Inc.



Shelly C. Rood,
Educational
Consultant, Mission
Ambition LLC



Michael Walton,
Industry Solution
Executive (Manufacturing), Microsoft

LEADERSHIP EXCHANGE**12:30 PM - 1:30 PM****EMERGING & ADVANCED TECHNOLOGIES FOR MANUFACTURING 2020**

Advanced manufacturing is transforming the economy and jobs, using cutting-edge technology and new manufacturing processes to accelerate innovation. Learn how companies are using advanced technologies to stay at the forefront of manufacturing.

MODERATOR: Dave O'Neil, Vice President, SME Media**PANELISTS:****Chandra Brown**, CEO, MxD**Jason T. Ray**, Co-Founder and CEO, Paperless Parts Inc.**Michael Walton**, Industry Solution Executive (Manufacturing), Microsoft



TUESDAY, NOVEMBER 12

KEYNOTE PRESENTATION

8:30 AM - 10:00 AM

FRANK ABAGNALE JR., Cybersecurity Expert, Best-selling Author and Subject of “Catch Me If You Can”

Renowned international cybersecurity and fraud-prevention expert Frank Abagnale — known as one of the world’s most famous con men — will present a two-part keynote. During the first part of his speech, appropriately titled “*Catch Me If You Can*,” Abagnale will provide entertaining insight into his life as the notorious imposter of the 1960s. He will then instruct attendees on how to protect themselves and their businesses from fraud during the second part titled the “*Art of the Steal*.”

LEADERSHIP EXCHANGE

12:30 PM - 1:30 PM

STATE OF THE INDUSTRY: AUTOMATION IN MANUFACTURING

Innovations in robotics and automation have catalyzed the fourth industrial revolution. This panel will explore how automation is changing the manufacturing landscape and cover both the role of technology and people in the future of manufacturing. Experts will share their perspective on the impact of robotics on human workers and the facts vs. fiction of worker replacement. They will discuss identifying key challenges to implementing automation and developing a pipeline to de-risking technology and implementing it on the factory floor.



NETWORKING EVENT

5:30 PM - 7:30 PM Lakeside Center, McCormick Place

INDUSTRY NIGHT

Enjoy a fun-filled evening of food, drinks, and networking during our Industry Night Party! The **Chicago Blues & Brews** themed event will include live blues music, local craft beer tasting, and much more. We expect this to be a sold-out event so be sure to register early.

Advance ticket price: \$50

MONDAY, NOVEMBER 11 & TUESDAY, NOVEMBER 12

AWS PROFESSIONAL WELDERS COMPETITION

Participants will go head-to-head as they complete and clean a single-pass fillet weld in just 5 minutes. Speed and accuracy count, and weldments will be evaluated to the current AWS D1.1 standard by a panel of Certified Welding Inspectors. Those interested in competing must be 18 years or older and weld for a living. Learn more about how to participate in the competition at aws.org/weldingcompetition.

WEDNESDAY, NOVEMBER 13**7:45 AM - 10:00 AM****WOMEN OF FABTECH BREAKFAST**

Join us for a networking breakfast celebrating the importance of women in the manufacturing sector. This event aims to foster relationships and dialogue between supporters and practitioners in the field. A breakfast buffet is included. **Price: \$25**

PRESENTATIONS**KEEPING UP WITH TECHNOLOGY****MODERATOR:**

Dan Davis, Editor-in-Chief,
The FABRICATOR®

SPEAKERS:

Susanne Lauda, Director, Global
Advanced Manufacturing Technology,
AGCO Corporation

Gretchen Zierick, President, Zierick
Manufacturing

**STARTING A WOMEN'S INITIATIVE
WITHIN YOUR ORGANIZATION****SPEAKERS:**

Monica Silliman, Manufacturing
Engineering Manager, Combine Final
Assembly, John Deere Harvester Works

Erin Welken, Manager, Business Process
Improvement, Global Agriculture and
Turf Supply Management Organization,
John Deere

**KEYNOTE PRESENTATION****8:30 AM - 9:30 AM****GRANT IMAHARA**, Former Host on Discovery's
"Mythbusters" and Animatronics Engineering Expert

On stage, Grant provides a behind-the-scenes look at his work on various sets and productions while also touching on the importance of advancing the engineering/manufacturing industry.

Grant has credits on numerous blockbusters including *The Matrix* sequels, *A.I.*, *Galaxy Quest*, *Terminator 3*, *Van Helsing*, and *Star Wars: Episodes 1-3*.

LEADERSHIP EXCHANGE**12:30 PM - 1:30 PM****THE IMPACT OF DISRUPTIVE TECHNOLOGY AND THE FUTURE
OF MANUFACTURING**

The pace of innovation is incredibly fast and new things are being discovered daily. As technology has advanced and becomes embedded in plants, warehouses, and throughout the supply chain, businesses have needed to adapt to stay competitive. Many already have, but the path toward digital transformation is different for every company. Come hear our panel of experts cover disruptive technologies from 5G and IoT to AI and robotics & automation, share case studies, and help manufacturers understand and explore the challenges and benefits that implementing these technologies entails.

MODERATOR:

John R. Brandt, CEO and Founder, The MPI Group

PANELISTS:

Mohamed (Mo) Abuali, Ph.D. Managing Partner, IoTco

Dave Beck, Founder and Managing Partner, Foundry 45

Greg Mark, CEO and Founder, Markforged

Tim Weber, Global Head of 3D Metals, HP 3D Printing

THURSDAY, NOVEMBER 14

LEADERSHIP EXCHANGE

11:00 AM - 12:00 PM**21ST CENTURY WORKFORCE: BUILDING TOMORROW'S WORKFORCE**

Manufacturers in the 21st century must make it a precedence to have a workforce that is educated, diverse, and motivated. Organizations need to produce a more globally competitive workforce that can meet the demands of an evolving digital economy and adapt to the trends and challenges of managing a multi-generational workforce. Come hear our experts share their strategies and some actions to address the challenges for the future.

MODERATOR:

Kord Kozma, Global Director of HR, Nidec Press & Automation

PANELISTS:

Hernán Luis y Prado, Founder and CEO, Workshops for Warriors

Rob Tessier, National Director of Advanced Fabrication Technologies, Airgas

Dean Steadman, CNC Education Program Manager, FANUC America

MONDAY, NOVEMBER 11 - THURSDAY, NOVEMBER 14**SMART MANUFACTURING HUB**

The Smart Manufacturing Hub will feature several advanced manufacturing technologies, including automation, advanced materials, 3D printing, the Industrial Internet of Things (IIoT), 3D scanning, and more. Technical presentations from industry-leading smart technology providers will provide insight on recent developments in this rapidly evolving field.

Sponsored by:





ABOUT THE EDUCATION PROGRAM

The Fabricators & Manufacturers Association, Int'l (FMA), SME, Precision Metalforming Association (PMA), and Chemical Coaters Association International (CCAI) co-sponsor the sessions on 3D/additive manufacturing, automation, cutting, finishing, forming and fabricating, laser, lean, management, marketing and sales, smart manufacturing, stamping, welding fabrication, and workforce development. All sessions offer practical knowledge you can use right away. Sessions with Tech Tours combine classroom instruction and expert-led guided tours on the show floor to see technology operating in designated booths.

The American Welding Society (AWS) presents a comprehensive lineup of welding education. Led by the industry's top professionals, programs focus on best practices and new commercial developments in welding. Events include career path workshops, seminars, RWMA Resistance Welding School, professional program, society events, and more.

EXPERIENCE LEVELS

The Schedule-at-a-Glance on the following pages provides a quick reference to all the educational programs offered at FABTECH 2019. Note that you can use the following key to find the education that meets your needs.

-  **Basic** — Recommended for the attendee who is new to the industry or needs a refresher on the topic.
-  **Intermediate** — Designed for the attendee who already has a basic understanding of the subject matter.
-  **Advanced** — For the attendee with several years of experience who is seeking more in-depth information.

CONTINUING EDUCATION CREDITS

Individuals who attend AWS Education programs are awarded 1 PDH (Professional Development Hour) for each hour of education program attendance. Individuals seeking FMA Recertification Credits will be awarded 2 credits for each conference session attended (forming and fabricating, cutting, or finishing tracks) plus an additional 2 credits for attending the show. Individuals who attend SME education programs may be eligible to receive 1 credit per hour attended toward their SME-managed recertification requirements.

MEMBERSHIP INFORMATION

Discounted rates for members are available on educational programs. Interested in becoming a member of AWS, FMA, SME, PMA, or CCAI? Find details on each of the event partner associations and membership benefits by visiting their websites today!



aws.org



fmanet.org



sme.org



pma.org



ccaiweb.com

TECHNOLOGY	8:00 AM – 9:30 AM	10:00 AM – 11:30 AM	12:00 PM – 1:30 PM	2:00 PM – 3:30 PM	
3D/ADDITIVE MANUFACTURING	NEW! F10: Application Discovery - Evaluating Real Use Cases for In-Office Metal 3D Printing	NEW! F20: 3D Printed Tools for Additive Manufacturing Environments	NEW! F30: The Ultimate Guide to Metal Additive: Mapping the Process from Discovery to Production	NEW! F40: Metal 3D Printing for Fabrication Shops	
AUTOMATION	NEW! F11: Move to the 21st Century: The Pro's and Con's of Adding Automation to Your Process	F21: Getting Started with Robotics: A Journey to the World of Robotics	NEW! F31: Leading and Preparing an Industry 4.0 Organization and Workforce	NEW! F41: Industrial Internet of Things (IIoT) for the Job Shop	
CUTTING		NEW! F22: Cutting for Advanced Materials		NEW! F42: Automated Processes in Hybrid Induction & Oxy-Fuel Cutting	
FINISHING		C20: ABCs of Infrared		NEW! C40: It's Your Money - Control Your Costs	
		NEW! C21: I Want to Powder Coat, Now What?		C41: Powder Coating Basics	
		NEW! C22: Corrosion Basics and Prevention		NEW! C42: Understanding the Basics of Pretreatment	
FORMING & FABRICATING	F13: Press Brake for Engineers	F23: Machine Safeguarding	NEW! F33: Material Handling	F43: Advanced Press Brake Technologies	
	F14: Coil Processing: Slitting HSS Materials	F24: Roll Forming: Basics and Lubricants	F34: Roll Forming: Tooling and Trouble Shooting	F44: Advanced Solutions for Tube and Pipe	
LASER		NEW! F25: Lasers for Joining Development and Control	NEW! F35: Remote Laser Joining & Interface Applications	F45: Lasers and Laser Systems for Advanced Manufacturing	
LEAN	NEW! F16: Lean Principle: Getting Started with Your Lean Journey	NEW! F26: Lean Tools: Flow & Pull in High Variety Environment	NEW! F36: Lean Principle: OEM Quality Excellence: 6 Practical Steps to Becoming an Award-Winning Supplier	F46: Lean Principle: Strategic Planning and Hoshin Kanri - How to Achieve the Future You See	
MANAGEMENT	NEW! F17: Choosing the Best Source of Growth Capital for Your Manufacturing Business	NEW! F27: Planning for the Present & Paving a Strategic Roadmap	F37: Job Shop Costing, Estimating and Scheduling for Complex Jobs	NEW! F47: Hands-on Workshop - Cultivate & Value Your Leadership	
MARKETING & SALES	NEW! F18: Supercharge Your Networking & Inbound Marketing	NEW! F28: Your Schematic for Assembling a Powerful Digital Marketing Machine	NEW! F38: Build a Sales Strategy & Model for Scalable Growth	NEW! F48: Deliver Superb Customer Service & Build a Customer-Centric Culture	
SMART MANUFACTURING	NEW! F19: Current State of Smart Manufacturing & The Connected Viewpoint	NEW! F29: SMART Manufacturing Basics to Get Started in The Digital World	NEW! F39: Industrial IoT Case Study - Real World Implementation	NEW! F49: Smart Manufacturing and Workforce Ready!	
STAMPING		NEW! S20: Understanding Servo Metal Stamping Presses - Proper Usage, Troubleshooting and Maintenance	S30: ANSI Z224.1 & OSHA 1910.147 Applications of Alternative Methods for Hazardous Energy Control	NEW! S40: Application of Real-Time Visual Monitoring Tool in Stamping	
		S21: Lubricants-1		NEW! S41: Lubricants-2	
WELDING FABRICATION		NEW! W200: The Welding Economy		NEW! W400: Robotic Welding for Job Shops	
WORKFORCE DEVELOPMENT	NEW! F200: Practicing Emotional Intelligence for Workplace Success	NEW! F211: The Future of Talent: Attracting and Retaining The Top Talent for the 21st Century	NEW! F212: Creating Career Path Programs That Empower & Engage	NEW! F213: Pushing Your Envelope: How Smart People Overcome Self-Doubt and Live with Bold Enthusiasm	
WELDING					
CAREER PATH WORKSHOPS	W17: Getting Started in Underwater Welding			1:00 PM	3:00 PM
	W18: Creating a WPS in 60 Seconds			1:00 PM	3:00 PM
PROFESSIONAL PROGRAM	W23: SESSION 1: Additive Manufacturing I			1:40 PM	5:00 PM
	SESSION 2: Modeling			1:40 PM	5:00 PM
	SESSION 3: Arc Welding			1:40 PM	5:00 PM
SPECIAL PROGRAMS	W30: AWS Prayer Breakfast			7:00 AM	8:30 AM

TECHNOLOGY	8:00 AM – 9:30 AM	10:00 AM – 11:30 AM	12:00 PM – 1:30 PM	2:00 PM – 3:30 PM	
3D/ADDITIVE MANUFACTURING		■ F60: Fundamentals of Additive Manufacturing	■ NEW! F70: Small & Large Format Printers for Additive Manufacturing	■ NEW! F80: How Additive Mfg Can Accelerate and Advance Your Design	
AUTOMATION		■ NEW! F61: Estimating and Job Costing for Industry 4.0 - The Science of Costing and the Art of Pricing	■ NEW! F71: The Full Potential of Automation and Lights-Out!	■ F81: IIoT Solutions to Better Manage Your Assets	
CUTTING		■ F62: Optimization of Cutting Metals with Fiber and Plasma Machining		■ F82: Comparative Cutting Innovations with Tech Tour	
FINISHING	■ NEW! C50: Lean and Green Cleaning	■ NEW! C60: Mother Earth Still Needs Our Help		■ C80: Identifying and Solving Finishing Defects - See It, Touch It, Fix It	
	■ NEW! C51: Powder System Design for Success	■ NEW! C61: How It's Made: Knowing Where Your Powder and Equipment Come From		■ C81: Lean and Mean - Making Powder Systems Work	
	■ NEW! C52: 1K, 2K, New K and Fluid Delivery Methods	■ NEW! C62: Oven Selection Solved		■ C82: Make Safety a Priority	
FORMING & FABRICATING		■ F63: Effective Safeguarding Risk Assessment	■ NEW! F73: Dust Collection for Fabrication Processes	■ F83: Sheet Metal Design and Press Brake Automation	
		■ F64: Coil Processing: Blanking Techniques and Handling Solutions	■ NEW! F74: Roll Forming: Design and Welding Techniques	■ F84: Roll Forming: Justification and In-Line Punching, Cutoff Dies	
LASER		■ NEW! F65: Quality & Control for Laser Joining Systems	■ NEW! F75: Accelerated & Combination Lasers for Sheet Metal	■ NEW! F85: Traditional & Fiber Laser Cutting for High Performance	
LEAN	■ NEW! F56: Lean Principle: Leadership and the Lean Journey	■ F66: Lean Tools: VSM Addressing Differences Between the Office and Shop Floor	■ F76: Lean Tools: A3 Thinking- Developing People & Solving Problems	■ F86: Lean Tools: Standard Work for Quality and Improvement	
MANAGEMENT	■ F57: Building a Competitive Advantage: Know What Your Business is Worth and Tax Credit Advantages	■ NEW! F67: The Dark Cloud Behind the Silver Lining: Economy in 2020	■ NEW! F77: Planning for the Future: The New Dawn of Manufacturing and Technology	■ NEW! F87: ERP Systems: Selection & Avoiding the ERP Technology Grim Reaper	
MARKETING & SALES	■ NEW! F58: Customer Experience for Manufacturers to Create Digitally-Powered Journeys That Help People Grow	■ NEW! F68: Sustainable Social Media Strategies	■ F78: Stngthen Your Marketing Through The Power of Story & Grow Your Revenue & Grow Your Team		
SMART MANUFACTURING	■ NEW! F59: Productivity, Performance & Quality Management for Smart Manufacturing	■ NEW! F69: Quit Making Excuses and Close the Loop - Now is the Time to Digitize	■ NEW! F79: From Rust-Belt to High-Tech: Transform, Ignite and Disrupt	■ NEW! F89: Artificial Intelligence for Machine Learning & Streamlining Quoting Process	
STAMPING	■ NEW! S50: Materials-1	■ NEW! S60: Materials-2		■ NEW! S80: Materials-3	
	■ NEW! S51: Connectivity-1	■ NEW! S61: Connectivity-2		■ NEW! S81: Connectivity-3	
WELDING FABRICATION		■ NEW! W600: Resistance & Arc Welding For Better Weldability and Hazard Reduction		■ NEW! W800: Improving Lightweight Materials Joining Through Friction Welding	
WORKFORCE DEVELOPMENT	■ NEW! F214: Engaging Manufacturing's Next Generation Through Full Contact Innovation	■ NEW! F215: Conflict & Communication For Strong Leadership	■ NEW! F216: Leadership Skills & Development Workshop (12:00 PM - 4:30 PM)		
WELDING					
SEMINARS	■ W11: AWS Educational Overview of Welding Codes and Standards - Day 1			8:00 AM	5:00 PM
	■ W12: Applied Welding Metallurgy			8:00 AM	4:00 PM
	■ W13: WPS's for Weld Inspection and Test-Taking Tips			8:00 AM	12:00 PM
CONFERENCES	■ W16: 5th International Electron Beam Conference - Day 1			8:00 AM	5:00 PM
PROFESSIONAL PROGRAM	■ W24: SESSION 4: Solid-State Processes			8:00 AM	12:00 PM
	■ SESSION 5: Surfacing & Dissimilar Joining			8:00 AM	12:00 PM
	■ SESSION 6: Welding Metallurgy I			8:00 AM	12:00 PM
	■ SESSION 7: Neural Networks & Machine Learning			1:40 PM	5:00 PM
	■ SESSION 8: Additive Manufacturing II			1:40 PM	5:00 PM
	■ SESSION 9: Welding Metallurgy II			1:40 PM	5:00 PM
RWMA SCHOOL	■ W22: RWMA Resistance Welding School - Day 1			8:00 AM	5:00 PM
EDU. SESSIONS	■ W29: AWS/Weld-Ed Education Conference - Using Advanced Waveforms in Welding Education			9:00 AM	4:30 PM
SPECIAL PROGRAMS	■ W31: AWS Awards/AWS Foundation Luncheon			12:00 PM	2:00 PM

TECHNOLOGY	8:00 AM – 9:30 AM	10:00 AM – 11:30 AM	12:00 PM – 1:30 PM	2:00 PM – 3:30 PM	
3D/ADDITIVE MANUFACTURING	NEW! F90: The ROI of 3D Printing: Analyze the Cost of Implementing 3D Printing for Your Business	NEW! F100: Impact and Quality Considerations for Additive Manufacturing	F110: Lasers and Additive Manufacturing Processes	NEW! F120: Safely Adopting Additive Manufacturing on The Production Floor	
AUTOMATION	NEW! F91: Effective Automation for Joining in Emerging Technologies	NEW! F101: Integrating Robotic Automation into Your Process	NEW! F111: Which Robot Application is Right for Your Needs?	NEW! F121: Automating the Material Handling Process - Why Now is the Time	
CUTTING		F102: Advantages of Waterjet Cutting Machining Technology			
FINISHING	C90: Architectural Coatings - Today and Future	NEW! C100: Conveying Effectively		NEW! C120: Quality Still Counts	
	C91: Optimizing Powder Operations	NEW! C101: Mastering Batch Powder Coating Operations		NEW! C121: Powder Coating Troubleshooting	
	NEW! C92: Creative Finishing Solutions	NEW! C102: Choose Your Weapon - Finding the Right Liquid Applicator		NEW! C122: Automation Roadmap for Liquid Finishing Operations	
FORMING & FABRICATING	NEW! F93: A Modular Approach to Turning Non-Value-Added Time on a Press Brake into Productive Time	F103: Press Brake Safety	NEW! F113: Alternative Forming Processes	NEW! F123: Press Brake Hurdles	
	F94: Roll Forming: Press Tonnage Rating and Welding Systems	F104: Tube & Pipe Lubricants, Bending and Case Studies in Tube Field Failures	NEW! F114: Alternative Techniques for Annealing, Testing and Grinding Abrasives	F124: Coil Processing: Slitting Thin Materials, Leveling & Deburring	
LASER	AWF100: Laser Welding Workshop (8:00 AM - 12:30 PM)			NEW! F115: The Use of Additive and Subtractive Lasers in Applications	
LEAN	NEW! F96: Lean Principle: Go to Gemba	NEW! F106: Lean Tools: Lean Production Shop to a Job Shop			
MANAGEMENT	F97: Ensuring Tomorrow: How to Effectively Choose and Prepare Your Successor	NEW! F107: Win the Inner Game: Free Yourself of Overwhelm and See Your Highest Potential Come True	NEW! F117: Diagnose Your Business: How to Free Yourself from Budget Limitations by Finding and Unlocking Hidden Money in Your Operations	F127: Enable the Transition to Next Gen - Family Business	
MARKETING & SALES	NEW! F98: Digital Recruiting Strategies & Data for Continuous Improvement	F108: Business Builders: Make Business Development a Competitive Advantage	F118: Protecting Original Design: The Importance of IP in Metal Forming	NEW! F128: A Marketing Framework: From Lead to Sale - Tools & Tips for Fabricators & OEMs	
SMART MANUFACTURING	NEW! F99: The Smart Factory & Feasibility with Case Studies	NEW! F109: A.I. for Predictive Manufacturing: Zero-Downtime, Zero-Defects	NEW! F119: Prevent Digital Failure and Benchmark Your Performance	NEW! F129: Smart Manufacturing on Predictable ROI	
STAMPING	NEW! S90: Stamping-1	NEW! S100: Stamping-2		NEW! S120: Stamping-3	
	NEW! S91: Sensors-1	NEW! S101: Sensors-2		NEW! S121: Quality & Tooling	
WELDING FABRICATION		NEW! W100: Optimization of Welding Documentation and Continuity Efficiency Using Computer Software			
WORKFORCE DEVELOPMENT	NEW! F217: Operational Excellence for Significant and Sustained Performance With Incentive Pay		NEW! F219: Leading Innovation & Change Initiatives in Your Organization	NEW! F220: Manage, Mentor and Develop Your New Workforce & Staff for The Future	
WELDING					
SEMINARS	W11: AWS Educational Overview of Welding Codes and Standards - Day 2			8:00 AM	5:00 PM
	W14: "Welding" Don't Be Afraid to Ask			8:00 AM	4:00 PM
	W15: Stainless Steel Welding D1.6 Structure			8:00 AM	4:00 PM
CONFERENCES	W16: 5th International Electron Beam Conference - Day 2			8:00 AM	5:00 PM
CAREER PATH WORKSHOPS	W19: Development of a New Standard for Metal Additive Manufacturing: AWS D20.1/D20.1M, Specification for Fabrication of Metal Components Using Additive Manufacturing			9:00 AM	11:00 AM
PROFESSIONAL PROGRAM	W25: SESSION 10: Plenary Session			8:00 AM	9:30 AM
	SESSION 11: In-Situ Measurement Techniques			9:40 AM	12:00 PM
	SESSION 12: Honorary Symposium for Prof. D. Olson I			9:40 AM	12:00 PM
	SESSION 13: Industrial Technology I			9:40 AM	12:00 PM
	SESSION 14: Process Sensing & Control			1:40 PM	5:00 PM
	SESSION 15: Honorary Symposium for Prof. D. Olson II			1:40 PM	5:00 PM
	SESSION 16: Weldability			1:40 PM	5:00 PM
RWMA SCHOOL	W22: RWMA Resistance Welding School - Day 2			8:00 AM	5:00 PM

TECHNOLOGY	8:00 AM – 9:30 AM	10:00 AM – 11:30 AM	12:00 PM – 1:30 PM	2:00 PM – 3:30 PM
3D/ADDITIVE MANUFACTURING	■ NEW! F130: How MES Transfers Data Efficiently Through The Additive Manufacturing Value Chain & Business Case Method			
AUTOMATION	■ NEW! F131: Sensors, Maintenance and Platforms for Leveraging Technology			
FINISHING	■ NEW! C130: Power Up and Hang On for Efficiency and Savings			
	■ NEW! C131: Using the Dirty Dozen to Optimize Your Powder Coating			
	■ C132: Test for the Best - Best Practices and Measurement Methods for Quality			
LEAN	■ NEW! F136: Lean Principle: Science of Lean Culture and Case Studies			
MANAGEMENT	■ F137: Making Better Decisions as a Business Leader & Tools for Management Success	■ NEW! F147: Financing to Enable Growth & Achieve Project Improvement		
SMART MANUFACTURING	■ NEW! F139: Smart Manufacturing to Successfully Implement the Trifecta; All in Real Time			
WORKFORCE DEVELOPMENT	■ NEW! F221: How to Win With Personalities & Team Engagement			
WELDING				
CAREER PATH WORKSHOPS	W20: Starting a Welding Inspection Business		8:00 AM	10:00 AM
	W21: Becoming a Certified Welding Accredited Test Facility for Testing Certified Welders		8:00 AM	11:00 AM
PROFESSIONAL PROGRAM	W26: SESSION 17: High-Energy Density Processes		8:00 AM	12:00 PM
	SESSION 18: Industrial Technology II		8:00 AM	12:00 PM

Detailed Education Program session descriptions, speakers, pricing, room locations and more can be found at fabtechexpo.com/edu.

EXPERIENCE LEVELS

Use this key along with the Schedule-at-a-Glance to find the education level that meets your needs.

- **Basic**..... Recommended for the attendee who is new to the industry or needs a refresher on the topic.
- **Intermediate**... Designed for the attendee who already has a basic understanding of the subject matter.
- **Advanced**..... For the attendee with several years of experience who is seeking more in-depth information.

EXHIBITS ONLY

Registration is FREE through November 8.

Beginning November 9, the cost to attend the exhibits is \$50. AWS, FMA, SME, PMA, and CCAI members may always attend the exhibits for FREE with proof of membership.

SPECIAL EVENTS

**INDUSTRY NIGHT AT McCORMICK PLACE
TUESDAY, NOVEMBER 12**

Advance ticket price for attendees is \$50 and includes food and drinks, networking, entertainment, and more.

**WOMEN OF FABTECH BREAKFAST
WEDNESDAY, NOVEMBER 13**

Price for FABTECH Attendees is \$25 and includes a breakfast buffet.

EDUCATION PROGRAMS

**3D/Additive Manufacturing, Automation, Cutting, Finishing, Forming & Fabricating,
Laser, Lean, Management, Marketing & Sales, Smart Manufacturing, Stamping,
Welding Fabrication, Workforce Development Tracks**

Packages (Buy More and SAVE!)	Member	Non-member
1 Session	\$195	\$220
2 Sessions	\$330	\$385
3 Sessions	\$450	\$540
4 Sessions	\$550	\$660
Full Conference: (5 or more sessions) BEST VALUE!	\$750	\$900

NOTE: The rate for the 1/2-Day Laser Welding Workshop (Session AWF100) and Leadership Skills & Development Workshop (Session F216) is \$365 for Members and \$465 for Non-members.

WELDING TRACK

	Member	Non-member ^a
AWS Educational Sessions	\$25	\$50
1/2-Day Seminar	\$345	\$430
1-Day Seminar	\$565	\$665
2-Day Seminar, Conference or RWMA School	\$795	\$895
Career Path Workshops	\$50	\$75
1-Day Professional Program	\$175	\$225
4-Day Professional Program	\$395	\$495
Student Professional Program	\$85	\$110 ^b
AWS Awards Luncheon	\$30	\$30
AWS Prayer Breakfast	\$15	\$25

^a Non-member price for AWS Sessions only includes a one-year AWS Individual Membership.

^b Non-member Student Professional Program price includes a one-year AWS Student Membership.



CONFERENCE CANCELLATION POLICY:

Cancellations and refund requests (for paid conference registrations) must be made in writing to Attn: Betsy Bonnell: FABTECH Conference Cancellation or sent to bbonnell@sme.org no later than October 28, 2019, to receive a full refund minus a \$50 administrative fee. Cancellations received after this date are non-refundable. Substitutions allowed.

3D/ADDITIVE MANUFACTURING

Track Sponsored By:

**MONDAY, NOVEMBER 11****8:00 AM - 9:30 AM**

NEW! F10: Application Discovery - Evaluating Real Use Cases for In-Office Metal 3D Printing ■

Tuan TransPham - Desktop Metal

10:00 AM - 11:30 AM

NEW! F20: 3D Printed Tools for Additive Manufacturing Environments ■

Metal AM Technology - The Fastest Way to Make the Hardest Parts

Alex Huckstepp - Digital Alloys

3D Printed Tools for Manufacturing Environments

Chris Haid - Cincinnati Inc.

12:00 PM - 1:30 PM

NEW! F30: The Ultimate Guide to Metal Additive: Mapping the Process from Discovery to Production ■

Hallee Deutchman - Fast Radius

2:00 PM - 3:30 PM

NEW! F40: Metal 3D Printing for Fabrication Shops ■

Metal 3D Printing: Process Validation for High-Requirement Applications

Eric Utley - Protolabs

How Metal 3D Printing Helped Manufacture Unique Look of Seattle High-Rise

Cullen Hilkenne - 3Diligent

TUESDAY, NOVEMBER 12**10:00 AM - 11:30 AM**

F60: Fundamentals of Additive Manufacturing ■

Carl Dekker - Met-L-Flo Inc.

12:00 PM - 1:30 PM

NEW! F70: Small & Large Format Printers for Additive Manufacturing ■

Using a Small Format 3D Printer to Improve Your Fabrication Operation

Mark Watson - Cincinatti Inc.

How Large-Format 3D Printing Is Transforming Industries

Frank Marangell - BigRep

2:00 PM - 3:30 PM

NEW! F80: How Additive Manufacturing Can Accelerate and Advance Your Design

Applying the Agility of Software Development to Hardware

Megan Brewster - Launch Forth

Case Study - How AM Can Accelerate and Advance Your Design

Carl Dekker - Met-L-Flo Inc.

WEDNESDAY, NOVEMBER 13**8:00 AM - 9:30 AM**

NEW! F90: The ROI of 3D Printing: Analyze the Cost of Implementing 3D Printing for Your Business ■

Jaime Howard - Ultimaker

10:00 AM - 11:30 AM

NEW! F100: Impact and Quality Considerations for Additive Manufacturing ■

Using RE to Enable and Support Additive Manufacturing

Carl Dekker - Met-L-Flo Inc.

Effect of Thermal Gradients on Micro-Structure & Mechanical Properties During AM of Ti-6Al-4V Using Directed Energy Disposition

Yashwanth Kumar Bandari - Oak Ridge National Laboratory

12:00 PM - 1:30 PM

F110: Lasers and Additive Manufacturing Processes ■

High Power Diode Lasers in Additive and Hybrid Manufacturing

Oleg Raykis - Laserline Inc.

The Additive Process Chain with Laser Metal Fusion

Michael Shaffer - TRUMPF Inc.

2:00 PM - 3:30 PM

NEW! F120: Safely Adopting Additive Manufacturing on the Production Floor ■

Case Study - How to Embrace AM (3D Printing) on the Production Floor

Carl Dekker - Met-L-Flo Inc.

The Great Unknown: Health Hazards of Additive Manufacturing

Frank Cea - RoboVent

THURSDAY, NOVEMBER 14

8:00 AM - 9:30 AM

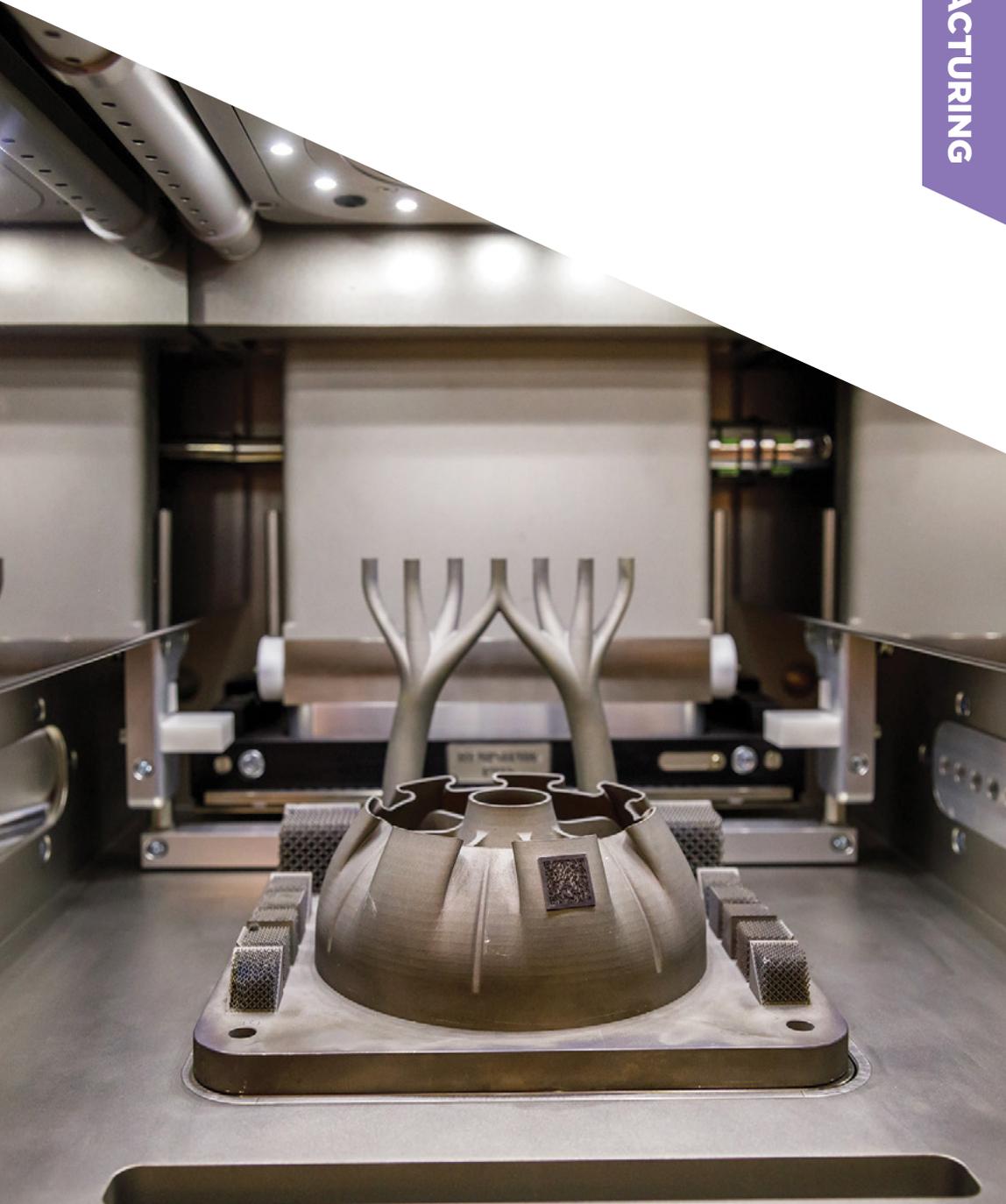
NEW! F130: How MES Transfers Data Efficiently Through the Additive Manufacturing Value Chain & Business Case Method ■

How MES Transfers Data Efficiently Through the AM Value Chain

William Cuervo - 3YOURMIND

Discussing Different Methods of AM Business Case Evaluation

Alexandre Donnadieu - 3YOURMI



AUTOMATION

Track Sponsored By:

FANUC**MONDAY, NOVEMBER 11****8:00 AM – 9:30 AM****NEW! F11: Move to the 21st Century: The Pro's and Con's of Adding Automation to Your Process** ■

Jeff Tyl - Murata Machinery USA - Muratec

10:00 AM – 11:30 AM**F21: Getting Started with Robotics: A Journey to the World of Robotics** ■

Bob Rochelle - Gudel Inc.

12:00 PM – 1:30 PM**NEW! F31: Leading and Preparing and Industry 4.0 Organization & Workforce** ■**Preparing an Industry 4.0 Ready Workforce**

Jeannine Kunz - Tooling U-SME

Leading an Industry 4.0 Organization: Empowering a Cultural Revolution in the Industrial Revolution

Will Healy III - Balluff, Inc.

2:00 PM – 3:30 PM**NEW! F41: Industrial Internet of Things (IIoT) for the Job Shop** ■**4 Reasons Why Automation Reduces Wastewater Operational Costs**

Chris Dooley and Mark Masters - DMP Corp.

Industrial Internet of Things (IIoT) for the Job Shop Fabricator

Will Healy III - Balluff, Inc.

TUESDAY, NOVEMBER 12**10:00 AM – 11:30 AM****NEW! F61: Estimating and Job Costing for Industry 4.0 - The Science of Costing and the Art of Pricing** ■

David Lechleitner - Ultra Consultants and Jason Ray - Paperless Parts, Inc.

12:00 PM – 1:30 PM**NEW! F71: The Full Potential of Automation and Lights-Out!** ■**Tapping the Full Potential of Industrial Robots**

Jim Berge - Berge Robotics

Running Your Fabrication Shop Lights-Out

Michael Schlagenhauser - Acuity

2:00 PM – 3:30 PM**F81: IIoT Solutions to Better Manage Your Assets** ■**Wired vs. Wireless for IIoT Solutions: The Pros, Cons and Key Considerations**

Will Zell - Nikola Labs

How IO-Link Is Revolutionizing Industrial Automation

Will Healy III - Balluff, Inc.

WEDNESDAY, NOVEMBER 13**8:00 AM – 9:30 AM****NEW! F91: Effective Automation for Joining in Emerging Technologies** ■**Weld Cells Modulation and Automation for 1-2-Weeks Typical Delivery**

John Babb - Robotic Automation

Effective Welding Automation and Emerging Technologies for Heavy Fabrication

Michael Bell - Pemamek LLC

10:00 AM – 11:30 AM**NEW! F101: Integrating Robotic Automation into Your Process** ■**Autonomous Mobile Robots in Diverse Work Settings**

Denise Ebenhoech - KUKA

Adapt Your Manufacturing Process: Do More with Less

Mark Sumner - Acieta

12:00 PM – 1:30 PM**NEW! F111: Which Robot Application is Right for Your Needs?** ■**The Benefits of Using Multi-Arm Robotic Applications**

Terry Tupper - Fanuc America Corp.

Robotizing Abrasive Processes

Nathan Herbst - 3M

Using the 6 Stages of Human-Robot Collaboration to Find the Right Robot for Your Application

Simon Whitton - KUKA

2:00 PM – 3:30 PM**NEW! F121: Automating the Material Handling Process - Why Now is the Time** ■

Troy Wilson - Cincinatti Inc.

THURSDAY, NOVEMBER 14

8:00 AM – 9:30 AM

NEW! F131: Sensors, Maintenance and Platforms for Leveraging Technology ■**Before Your ‘Machine Whisperers’ Retire: Enable Sensors to Tell the Story**

Will Zell - Nikola Labs

Leveraging Technology Platforms to Solve Common Supply Chain Issues in the Metal Industry

Jon Haley - Reibus International

IoT Strategies to Drive Robotic Predictive Maintenance

Wesley Mershon - KUKA

CUTTING**MONDAY, NOVEMBER 11**

10:00 AM – 11:30 AM

NEW! F22: Cutting for Advanced Materials ■**Steel Kirigami: Exploring Structures Through Advanced Manufacturing**

Emily Baker - University of Arkansas

Laser Cutting with High Power Ring-Mode Beams in Combination with a Large-Scale Zoom Functionality

Nico Baumbach - II-VI HIGHYAG

2:00 PM – 3:30 PM

NEW! F42: Automated Processes in Hybrid Induction & Oxy-Fuel Cutting ■**Hybrid Induction Cutting of Metal at Very High Speed on the Factory Floor or Using Mobile or Portable Robotics Outdoors**

Jerry Jones - EnergynTech, Inc.

Oxy-Fuel Cutting & What Is Required for a Fully Automated Process

Kurt Nachbargauer - IHT Automation GmbH & Co. KG

TUESDAY, NOVEMBER 12

10:00 AM – 11:30 AM

F62: Optimization of Cutting Metals with Fiber and Plasma Machining ■**Optimization of Sheet Metal Cutting with a High Power, Variable Mode Fiber Laser**

Daniel Capostagno - SPI Lasers

10 Ways to Increase Your Plate Steel Utilization and Decrease Your Costs

Derek Weston - Hypertherm Inc.

How to Optimize Results When Cutting Stainless Steel with High-End Plasma

Phillip Parker and John Peters - Hypertherm Inc.

2:00 PM – 4:00 PM

F82: Comparative Cutting Innovations with Tech Tour ■**Laser Cutting**

Speaker TBD - MC Machinery Systems, Inc.

Waterjet Cutting

David Dumas - Hypertherm Inc.

Plasma Cutting

Jim Colt - Hypertherm Inc.

WEDNESDAY, NOVEMBER 13

10:00 AM – 11:30 AM

F102: Advantages of Waterjet Cutting Machining Technology ■**Advantages of Waterjet Technology: Versatility, Efficiency, and Productivity**

Brian Sherick - Flow International Corp.

Abrasive Waterjet as a Complementary Machining Process

Vlad Bucur and Jeffrey Anheier - OMAX Corp.

**FABTECH BISTRO**

Reserve a seat at the FABTECH Bistro and you will always have a convenient place to eat, meet and network.

The Bistro offers assorted menu options including fresh and healthy lunch options, all at a reasonable price.

Pre-purchase your individual lunch tickets to avoid the lines. Find the daily menu, pricing and order tickets at **fabtechbistro.com**.

FINISHING

MONDAY, NOVEMBER 11

10:00 AM - 11:30 AM

C20: ABCs of Infrared ■

Scott Bishop - Alabama Power Co., Tim O'Neal - Selas Heat Technology Co. LLC, John Podach - Fostoria Process Equipment div. of TPI Corp., and Lee McWhorter - Heraeus Noblelight America LLC

NEW! C21: I Want to Powder Coat, Now What? ■

Chris Merritt - Gema USA Inc., Ron Cudzilo - George Koch Sons, LLC, Suresh Patel - BASF/Chemetall, and Tom Whalen - TCI Powder Coatings

NEW! C22: Corrosion Basics and Prevention ■

Terry Giles - Henkel Corp. and Andrea Gray - PPG Industrial Coatings

2:00 PM - 3:30 PM

NEW! C40: It's Your Money - Control Your Costs ■**Pretreatment Cost Savings & Increase Profits, Quality and System Efficiency**

Tomasz Slezak - BASF/Chemetall

Masking, the Key to Quick Cost Savings

Christopher Malone - Caplugs

Hook and Rack Cleanliness and Its Impact on Transfer Efficiency and Film Build Uniformity

James Malloy - Kolene Corp.

C41: Powder Coating Basics ■

Greg Dawson - Nordson Corporation, Michael Withers - Axalta Coating Systems, and John Sudges - Midwest Finishing Systems, Inc.

NEW! C42: Understanding the Basics of Pretreatment ■**Improving or Changing My Pretreatment for Best Performance**

Sergio Mancini - Bulk Chemicals, Inc.

Pretreatment Considerations for Process Changes

Kirk Beaster - BASF/Chemetall

Practical Control of Pretreatment Baths

William Giebel and Terry Sjoström - Henkel Corp.

TUESDAY, NOVEMBER 12

8:00 AM - 9:30 AM

NEW! C50: Lean and Green Cleaning ■**Parts Cleaning - Go Lean & Green with New Technology!**

Joe McChesney - KYZEN

Biological Wastewater Treatment for the Metal Finishing World

Robin Deal - Hubbard-Hall

Zero Discharge for Spray Washers

Joseph Smith - Houghton International

NEW! C51: Powder System Design for Success ■**Powder System Design Success**

Bill Oney - Therma-Tron-X

All the Right Moves

Joe Glassco - Wagner Industrial Solutions

NEW! C52: 1K, 2K, New K and Fluid Delivery Methods ■**1K, 2K, New K**

Dan Szczepanik - The Sherwin Williams Co.

Fluid Handling Methods & Energy Savings and Fluid Safety

Martin Powell - Carlisle Fluid Technologies

10:00 AM - 11:30 AM

NEW! C60: Mother Earth Still Needs Our Help! ■**Removal of Oils/Soils from Industrial Wastewater & Recycling Aqueous Cleaning Solutions**

Raymond Graffia - Arbortech Corp.

Water Issues: Quality, Costs, Compliance and Resource Recovery by the Numbers

Jeff Watson - Manufacturing Infrastructure Solutions, LLC

NEW! C61: How It's Made: Knowing Where Your Powder and Equipment Come From ■

Jackson Horne - Nordson Corp., Todd Thomas - Axalta Coating Systems and Chris Berger - Calvary Industries, Inc.

NEW! C62: Oven Selection Solved ■**Restricting the Limitations of Traditional Thermal Systems for Finishing Processes**

Lee McWhorter - Heraeus Noblelight America LLC

Rebuilding vs. Replacing an Industrial Oven

John Hober - Precision Quincy Ovens, LLC

2:00 PM - 3:30 PM

C80: Identifying and Solving Finishing Defects: See It, Touch It, Fix It ■

David Schimpff - DuBois Chemicals and Tabitha McLeish - The Sherwin Williams Co.

C81: Lean and Mean - Making Powder Systems Work ■**Lean Improvements in Powder Coatings**

Marty Sawyer - Trimac Industrial Systems

Management of Powder in My Process, Why Should I Care About It?

Jeffrey Hale - Gema USA Inc.

C82: Make Safety a Priority ■**How Codes Affect Your Spray Booth Design**

Robert Hauck - Spray Systems

PPE Options for Coating

Nicholas Liberto - Powder Coating Consultants

WEDNESDAY, NOVEMBER 13**8:00 AM - 9:30 AM****C90: Architectural Coatings - Today and Future** ■

Michael Withers and Manuel Mayer - Axalta Coating Systems and Ben Mitchell - Dura Coat Products

C91: Optimizing Powder Operations ■

Suresh Patel - BASF/Chemetall, John Cole - Parker Engineering of America and John Sudges - Midwest Finishing Systems, Inc.

NEW! C92: Creative Finishing Solutions ■**Digital Transformation in Abrasive Blasting**

Joe Craig - Blast Services Inc.

Incorporating Magnetic Inserts into Masking for Powder Coating

Cliff Shephard - Echo Engineering and Production Supplies, Inc.

Sanding and Polishing Robot Applications

Michael Elberson - Autoquip Automation

10:00 AM - 11:30 AM**NEW! C100: Conveying Effectively** ■**Conveyor Lubrication, Cleaning and Wear Monitoring**

Rolly Wolford - Mighty Lube

Chain-On-Edge Systems for Liquid Paint or Powder Coating

Martin Powell - Carlisle Fluid Technologies

NEW! C101: Mastering Batch Powder Coating Operations ■**Manual Batch Powder Systems: What You Need to Know to Be Successful**

John Kapsner - Pretreatment Equipment Manufacturing, Inc., Frank Mohar - Nordson Corp. and Russ Green - Midwest Finishing Systems Inc.

NEW! C102: Choose Your Weapon - Finding the Right Liquid Applicator ■**Are Electrostatics Beneficial to My Liquid Paint Line?**

Bryan Parker - Nordson Corp.

Benefiting from Non-Electrostatic Liquid Applicators

Diego Bertolo - SAMES KREMLIN Inc.

2:00 PM - 3:30 PM**NEW! C120: Quality Still Counts** ■**Understanding and Utilizing LED Technology to Best Light Your Booth**

Nicole Boss - LDPI Inc.

Quality Control for Pretreatment Processes

Ken Kaluzny - Coral Chemical Company

What Is Quality Control?

Michael Wittenhagen - TCI Powder Coatings

NEW! C121: Powder Coating Troubleshooting ■**Advanced Powder Coating: Troubleshooting and Problem Solution**

Martin Korecky - AkzoNobel Coatings, Inc.

NEW! C122: Automation Roadmap for Liquid Finishing Operations ■

William Heuer, Aaron Elliott and Alex Jones - Graco, Barton Faylor - FANUC America Corp., and Dominic Zerilli - Therica Equipment Corp.

THURSDAY, NOVEMBER 14**8:00 AM - 9:30 AM****NEW! C130: Power Up and Hang On for Efficiency and Savings** ■**Hang Methods, Hook/Rack Cleaning and Line Density**

Dan Nesper - Dubois Chemicals - American Finishing Resources

Why is Ground So Important to Powder Coating Success...AKA Ground Ad Nauseam

John Cole - Parker Engineering of America

What to Do When Your Powder Coating Line Sounds Like an Episode from Star Trek

Jeffrey Hale - Gema USA Inc.

NEW! C131: Using the Dirty Dozen to Optimize Your Powder Coating ■

Stephen Houston - Vitracat Powder Coatings

C132: Test for the Best - Best Practices and Measurement Methods for Quality ■**Measurement - Nanoindentation and Load Scratch**

Rahul Nai - Fischer Technology Inc.

Best Practices and Methods for Testing Organically Coated Products

Nicholas Liberto - Powder Coating Consultants

FORMING & FABRICATING

MONDAY, NOVEMBER 11

8:00 AM - 9:30 AM

F13: Press Brake for Engineers ■

Steve Benson - Asma LLC

F14: Coil Processing: Slitting HSS Materials ■

Al Zelt - ASKO Inc.

10:00 AM - 11:30 AM

F23: Machine Safeguarding ■

Roger Harrison - Rockford Systems, LLC

F24: Roll Forming: Basics and Lubricants ■
Roll Forming Basics

Brian Rodgers - Formtek, Inc.

Modern Lubricants for Roll Form Processes

David Kinnard - Tower Metalworking Fluids

12:00 PM - 1:30 PM

NEW! F33: Material Handling ■**How to Keep Full Traceability of Parts (Material, Workcenter and Operator) While Minimizing Hi-Lo Moves (Container Movement)**

Jeffrey Sawka - AIM Computer Solutions, Inc.

New Machine Concepts with Fully Integrated Robots Revolutionize Manufacturing Technologies

Christopher Roehm - WAFIOS AG / WAFIOS Machinery Cooperation

F34: Roll Forming: Tooling and Trouble Shooting ■

Steve Ebel and Travis Ebel - Roll Form Solutions Inc.

2:00 PM - 3:30 PM

F43: Advanced Press Brake Technologies ■**High-Mix Low-Volume Bending Technologies**

Scott Ottens - Amada America Inc.

Justifying Modern Press Brake Technologies

Paul LeTang - Bystronic Inc.

Latest Advancements in Press Brake Guarding

Tony Caruso - ISB / MERLIN

F44: Advanced Solutions for Tube and Pipe ■**Advanced Cutting Solutions for Scrap Reduction and Improved Efficiency in Tube and Pipe Production**

Christopher Murray - Thermatool

HF Weld Process Optimization

Olexandra Tupalo - Thermatool

Utilizing Technology to Increase Tube & Pipe Process, Quality & Profitability

Grant Huffman - Thermatool

TUESDAY, NOVEMBER 12

10:00 AM - 11:30 AM

F63: Effective Safeguarding Risk Assessment ■Douglas Raff - Paragon Industrial Controls Inc.
Brian Roberts - CNA Insurance**F64: Coil Processing: Blanking Techniques and Handling Solutions** ■**Laser Blanking from Coil**

Jay Finn - LaserCoil Technologies, LLC.

Maximizing Profit by Applying Safe, Efficient "Green" Solutions for Coil Handling and Storage

Michael Baach - Philpott Rubber & Plastics

12:00 PM - 1:30 PM

NEW! F73: Dust Collection for Fabrication Processes ■**Ambient and Source Capture Dust Collection Systems**

Jeremiah Wann - Imperial Systems Inc.

Combustible Dust - An Explosive Situation

Frank Cea - RoboVent

NEW! F74: Roll Forming: Design and Welding Techniques ■**Rollforming Solutions - Functional, Lightweight, and Freedom in Design**

Bill Johnson - Welsper Inc.

Welding Roll Formed Profiles - Select the Right Welding Method

Jack Pennuto - TRUMPF Laser Technology

2:00 PM - 3:30 PM

F83: Sheet Metal Design and Press Brake Automation ■**Cost Reduction Through Innovative Sheet Metal Design**

Grant Hagedorn - TRUMPF Inc.

Automated Press Brake Forming

Andrew Jeffrey - TRUMPF Inc.

F84: Roll Forming: Justification and In-Line Punching, Cutoff Dies ■**Justification for Roll Forming**

Brian Rodgers - Formtek, Inc.

Increasing Value to Your Rollforming Lines with In-line Punching and Cutoff Dies

Paul Williams - Hill Engineering / Formtek, Inc.



WEDNESDAY, NOVEMBER 13**8:00 AM – 9:30 AM****NEW! F93: A Modular Approach to Turning Non-Value Added Time on a Press Brake into Productive Time** ■

David Bishop - Wila USA

F94: Roll Forming: Press Tonnage Rating and Welding Systems ■**Advanced Roll Forming Techniques**

Brian Rodgers - Formtek, Inc.

When the Press Tonnage Rating Is Really Not That Tonnage

Paul Williams - Hill Engineering/Formtek, Inc.

10:00 AM – 11:30 AM**F103: Press Brake Safety** ■

Douglas Raff - Paragon Industrial Controls Inc.

F104: Tube & Pipe Lubricants, Bending and Case Studies in Tube Field Failures ■**Modern Tube Bending Machinery**

Greg Miller - Tubular Solutions Inc.

Field Failures in Tubing, Case Studies, Corrosion Resistant Alloys

David O'Donnell - RathGibson

Selecting the Right Lubricant for the Tube Material - Tube Forming & Mandrel Bending

Christopher Fletcher - Tower Metalworking Fluids

12:00 PM – 1:30 PM**NEW! F113: Alternative Forming Processes** ■**Sheet Hydroforming as a More Economical Process for Prototype Tool Design and Low Volume Production**

Randy Kish - Quintus Technologies

Artificial Intelligence for Roll Bending

Greg Hoesly - Boschert USA and Gregory Conraud - AMB Picot

NEW! F114: Alternative Techniques for Annealing, Testing and Grinding Abrasives ■**On-Site Generated Hydrogen May Offer Lower Costs and Green Benefits for Annealing**

David Wolff - Nel Hydrogen

Magnetic Structurescopy (Coercimetry) for Quality Assessment in Metallurgy and Metalwork Manufacturing

Roman Solomakha and Svitlana Savluk - CM Diagnostics

Bonded Abrasive Technology: Reducing Labor Costs by Adding Comfort

Marc Brunet Gagné - Walter Surface Technologies

2:00 PM – 3:30 PM**NEW! F123: Press Brake Hurdles** ■**Lowering the Hurdles in the Press Brake Department**

Larry Boden - Mate Precision Tooling

Understanding Press Brake Crowning

Todd Kirchoff - Cincinnati Inc.

F124: Coil Processing: Slitting Thin Materials, Leveling & Deburring ■**Processing and Slitting Thin, Ultra Thin and Surface Critical Material: Copper, Brass, Stainless, Tin Plate or Aluminum**

Mike McGuire - Burghardt + Schmidt GmbH

Leveling & Deburring: Modern Metal Processing

Nicholas Miller - ARKU, Inc.

LASER

MONDAY, NOVEMBER 11

10:00 AM - 11:30 AM

NEW! F25: Lasers for Joining Development and Control ■**Full Digital Controlled Robotic Hybrid Laser and Arc System**Michael Sharpe - FANUC America Corp. and
Kyle Smith - Lincoln Electric**Introducing CleanWeld: A New Approach to High Power Fiber Laser Welding**

Jean-Philippe Lavoie - Coherent

12:00 PM - 1:30 PM

NEW! F35: Remote Laser Joining & Interface Applications ■**Compact Remote Welding with Robotic Servo Motor Controlled Laser Beam Welding**

Michael Sharpe - FANUC America Corp.

Remote Laser Welding with Omni-Directional Seam Tracking

Matthias Kühnel - II-VI HIGHYAG

Modular Remote Laser Welding Head Combined with a Consistent Interface Standardization Provides Flexible Application Possibilities in Production

Jay Flowers - Abicor Binzel

2:00 PM - 3:30 PM

F45: Lasers and Laser Systems for Advanced Manufacturing ■**Lasers and Laser Systems for Advanced Manufacturing in Welding**

Mark Boyle - Amada Miyachi America, Inc.

Industrial Manufacturing with Diode Lasers

Oleg Raykis - Laserline Inc.

Fiber Laser Cutting, Fundamentals and Beyond

Rouzbeh Sarrafi - IPG Photonics

TUESDAY, NOVEMBER 12

10:00 AM - 11:30 AM

NEW! F65: Quality & Control for Laser Joining Systems ■**The Long Road to Zero Failures in Laser Welding**

Brian Smith - Precitec

Quality Control: Vision Systems vs. Light Section Technology

Gerry Paci - Pepperl + Fuchs

Advancements in Laser Pattern Welding Utilizing Integrated Shape Recognition and Beam Positioning

Jason Woolley - Abicor Binzel

12:00 PM - 1:30 PM

NEW! F75: Accelerated & Combination Lasers for Sheet Metal ■**Combination Punch/Laser, the Ultimate Machine for Sheet Metal Fabrication**

Timothy Brady - Amada America, Inc.

Fiber Laser Acceleration - The Hidden Key to Success

Chip Burnham - Fairmont Machinery

2:00 PM - 3:30 PM

NEW! F85: Traditional & Fiber Laser Cutting for High Performance ■**Integrated Pierce Detection for Improved Fiber Laser Welding, Drilling, and Cutting**

Daniel Capostagno - SPI Lasers

Fiber Laser Performance and Reliability in Processing Highly Reflective Metals

Geoff Fanning - nLIGHT

Beyond Traditional Laser Cutting Parameters - QCW Peak Power and Adjustable Beam Mode

Rouzbeh Sarrafi - IPG Photonics

WEDNESDAY, NOVEMBER 13

8:00 AM - 12:30 PM

AWF100: Laser Welding Workshop ■

Discover the latest real-world techniques and applications from our FABTECH laser experts. This workshop will cover: what's new, laser system overview and sources, design considerations, additive and hybrid laser welding, followed by an application discussion with expert speakers.

Essential Considerations for Laser Welding - From Component Design to Implementation

David Havrilla - TRUMPF Inc.

Introduction to Industrial Laser Welding

Tom Kugler - Laser Mechanisms, Inc.

Laser Sources for Industrial Laser Welding: Fiber, Disk and Diode

Jean-Philippe Lavoie - Coherent Inc.

What's New in Laser Welding

Geoff Shannon - Coherent Inc.

System Overview for Automated Laser Welding in Production with Examples for Welding Automotive Seat Components and Tailor Welded Blanks

David Guastaferrri - Lincoln Electric Automation

Hybrid Laser Welding

Paul Denney - IPG Photonics

Laser Welding and Additive Technologies

Wayne Penn - Alabama Laser

2:00 PM – 3:30 PM

NEW! F115: The Use of Additive and Subtractive Lasers in Applications for Custom Parts ■

Jon Carlson - GF Machining Solutions

LEAN

MONDAY, NOVEMBER 11

8:00 AM – 9:30 AM

F16: Lean Principle: Getting Started with Your Lean Journey ■

Jeff Sipes - Back2Basics, LLC

10:00 AM – 11:30 AM

F26: Lean Tools: Flow & Pull in High Variety Environment ■

Kevin Duggan - Institute for Operational Excellence

12:00 PM – 1:30 PM

NEW! F36: Lean Principle: OEM Quality Excellence: 6 Practical Steps to Becoming and Award-Winning Supplier ■

Jeff Hohlfeldt - Northern Industrial Manufacturing and Steve Bieszczat - IQMS

2:00 PM – 3:30 PM

F46: Lean Principle: Strategic Planning and Hoshin Kanri - How to Achieve the Future You See ■

Anthony Manos - Profero, Inc.

TUESDAY, NOVEMBER 12

8:00 AM – 9:30 AM

NEW! F56: Lean Principle: Leadership and The Lean Journey ■

Jeff Sipes - Back2Basics, LLC

10:00 AM – 11:30 AM

F66: Lean Tools: VSM - Addressing Differences Between the Office and Shop Floor ■

Mike Osterling - Osterling Consulting, Inc.

12:00 PM – 1:30 PM

F76: Lean Tools: A3 Thinking - Developing People & Solving Problems ■

Mike Osterling - Osterling Consulting, Inc.

2:00 PM – 3:30 PM

F86: Lean Tools: Standard Work for Quality and Improvement ■

Anthony Manos - Profero, Inc.

WEDNESDAY, NOVEMBER 13

8:00 AM – 9:30 AM

NEW! F96: Lean Principle: Go to Gemba ■

Jeff Sipes - Back2Basics, LLC

10:00 AM – 11:30 AM

NEW! F106: Lean Tools: Lean Production Shop to a Job Shop ■

Rich Steel Jr. - Miller Fabrication Solutions

THURSDAY, NOVEMBER 14

8:00 AM – 9:30 AM

NEW! F136: Lean Principle: Science of Lean Culture and Case Studies ■

Science Behind Culture in a Lean Transformation

Brett Polglaze and Joseph Girard - Wipfli CPAs and Consultants

Lean Case Study

Michael Schlagenhauser - Acuity

MANAGEMENT

MONDAY, NOVEMBER 11**8:00 AM - 9:30 AM****NEW! F17: Choosing the Best Source of Growth Capital for Your Manufacturing Business** ■

Paul Liles - CIBC

10:00 AM - 11:30 AM**NEW! F27: Planning for the Present & Paving a Strategic Roadmap** ■**Planning for the Future? What About the Present?**

Bridget Lazlo - Guardian Business Solutions

Paving a Strategic ROADMAP™ to Success: Overcoming the Challenge of Developing a Simple, Clear and Effective Business Strategy

Andy Shafer - Shafer's Innovation and Business Building Services

12:00 PM - 1:30 PM**F37: Job Shop Costing, Estimating and Scheduling for Complex Jobs** ■**Job Shop Costing and Estimating**

Don Clutter - MIE Solutions

Unique Benefits of Finite Capacity Scheduling for Complex Job Shops

Prasad Velaga - Optisol

2:00 PM - 3:30 PM**NEW! F47: Hands-on Workshop - Cultivate & Value Your Leadership** ■**Cultivating Transformative Leaders**

Amir Ghannad - The Ghannad Group, LLC

Hands-on Workshop - Value Your Leadership

Noa Ronen - Noa Ronen Coaching

TUESDAY, NOVEMBER 12**8:00 AM - 9:30 AM****F57: Building A Competitive Advantage: Know What Your Business is Worth and Tax Credit Advantages** ■**Building a Competitive Advantage Through R&D Tax Credits**

John Madsen - Black Line Group

Do You Know What Your Manufacturing or Metal Fab Business Is Worth?

Matthew Bradbury - Business Acquisition & Merger Associates

10:00 AM - 11:30 AM**NEW! F67: The Dark Cloud Behind the Silver Lining: Economy in 2020** ■

Chris Kuehl - Armada Corporate Intelligence

12:00 PM - 1:30 PM**NEW! F77: Planning for the Future: The New Dawn of Manufacturing and Technology** ■**Is Tech the Answer to Solving the U.S. Manufacturing Plateau? Survey Says...**

Jeff Ralyea - ECi Software Solutions

The New Dawn of Manufacturing in America

Rosemary Coates - Reshoring Institute at University of San Diego

2:00 PM - 3:30 PM**NEW! F87: ERP Systems: Selection & Avoiding the ERP Technology Grim Reaper** ■**Why ERP Kills Small Manufacturers**

Matt Peterson - InflexionPoint

Selecting Your Next ERP Solution - 5 Steps to Success

David Lechleitner - Ultra Consultants

Bridget Lazlo - Guardian Business Solutions

WEDNESDAY, NOVEMBER 13**8:00 AM - 9:30 AM****F97: Ensuring Tomorrow: How to Effectively Choose and Prepare Your Successor** ■

Michael Beck - Eliciting Excellence

10:00 AM - 11:30 AM**NEW! F107: Win the Inner Game: Free Yourself of Overwhelm and See Your Highest Potential Come True** ■

Pete Winiarski - Win Enterprises, LLC

12:00 PM - 1:30 PM**NEW! F117: Diagnose Your Business: How to Free Yourself from Budget Limitations by Finding and Unlocking Hidden Money in Your Operations** ■

David Tweedt - Win Enterprises, LLC

2:00 PM - 3:30 PM**F127: Enable the Transition to Next Gen - Family Business** ■

Henry Hutcheson - Family Business USA

THURSDAY, NOVEMBER 14

8:00 AM - 9:30 AM

NEW! F137: Making Better Decisions as a Business Leader & Tools for Management Success ■

Making Better Decisions as a Business Leader

Dan Ryan - Ryan Search & Consulting

Decision Making Tools for Management

Larry Burks - West Chester Township

10:00 AM - 11:30 AM

NEW! F147: Financing to Enable Growth & Achieve Project Improvements ■

How to Use Financing to Support & Enable Growth in a Manufacturing Business

David Goose and Chris Richardson -
Manufacturers Capital

GOAL: Achieving Your Most-Rewarding New/Renovated Plant or Process Improvement Project

G Robert Sipp - TecTrans



MARKETING & SALES

MONDAY, NOVEMBER 11

8:00 AM - 9:30 AM

NEW! F18: Supercharge Your Networking & Inbound Marketing ■

Create Opportunities by Better Networking
Kenneth Mall and Chuck Mouranie - EDSI

Maximizing Your Trade Show Investment: A Defined Process for Pre-Show Marketing, Lead Follow-Up, Tracking, and Measuring ROI
Josh Curcio - protocol 80, Inc.

10:00 AM - 11:30 AM

NEW! F28: Your Schematic for Assembling a Powerful Digital Marketing Machine ■

Stoney deGeyter - The Karcher Group

12:00 PM - 1:30 PM

NEW! F38: Build a Sales Strategy & Model for Scalable Growth ■

How to Get 20% of Your Reps' Time If You Are Only 10% of Their Income

Charles Cohon - Manufacturers' Agents National Association

Sales Model for Scalable Growth

Michele Nichols - Launch Team, Inc.

Modern Sales Strategies to Reach Business Goals

Patricia Cisco - Marketing Essentials

NEW! F48: Deliver Superb Customer Service & Build a Customer-Centric Culture ■

6 Ways to Build a Customer-Centric Culture

Andrea Olson - Pragmadik

Deviate from the Process to Deliver Superb Customer Service

Holly O'Donnell - Slone Solutions, LLC

TUESDAY, NOVEMBER 12

8:00 AM - 9:30 AM

NEW! F58: Customer Experience for Manufacturers to Create Digitally-Powered Journeys That Help Grow People ■

David Whited and Charissa Morgan - Highland Solutions

10:00 AM - 11:30 AM

NEW! F68: Sustainable Social Media Strategies ■

Congratulations! You've Launched a New Website - Now What?

Nicole Wagner - Stevens & Tate Marketing

Building Sustainable, Strategic Social Media Marketing

Steven Vrooman - Texas Lutheran University

12:00 PM - 1:30 PM

F78: Strengthen Your Marketing Through the Power of Story & Grow Your Revenue & Grow Your Team ■

Strengthen Your Marketing Through the Power of Story

Dan Gartlan - Stevens & Tate Marketing

Increase Your Influence: Grow Your Revenue & Grow Your Team

Dacia Coffey - The Marketing Blender

WEDNESDAY, NOVEMBER 13

8:00 AM - 9:30 AM

NEW! F98: Digital Recruiting Strategies & Data for Continuous Improvement ■

Digital Recruiting Strategies for Attracting Today's Modern Manufacturing Talent

Patricia Cisco - Marketing Essentials

Digital Marketing for Contract Fabricators/ How to Use Data for Continuous Improvement

Tim Doyle - TopSpot

10:00 AM - 11:30 AM

F108: Business Builders: Make Business Development a Competitive Advantage ■

Mark Frasco - COACT Associates, Ltd.

12:00 PM - 1:30 PM

NEW! F118: Protecting Original Design: The Importance of IP For Fabricators ■

Protecting Original Design: The Importance of IP for Fabricators

David Adler - Adler Law Group

Patent Rights in Metal Forming

Marshall Honeyman - Erise IP

2:00 PM - 3:30 PM

NEW! F128: A Marketing Framework: From Lead to Sale - Marketing Tools & Tips for Fabricators and OEMs ■

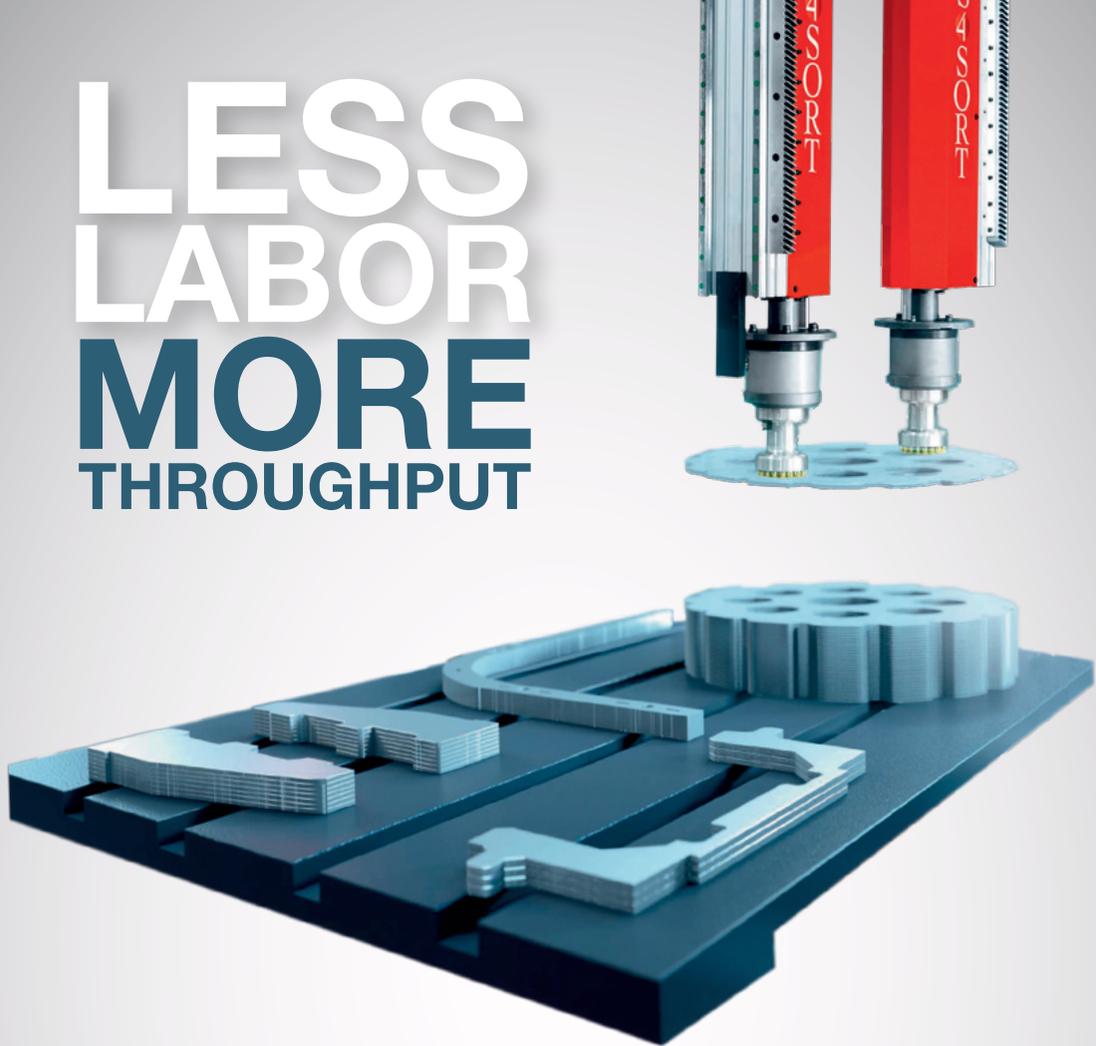
From Lead to Sale - Marketing Tools & Tips for Fabricators & OEMs

Andrew Garman - Pipedream Marketing

A Proven Framework for Effectively Marketing to Engineers Along the Buyer's Journey

Dan Konstantinovskiy - RH Blake

**LESS
LABOR
MORE
THROUGHPUT**



NEW! AUTOMATED PART PALLETIZING

#SeeToBelieve

FABTECH BOOTH A2923



SMART MANUFACTURING

Track Sponsored By:



MONDAY, NOVEMBER 11

8:00 AM - 9:30 AM

NEW! F19: Current State of Smart Manufacturing & The Connected Viewpoint ■

Smart Manufacturing Driven by Smart Technology: What's the Current State?

Jeff Car - Ultra Consultants

The Connected Viewpoint: The New Era of Data for Industry 4.0

Paul Ausserer - Marquis Data

10:00 AM - 11:30 AM

NEW! F29: Smart Manufacturing Basics to Get Started in the Digital World ■

Smart Factory: 101

Adria Haines - Lantek Systems, Inc.

Smart Manufacturing: Why Should I Care? Where Do I Start?

Will Healy III - Balluff, Inc.

Power Your Digital Transformation with a Connected Enterprise (IoT)

Christine Hansen - Epicor Software Corp.

12:00 PM - 1:30 PM

F39: Industrial IoT Case Study - Real World Implementation ■

Jonathan Kim, Casey Greer, Willie Pramono and Eric Trexler - Amada America Inc.

2:00 PM - 3:30 PM

NEW! F49: Smart Manufacturing and Workforce Ready! ■

Scale Your Workforce Training Using Virtual Reality

Dave Beck - Foundry 45

Smart Manufacturing Meets Workforce Development

David Iyoha - Lantek Systems, Inc.

TUESDAY, NOVEMBER 12

8:00 AM - 9:30 AM

NEW! F59: Productivity, Performance & Quality Management for Smart Manufacturing ■

Make the Transition to 100% PMI Without Adding a Significant Cost to Your Business

Jordan Rose - Hitachi High-Tech Analytical Science

Shop Floor Optics: Illuminate Your Hidden Improvement Potential with IIoT Machine Learning and Performance Technology

Mark Stevens and Jake Rohrer - Wipfli CPAs and Consultants

10:00 AM - 11:30 AM

NEW! F69: Quit Making Excuses and Close the Loop - Now is the Time to Digitize ■

Quit Making Excuses. Now Is the Time to Digitize

Kevin Must - Lantek Systems, Inc.

Closing the Loop - How Digital Technology Can Play a Transformative Role in Enabling Intelligent Manufacturing Systems

Tyler Vizek - MxD

12:00 PM - 1:30 PM

NEW! F79: From Rust-Belt to High-Tech: Transform, Ignite and Disrupt ■

Steve Blue - Miller Ingenuity

2:00 PM - 3:30 PM

NEW! F89: Artificial Intelligence for Machine Learning & Streamlining Quoting Process ■

Applying Artificial Intelligence and Machine Learning to Metal Shop Processes

Richard Boyd - Tanjo Inc.

Streamline Your Quoting Process with Artificial Intelligence

Kevin Must - Lantek Systems, Inc.

WEDNESDAY, NOVEMBER 13

8:00 AM – 9:30 AM

NEW! F99: The Smart Factory & Feasibility with Case Studies ■

The Story of a Smart Factory

Ryan Zimmerman and Kyle O'Reilly - VKS - Visual Knowledge Share

Smart Manufacturing Feasibility Case Study

David Iyoha - Lantek Systems, Inc.

10:00 AM – 11:30 AM

NEW! F109: A.I. for Predictive Manufacturing: Zero Downtime, Zero Defects ■

Isaac Bennett - Detroit Manufacturing Systems (DMS) and Mohamed Abuali - IoTco

NEW! F119: Prevent Digital Failure and Benchmark Your Performance ■

People and Process Actions to Prevent Digital Transformation Failure

Paul Vragel - 4aBetterBusiness, Inc.

Benchmarking Performance: Where Do You Stand vs. Your Competition?

Lou Zheng - MachineMetrics

2:00 PM – 3:30 PM

NEW! F129: Smart Manufacturing on Predictable ROI ■

Manufacturing Mysteries: How the Best Always Seem to Know the Answers Ahead of Time

Unlocking New Business Models With Industrial Apps & Software

Simone Gianotti - Schneider Electric

THURSDAY, NOVEMBER 14

8:00 AM – 9:30 AM

NEW! F139: Smart Manufacturing to Successfully Implement the Trifecta; All in Real Time ■

Paul Hogendoorn - FreePoint Technologies



STAMPING

MONDAY, NOVEMBER 11

10:00 AM – 11:30 AM

NEW! S20: Understanding Servo Metal Stamping Presses - Proper Usage, Troubleshooting and Maintenance ■

Jeffery Fredline - MECO Corporation

S21: Lubricants - 1 ■**LUBRI-NOMICS - The Science of Lubrication and Economics in Metal Stamping**

Bob Anderson - Tower Metalworking Fluids

12:00 PM – 1:30 PM

S30: ANSI Z224.1 & OSHA 1910.147 Applications of Alternative Methods for Hazardous Energy Control ■**ANSI Z244.1/OSHA 1910.147 and Applications of Alternative Methods of Hazardous Energy Control for Machine Safety and Productivity Improvements**

Ted Sberna - White Horse Safety Inc.

2:00 PM – 3:30 PM

NEW! S40: Application of Real-Time Visual Monitoring Tool in Stamping ■

Hyunok Kim - EWI and Michael Selent - SelmaTec Systems GmbH

NEW! S41: Lubricants - 2 ■**Chlorinated Metal Working Fluids- Fact, Fiction & Options**

Bob Anderson - Tower Metalworking Fluids

Avoiding Oil Mist Mishaps

Frank Cea - RoboVent

TUESDAY, NOVEMBER 12

8:00 AM – 9:30 AM

NEW! S50: Materials - 1 ■**Utilizing Advanced Materials and Joining Technologies to Lightweight Current and Future Mobility Solutions**

Stephen Rawe - Martinrea International Inc.

Tensile Tests, Metal Certs and Simulation

Daniel Schaeffler - Engineering Quality Solutions

NEW! S51: Connectivity - 1 ■**Sensors & Connectivity Improvements for Transfer Die Applications**

Will Healy III - Balluff, Inc.

Is ERP an Effective Solution for Die Makers and Metal Fabricators?

Jeanne Naysmith - TST Tooling Software

10:00 AM – 11:30 AM

NEW! S60: Materials - 2 ■**The Effects of Automotive Lightweight-Initiatives on Die Design Strategy and Construction**

Peter Ulintz - Precision Metalforming Association and Daniel Schaeffler - Engineering Quality Solutions

NEW! S61: Connectivity - 2 ■**Case Studies of IO-Link Modernizing the Press Shop**

Will Healy III - Balluff, Inc.

I-PRESS, the Future of Press Control Technology

Ray Fausz - Sutherland Presses

2:00 PM – 3:30 PM

S80: Materials - 3 ■**Focus on Materials: How Do Material Properties Influence Metal Stamping Outcomes?**

Kidambi Kannan - AutoForm Engineering USA Inc.

NEW! S81: Connectivity - 3 ■**Wireless Pressure Monitoring of Nitrogen Systems in Metal Stamping Dies**

Mathew Glidden - FIBRO, Inc.

WEDNESDAY, NOVEMBER 13

8:00 AM – 9:30 AM

NEW! S90: Stamping - 1 ■**Strengthening Die Maintenance Programs**

Peter Ulintz - Precision Metalforming Association

NEW! S91: Sensors - 1 ■**How Die Protection Sensors & Press Setup Technologies Enable Quick Die Changes, Quality Parts & Prevent Die Crashes**

Will Healy III - Balluff, Inc.

10:00 AM – 11:30 AM

NEW! S100: Stamping - 2 ■**What's Holding You Back - How to Optimize Your Press Line and Protect Your Tooling**

Rob Meyer - Nidec Minster Corporation

NEW! S101: Sensors - 2 ■**Automatic In-Die Part Quality Monitoring & Tool Adjustments**

James Barrett - Link Systems, Inc.

2:00 PM – 3:30 PM

NEW! S120: Stamping - 3 ■

Advances In-Die Transfer Technology - Trog Dies

Robert Gunst - Jacar Systems LLC

NEW! S121: Quality & Tooling ■

Process Based Quality Management System - A Simplified Approach

Mark Netzel - Die-Matic Corporation

Transforming the Future of Automation & Tooling

Jad Khattab, Ron Slone and Mike Filipiak - IMI Precision Norgren Automation Solutions

WELDING FABRICATION

MONDAY, NOVEMBER 11

10:00 AM – 11:30 AM

NEW! W200: The Welding Economy ■

Michael Lang - Fluor

2:00 PM – 3:30 PM

NEW! W400: Robotic Welding for Job Shops ■

Bryan Peoples - OTC Daihen

TUESDAY, NOVEMBER 12

10:00 AM – 11:30 AM

NEW! W600: Resistance & Arc Welding for Better Weldability and Hazard Reduction ■

Resistance Spot Welding Coupled with High Frequency Acoustic Waves for Better Weldability of Dissimilar Materials

Umair Shah - The Ohio State University

Electrical Hazard Reduction in Arc Welding

Jim Galloway - Conestoga College

2:00 PM – 3:30 PM

NEW! W800: Improving Lightweight Materials Joining Through Friction Welding ■

Mike Spodar - Coldwater Machine Company, a Lincoln Electric Company

WEDNESDAY, NOVEMBER 13

10:00 AM – 11:30 AM

NEW! W100: Optimization of Welding Documentation and Continuity Efficiency Using Computer Software ■

Antonio Howard - CEI

WORKFORCE DEVELOPMENT

MONDAY, NOVEMBER 11

8:00 AM – 9:30 AM

NEW! F200: Practicing Emotional Intelligence for Workplace Success ■

M.J. Clark - Integrated Leadership Systems, (ILS)

10:00 AM – 11:30 AM

NEW! F211: The Future of Talent: Attracting and Retaining the Top Talent for the 21st Century ■

The Future of Manufacturing Depends on Skilled Trades - How to Attract and Retain Future Talent

Joseph Mazzeo - Integrated Lean and Quality Solutions, LLC

Sweat the Small Stuff: How Attention to Detail Keeps Your Top Talent from Leaving

Lisa Ryan - Grategy.com

12:00 PM – 1:30 PM

NEW! F212: Creating Career Path Programs That Empower & Engage ■

Paths to Success: Creating Career Paths That Empower and Engage

Sue Mueller - Tooling U-SME

Five Steps to Creating a Successful Career Path Program in Your Company

Mark Ernst - Ernst Enterprises

2:00 PM – 3:30 PM

NEW! F213: Pushing Your Envelope: How Smart People Overcome Self-Doubt and Live with Bold Enthusiasm ■

Maureen Zappala - High Altitude Strategies

TUESDAY, NOVEMBER 12

8:00 AM – 9:30 AM

NEW! F214: Engaging Manufacturing's Next Generation Through Full Contact Innovation ■

Engaging Manufacturing's Next Generation Through Full Contact Innovation

Bill Padnos - NTMA

Millennials in Manufacturing

Adria Haines - Lantek Systems, Inc.

10:00 AM – 11:30 AM

NEW! F215: Conflict & Communication for Strong Leadership ■

Leadership, Communication and the 'Adventure Economy'

Steven Vrooman - Texas Lutheran University

The HEART of Conflict - Open Heart Mindset for Strong Leaders

Noa Ronen - Noa Ronen Coaching

12:00 PM – 4:30 PM

NEW! F216: Leadership Skills & Development Workshop ■

This workshop is ideal for all leaders, supervisors, managers, team leaders and project managers. Topics will enable new skills and valuable information to implement immediately for current or upcoming leaders. The workshop provides specific topics for strategies to lead effectively through performance management, accountability, engagement & recognition, delegation, crucial conversations, and becoming the learning leader.

How to Have Conversations That Matter in the Workplace

Amir Ghannad - The Ghannad Group, LLC

Delegation Strategies to Help You Be a More Effective Manager

Mark Ernst - Ernst Enterprises

Accountability Through Engagement

Pete Winiarski - Win Enterprises LLC

Engaging and Recognizing Employees

Lisa Ryan - Grategy.com

Be the 'One' Manager That Is Respected and Remembered

Mark Ernst - Ernst Enterprises

Learning Leaders Drive Successful Organizations

Joseph Mazzeo - Integrated Lean and Quality Solutions, LLC

WEDNESDAY, NOVEMBER 13

8:00 AM – 9:30 AM

NEW! F217: Operational Excellence for Significant and Sustained Performance with Incentive Pay ■

Creating Operational Excellence with Incentive Pay

Vince Bovino - Bovino Consulting Group

How to Translate the Daily Challenge to the Production Floor and Tie Pay to Achieving It

Charles DeBettignies - Gainsharing Inc.

12:00 PM – 1:30 PM

NEW! F219: Leading Innovation & Change Initiatives in Your Organization ■

Leading a Change Initiative

Mark Ernst - Ernst Enterprises

Innovative Manufacturing – What Is It and How Do We Teach It?

Sebastian Ceron - Saskatchewan Polytechnic Regina Campus

2:00 PM - 3:30 PM

NEW! F220: Manage, Mentor and Develop Your New Workforce & Staff for the Future ■

Helpful Tips on How to Manage, Mentor and Develop Your New Workforce

Marion Wells - Human Asset Management

THURSDAY, NOVEMBER 14

8:00 AM - 9:30 AM

NEW! F221: How to Win with Personalities & Team Engagement ■

Together We Win

Justin Copie - Innovative Solutions

How Personalities Impact Team Engagement

Holly O'Donnell - Slone Solutions, LLC



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SEMINARS

TUESDAY, NOVEMBER 12**8:00 AM – 4:00 PM****W11: APPLIED WELDING METALLURGY**

Introduction to basic metallurgy concepts and how they affect the material properties from time of manufacturing through to welding fabrication.

Ben A. Pletcher, Bechtel Global Corporation — Welding and Applied Technology Center

8:00 AM – 12:00 PM**W12: WPS'S FOR WELD INSPECTION AND TEST-TAKING TIPS**

Learn about weld geometry, shapes, sizes, terminology, and welding positions. Welding symbols and methods, strategies, and tips for taking and passing technical tests will be discussed.

Ben Taves, AWS Instructor

TUESDAY, NOVEMBER 12 – WEDNESDAY, NOVEMBER 13**8:00 AM – 5:00 PM****W13: AWS EDUCATIONAL OVERVIEW OF WELDING CODES AND STANDARDS**

This seminar highlights the significant changes in recent revisions of AWS B2.1, AWS D1.2, AWS D18.1 and ASME Section IX. Industry experts also provide insight into how welding qualification codes ASME Section IX and AWS B2.1 are used in conjunction with ASME construction codes B31.1, B31.3, and Section VIII. Reference standards AWS B1.10, AWS B1.11, AWS A2.4, and AWS A3.0 will also be discussed.

WEDNESDAY, NOVEMBER 13**8:00 AM – 4:00 PM****W14: "WELDING" DON'T BE AFRAID TO ASK**

What is "welding," what does it look like, and how do you do it? These questions and a lot more will be answered, including how and where a person can learn to weld, what are "codes" and why do we use them, what is a Certified Welder or Certified Welder Inspector (CWI), and how to become one?

Ben Taves, AWS Instructor

W15: STAINLESS STEEL WELDING D1.6 STRUCTURE

This session will cover the basic types of stainless steel, general welding discontinuities and defects, specific discontinuities and defects in stainless steel welds, and general corrosion issues.

Rich Campbell, Bechtel Global Corporation and AWS Instructor

CONFERENCES

TUESDAY, NOVEMBER 12 – WEDNESDAY, NOVEMBER 13**8:00 AM – 4:00 PM****W16: 5TH INTERNATIONAL ELECTRON BEAM CONFERENCE**

We are pleased to announce the first call for abstracts to the 5TH International Conference on Electron Beam Welding. The conference, co-sponsored by the American Welding Society, DVS — German Welding Society, and the International Institute of Welding — Commission IV, will bring together scientists and engineers from industry, academia, and research laboratories from around the world to discuss current and future trends in electron beam welding.

RWMA RESISTANCE WELDING SCHOOL**TUESDAY, NOVEMBER 12 – WEDNESDAY, NOVEMBER 13****8:00 AM – 5:00 PM****W22: RWMA RESISTANCE WELDING SCHOOL**

The RWMA Resistance Welding School is an intensive two-day course about the basics of resistance welding once a year. The school is designed to give operators, production supervisors, engineers, and others the opportunity to study, better understand, and further their knowledge in the theory, applications, and equipment used in the resistance welding process. This intensive learning atmosphere will better prepare the unfamiliar and further educate the experienced. The first day of this school introduces the processes and machines, materials, electrodes, and power systems associated with resistance welding. The second day covers welding controls, quality standards, machine set-up, and maintenance topics.

MONDAY, NOVEMBER 11

1:00 PM – 3:00 PM

W17: GETTING STARTED IN UNDERWATER WELDING

Underwater welders work all over the country and even around the world. Come learn from an international industry expert about the opportunities available and the skills you can develop.

Uwe Aschemeier, Subsea Global Solutions and Whitey McDonald, Subsea Global Solutions

W18: CREATING A WPS IN 60 SECONDS

The latest technology tools take the guesswork out of creating WPSs. Learn how to save time and money by creating accurate and prequalified WPSs, or even more specialized welding procedures safely by using technology.

Mike Bernasek, C-Spec and Dustin Brungardt, C-Spec

WEDNESDAY, NOVEMBER 13

9:00 AM – 11:00 AM

W19: DEVELOPMENT OF A NEW STANDARD FOR METAL ADDITIVE MANUFACTURING: AWS D20.1/D20.1M, SPECIFICATION FOR FABRICATION OF METAL COMPONENTS USING

ADDITIVE MANUFACTURING

This presentation will provide a discussion of unique challenges involved in the production of metal AM parts, as well as an overview of the AWS D20.1 standard and how this standard addresses these challenges.

Jessica Coughlin, Naval Nuclear Laboratory

THURSDAY, NOVEMBER 14

8:00 AM – 10:00 AM

W20: STARTING A WELDING INSPECTION BUSINESS

What is required legally to go into business for yourself as a consultant? Learn from successful entrepreneurs who made welding inspection work for them.

Brent Boling, ARC-Tech Welding Inspection

8:00 AM – 11:00 AM

W21: BECOMING A CERTIFIED WELDING ACCREDITED TEST FACILITY FOR THE TESTING CW

This course is designed to help you navigate through the process of becoming an AWS Accredited Test Facility.

Emil Pagoaga and Joe Young, American Welding Society

PROFESSIONAL PROGRAMS

Pick and choose between concurrent sessions for the latest in welding research and commercial developments. Pick a day or attend the entire four-day program.

MONDAY, NOVEMBER 11

SESSION 1: ADDITIVE MANUFACTURING I

Session Chairs: P. Hochanadel, Los Alamos National Laboratory and T. Borchers, Arconic Inc.

1:40 PM

Wire-Arc Additive Manufacturing: Multi-Pass Gas-Metal Arc Welding in the Digital Age

G. Knapp, T. Mukherjee and T. DebRoy, The Pennsylvania State University

2:00 PM

Zero Programming Repair Strategy Using Additive Manufacturing

S. Alam, P. F. Mendez and D. R. Ramirez Rebollo, University of Alberta — CCWJ; M. Dewar and S. Borle, Group Six Technologies

2:20 PM

Comparison of Low Heat Input Deposition Methods for Suitability in Wire Arc Additive Manufacturing

J. Ream and S. Liu, Colorado School of Mines

2:40 PM

Formation of Austenite in Duplex Stainless Steels Produced Using Laser-Based Directed Energy Deposition Additive Manufacturing

A. Iams and T. Palmer, The Pennsylvania State University

3:00 PM

Modeling the Effect of Particle Shapes and Hatching Patterns on Solidification Structure in Powder Bed Additive Manufacturing

X. Gao, A. Faria Guilherme, K. Kamal, W. Zhang, R. Antonio, and Y. Wang, The Ohio State University; K. Wheeler, NASA Ames Research Center

3:20 PM

Producing Larger Part Overhangs Using Non-Gravity Aligned Torch Orientations in Large Scale Metals Additive Manufacturing

J. Penney and W. Hamel, University of Tennessee

3:40 PM

Additive Manufacturing of Multi-Material Parts Using the Wire-Arc Process

A. Nycz, M. Noakes, C. Masuo, D. Vaughan, S. Patrick, Oak Ridge National Laboratory; J. Paul and J. Flamm, Wolf Robotics

4:00 PM

Wire-Arc Additive Manufacturing Process Assisted by Magnetic Arc Oscillation

A. Bracarense and D. Corradi, Universidade Federal de Minas Gerais

4:20 PM**Wire Feed Rate and Arc Length Adaptive Control System in Additive Manufacturing by Double Electrode Micro-Plasma Arc Welding**

D. Fan and N. Li, Lanzhou University of Technology

4:40 PM**Wire and Arc Additive Manufacturing Technology of In-Situ Strengthened Functionally Gradient Materials Titanium Alloy and Research of Microstructure and Properties**

J. Huang, H. Chen, S. Yu, W. Yuan, W. Pan, and D. Fan, Lanzhou University of Technology

SESSION 2: MODELING

Session Chairs: W. Zhang, The Ohio State University and U. Duman, LAM Research

1:40 PM**Physical Mechanisms Present in the Welding Arc**

P. Mendez, University of Alberta; M. Ramirez Argaez, A. Delgado Alvarez, A. Morales Antonio, and A. Velazquez Sanchez, UNAM; D. Apaoblaza Chaer, University of Chile

2:00 PM**Computational Modeling of Stress Relief Cracking Test**

C. Sarich, B. Alexandrov and A. Benatar, The Ohio State University

2:20 PM**Transport Phenomena-Based Models for Building a Digital Twin for Metal Printing**

T. Mukherjee, G. Knapp and T. DebRoy, Pennsylvania State University

2:40 PM**Thermocapillary-Driven Weld Pool Flows in Autogenous Fusion Welding: Scaling Analysis**

D. Havrylov and P. Mendez, Canadian Centre for Welding and Joining

3:00 PM**Microstructure Based Creep Fracture Model for Type IV Cracking of Grade 91 Steel Weldment**

W. Zhang, Y. Wang and Z. Feng, Oak Ridge National Laboratory

3:20 PM**Practical Considerations for Analytical Modelling of Residual Stress**

M. Grams, P.F. Mendez, CCWJ — University of Alberta — CCWJ

3:40 PM**Uncertainty Analysis in Computational Weld Mechanics Based Simulations Due to Input Material Property Data**

C. Fisher, D. Bechetti and J. Semple, Naval Surface Warfare Center — Carderock

4:00 PM**Fracture Prediction of AISi Coated Hot Stamped Boron Steels Spot-Welded Joints**

Y. Lu, K. Zhang, M. Kimchi, and W. Zhang, The Ohio State University; T. Abke, S. Malcolm and K. Pydimarry, Honda R&D Americas, Inc.

4:20 PM**An Improved Prediction of Distortion in Additive Manufacturing by Considering the Repeated Annealing Phenomena of Ti-6Al-4V**

Q. Shi, Tsinghua University

4:40 PM**Multi-Scale Modeling of Hybrid RSW/FEW: RSW Model Validation and AHSS Microstructural Evolution Modeling**

E. Brizes and A. Ramirez, OSU Welding Engineering; H. Ghassemi-Armaki, ArcelorMittal; Tim Abke, Honda R&D Americas Inc

SESSION 3: ARC WELDING

Session Chairs: Y. Yang, Huntington Ingalls Shipbuilding and Nick Kapustka, EWI

1:40 PM**A Novel Method of Triple-Wire Gas Indirect Arc Welding**

G. Song, Dalian University of Technology

2:00 PM**Arc Characteristics and Metal Transfer Behavior in Pulsed DE-GMA-Additive Manufacturing**

G. Zhang, G. He, Y. Shi, Y. Gu, and D. Fan, Lanzhou University of Technology

2:20 PM**Discharge Process with High Frequency Pulsed Arc Welding**

M. Yang, H. Liu and B. Qi, Beijing University of Aeronautics and Astronautics

2:40 PM**Effect of Arc Pressure on Digging Process in Variable Polarity Plasma Arc Welding of A5052P Aluminum Alloy**

S. Chen, B. Xu and F. Jiang, Beijing University of Technology

3:00 PM**GTAW Penetration Control Based on Arc Voltage Sensing**

R. Yu and Y. Zhang, University of Kentucky; Y. Cheng, Beijing University of Technology

3:20 PM**Study on Bypass-Current Plasma-MIG Hybrid Welding Process of 5083 Aluminum Alloy**

Y. Miao, J. Zou, Z. Lin, J. Guo and C. Li, Harbin Engineering University

3:40 PM**Thermal Characteristics of Narrow Gap GMA Welding at Vertical Position with Arc Swinging and Shifting**

H. Lan, S. E. and J. Shao, Zhejiang Normal University; H. Zhang, Shanghai Zhenhua Heavy Industries Co Ltd; S. Lin, Harbin Welding Institute

4:00 PM**Influence of Helium Pressure on Low Current GTAW Welding on the Performance of Tungsten Electrodes Classifications**

G. Di Gennaro, Coni — Consultoria e Projetos; Sergio Brandi, USP

4:20 PM

Effect of Fluorides on the Surface Tension of Molten Pool During GTA Welding Process

C. Li, Y. Shi, Y. Gu, and C. Bian, Lanzhou University of Technology

4:40 PM

Plasma Arc Gradient Functional Material Manufacturing Process Based on Bypass Double Wire

C. Li, Y. Miao, J. Zou, and Z. Lin, Harbin Engineering University College of Shipbuilding Engineering

TUESDAY, NOVEMBER 12

SESSION 4: SOLID-STATE PROCESSES

Session Chairs: W. Tang, Oak Ridge National Laboratory and J. Pfeiffer, PVA TePla — Germany

8:00 AM

Innovative Connectors for Joining Aluminum Alloys

Dr. H. Zhang, The University of Toledo

8:20 AM

Applying Torque Based Control to Friction Stir Extrusion

A. Jarrell, A. Strauss and G. Cook, Vanderbilt University

8:40 AM

Effects of Ultrasonic Vibrations on Microstructure and Mechanical Properties in Dissimilar Friction Stir Welding of Al/Mg Alloys

C. Wu, Institute of Materials Joining, Shandong University

9:00 AM

Enhance Heat Generation and Joint Strength in Dissimilar Metal Ultrasonic Welds by Surface Engineering

H. Huang, J. Chen, Y.C. Lim, Z. Feng, and X. Sun, Oak Ridge National Laboratory

9:20 AM

Improving the Strength of Refill Friction Stir Spot Welding of 6061-T6 Aluminum Alloy with a New Method

T. Yuan, S. Chen and J. Shi, Beijing University of Technology

9:40 AM

Irradiated Stainless-Steel Friction Stir Weld Microstructure Characterization

W. Tang, Z. Feng, M. Gussev, R. Miller, J. Che, and S. Clark, Oak Ridge National Laboratory; J. Tatman, G. Frederick and B. Sutton, Electric Power Research Institute

10:00 AM

Analysis of Friction Stir Welding Behavior of Aluminum Cerium Alloy and Viability for Industrial Application

D. Sweitzer, Vanderbilt University

10:20 AM

Modelling the Thread Effect in Friction Stir Welding of AZ31B Magnesium Alloy

R. Giorjão and A. Ramirez, The Ohio State University; E. Monlevade and A. Tschiptschin, University of São Paulo; J. Avila, São Paulo State University

10:40 AM

Ultrasonic Welding of AZ31B Magnesium and DP590 Steel

J. Chen, Y. Lim, H. Huang, and Z. Feng, Oak Ridge National Laboratory

11:00 AM

3D Finite Element Modeling and Simulations of Ultrasonic Metal Welding

N. Shen, Tesla; H. Ding, University of Iowa; and W. Cai, General Motors Global R&D Center

11:20 AM

Mechanical and Solid-State Hybrid Joining of High Strength Aluminum Alloy AA7075-T6 by Friction Self-Piercing Riveting (F-SPR) Process

Y. Ma and Y. Li, School of Mechanical Engineering, Shanghai Jiao Tong University

SESSION 5: SURFACING AND DISSIMILAR JOINING

Session Chairs: G. Wood, Apollo-Clad Laser Cladding; Y. Li, School of Mechanical Engineering, Shanghai Jiao Tong University

8:00 AM

Abnormal Crystal Growth and Cracking During Glass-Ceramic-to-Metal Joining:

Z. Ghanbari, D. Susan, B. Elisberg, R. Grant, M. Rodriguez, and S. Dai, Sandia National Laboratories

8:20 AM

Calculation of Catchment Efficiency in Laser Cladding Processes

Y. Lu and P.F. Mendez, Canadian Centre for Welding and Joining, University of Alberta

8:40 AM

Bypass-Current Plasma MIG Welding of Ti-6Al-4V Titanium Alloy to Q235 Galvanized Steel with Copper Alloy

Z. Lin, Y. Miao, J. Zou, C. Li, and J. Guo, Harbin Engineering University

9:00 AM

ICE Process Development for Cladding of Continuous Caster Rolls

F. LeClaire, G. Chouinard and R. Menon, Stoodly, an ESAB Brand

9:20 AM

Influence of Cu-Coated Layer on Interfacial Intermetallics of Laser-MIG Hybrid Welded-Brazed Al/Steel Joint

T. Yang and W. Dai, Southwest Jiaotong University

9:40 AM

Analysis of Thermal Efficiency in Coaxial Laser Cladding Using a Fiber Laser

G. Wood, D. Jones and D. Hamre, Apollo-Clad Laser Cladding

10:00 AM**Criterion for Steady-State in Laser Cladding and Heat Treating**

Y. Wang and P.F. Mendez, University of Alberta

10:20 AM**Influence of Duty Cycle on the Hot Cracking in K447A Laser Cladding Layer Obtained with Quasi-Continuous Laser**

Z. Zhang, Y. Zhao, A. Wu, and J. Shan, Tsinghua University

10:40 AM**The Research on Forming Mechanism of Diode Laser Cladding**

M. Zhu, B. Yan, Y. Shi, and G. Zhang, Lan Zhou University of Technology

11:00 AM**Thermal Spray Cladding Optimization for Steel Drill Pipe**

W. Ott, S. Liu and Z. Yu, Colorado School of Mines; J. Scott, Devasco, Inc.; H. Nguyen, ResOps Laboratory Services LLC

11:20 AM**Ultrasonic-Assisted Transient Liquid Phase Bonding of Mg/Al Dissimilar Alloy Using Ni Multi-interlayers**

Y. Li, Qingdao University of Technology; A.J. Ramirez, The Ohio State University

11:40 AM**Atomic Scale Characterization of Al-steel Welds Fabricated in the Solid State**

N. Sridharan and J. Poplowsky, Oak Ridge National Laboratory; H. Meyer, A. Vivek, and G. Daehn, The Ohio State University

SESSION 6: WELDING METALLURGY I

Session Chairs: B. Alexandrov, The Ohio State University and Richard Baumer, LeTourneau University

8:00 AM**Austenite Formation Kinetics During Continuous Heating in Microalloyed Steels**

A.H. Cesaro and P.F. Mendez, University of Alberta – CCWJ

8:20 AM**Carbide Precipitation During Multi-Pass Welding of Grade 22 Steel**

J. Stewart, The Ohio State University

8:40 AM**Characterization of Texture Evolution During HF-ERW of API X70 Pipeline Steel**

L. Guo, R. Kannan, N. Sharma, and L. Li, University of Alberta; N. Anderson, M. Rashid and Laurie Collins, EVRAZ Inc. NA

9:00 AM**Dissimilar Girth Weld of Internally Cladded API X65 Steel Pipe with Overmatching Requirements**

E. Miná, R. Silva, M. Motta, H. de Miranda, and C. Silva, Universidade Federal do Ceará; M.P. Paes, R. Marinho and G. Dalpiaz, Petroleo Brasileiro S/A

9:20 AM**Welding Investigation of a Wrought FeMnAl Steel for Armor Application**

T. Dai, D. Kyle and Z. Feng, Oak Ridge National Laboratory

9:40 AM**Investigation of Heat Affected Zone Mechanical Property Variations Due to Welding Thermal Cycles in Low Density Fe-Mn-Al-C Steels**

R. Kant and J. DuPont, Lehigh University

10:00 AM**Microstructural Features of Mn35Fe5Co20Ni20Cu20 Filler Material in Brazing of Nickel-Base Superalloy**

B. Schneiderman, M. Gao and Z. Yu, Colorado School of Mines; A. Chuang, Argonne National Laboratories; J. Morris, Oak Ridge National Laboratory

10:20 AM**Phase Transformations and Mechanical Properties of a 10 wt% Ni Steel Welding Consumable**

E. Barrick and J. DuPont, Lehigh University; M. Sinfield, D. Bechetti and J. Farren, Naval Surface Warfare Center, Carderock Division

10:40 AM**Thermal Processing Effects on Heat Affected Zone Liquefaction Cracking Susceptibility of Boron Micro-Alloyed 304L Stainless Steel**

J. Rodelas, D. Susan, M. Maguire, P. Duran, M. Vieira, and A. Barr, Sandia National Laboratories

11:00 AM**Influence of Composition on the Solidification of HP-Modified Heat-Resistant Austenitic Stainless Steels**

S. Orzolek and J. DuPont, Lehigh University

11:20 AM**Investigation of the Fracture Toughness of Hybrid Laser Arc Welds**

D. Bechetti, M. Sinfield, M. Kinsey, and N. Korinckak, Naval Surface Warfare Center

11:40 AM**Nitrogen Evolution Kinetics in Arc Welding Duplex Stainless Steels**

B. Varbai, Budapest University of Technology and Economics, Department of Materials Science; J. Andersson, University West; Y. Adonyi, LeTourneau University

SESSION 7: NEURAL NETWORKS & MACHINE LEARNING

Session Chairs: W. Zhang and Y. Lu, The Ohio State University

1:40 PM**Artificial Intelligence Combined with Machine Learning System to Improve Welding Quality and Productivity for Arc, Resistance, and Friction Stir Processes**

J. Jones, V. Rhoades, M. Mann, A. Cuneo, J. Gaffney, T. Surufka, and S. Cornell, Energyntech, Inc.; T. Holverson, ITW Welding North America; J. Dydo, Gatekey Engineering

2:00 PM

Detection and Segmentation of Weld Defects with Machine Learning

X. Yu; Beijing Institute of Technology

2:20 PM

Identification and Prediction of Cord Geometry in GMAW Welding with a Recurrent High Order Adaptive Neural Network and Feed Back by Infrared Images and Sound

J.J. Muñoz, S.A. Alfaro and J.R. Vargas, UnB

2:40 PM

Intelligent Penetration Control Based on CNNs

W. Jiao, University of Kentucky

3:00 PM

Machine Learning for GMAW Weld Quality

A. Ayoade and J. Steele, Colorado School of Mines

3:20 PM

Mitigation of Defects in Friction Stir Welding Using Machine Learning

Y. Du, Tianjin University; T. Mukherjee and T. DebRoy, The Pennsylvania State University

3:40 PM

Prediction of Bead Geometry in Fluxed-Cored Arc Welding Using Neural Network and a Second-Order Regression Model

Y. Gu, J. Xie, Y. Shi, C. Li, and H. Zhang, Lanzhou University of Technology

4:00 PM

Intelligent Welding Technology for Large Deep and Narrow Shaped Box with Robot

H. Lan, Zhejiang Normal University; H. Zhang, J. Fu and Y. Chen, Shanghai Zhenhua Heavy Industries Co., Ltd.

4:20 PM

GTAW Penetration Control Based on Active Vision with Convolutional Neural Networks

Y. Cheng, S. Chen and J. Xiao, Beijing University of Technology; Y. Zhang, University of Kentucky

SESSION 8: ADDITIVE MANUFACTURING II

Session Chairs: A. Black, Los Alamos National Laboratory and G. Wood, Apollo-Clad Laser Cladding

1:40 PM

Effect of Composition on Aging Response and Mechanical Behavior of Additively Manufactured 17-4 PH Grade Steels

D. Shaffer, A. Wilson-Heid, A. Beese, and T. Palmer, Department of Material Science and Engineering, Pennsylvania State University; J. Keist, Applied Research Laboratory, Pennsylvania State University

2:00 PM

Anisotropic Deformation Behavior of Additively Manufactured 304L

D. Wilson, Honeywell FM&T; M. Maguire, J. Rodelas and P. Noell, Sandia National Laboratories; S. Liu, Colorado School of Mines

2:20 PM

Effects of Interpass Temperature and Shielding Gas on the Microstructure and Mechanical Performance of Duplex Stainless Steels Multi-Layer Structures

D. Aidun, F. Binesh, M. Hebel, and F. Hejripour, Clarkson University; A. Bahrami, Fulton Companies

2:40 PM

Tailoring Thermal Expansion in Additively Manufactured Functionally Graded Titanium Alloys

S. Hilburn, T. Simpson and T. Palmer, Pennsylvania State University

3:00 PM

Integrating Computational Thermodynamics into Additive Manufacturing Models

A. Hope and P. Mason, Thermo-Calc Software Inc.

3:20 PM

Structure and Mechanical Properties of an Additively Manufactured Hybrid S316L and Inconel 625 Structure

N. Chen, H. Khan, J. Lippert, and J. Li, Pennsylvania State University

3:40 PM

Full-Field Strain Distribution and Evolution Behavior During Wire Arc Additive Manufacturing by Digital Image Correlation In-Situ Measurement

Y. Zhao, J. Jia, M. Dong, and A. Wu, Tsinghua University; Q. Li, Capital Aerospace Machinery Corporation

4:00 PM

The Effectiveness of Shielding Gas in Metal Big Area Additive Manufacturing

B. Silwal, Georgia Southern University; A. Nycx, M. Noakes, C. Masuo, and D. Vaughan, Oak Ridge National Laboratory

4:20 PM

Understanding of Correlation Between Interlayer Cooling Time, Clamping and Scan Strategy on Part Deformation and Properties in Large-Scale Ti-6Al-4V Additive Manufacturing

Y. Lee, Y. Bandari, P. Nandwana, B. Richardson, and S. Srdjan, Oak Ridge National Laboratory

4:40 PM

Multi-Scale and Multi-Physics Modeling of Process-Microstructure-Property Relationship in Metal Additive Manufacturing

W. Tan; University of Utah

SESSION 9: WELDING METALLURGY II

Session Chairs: M. Sinfield, NSWC-Carderock and C. Fink, The Ohio State University

1:40 PM

Mechanism of Weld Seam Formation During High-Frequency Electric Resistance Welding (HF-ERW) of Steels

R. Kannan, L. Guo, L. Li, University of Alberta; N. Anderson, M. Rashid and L. Collins, EVRAZ Inc. North America

2:00 PM**Evaluation of Alternative Ni-Based Alloy Designed for Dissimilar Welding of Cladded Steel Pipes with Overmatching Requirements**

R. Silva, E. Miná, M. Motta; C. Silva, and H. de Miranda, Universidade Federal do Ceará; D. Garcia, Welding Consultant; G. Dalpiaz, M. Piza Paes and R. Marinho, Petroleo Brasileiro S/A

2:20 PM**Improved Welding Penetration of Activated Flux-Tungsten Inert Gas Arc Welding of High-Manganese Steel**

A. Hu, L. Zhang and Z. Feng, University of Tennessee

2:40 PM**Kinetics of Intermetallic Compound Layers Between Stainless Steel and Molten Aluminum**

H. He and P. Mendez, University of Alberta

3:00 PM**Mitigation of Liquid Metal Embrittlement in Resistance Spot Welding of Galvannealed AHSS**

A. Abdelmotagaly, B. Schneiderman and Z. Yu, Colorado School of Mines; J. Hu, Honda R&D Americas Inc.

3:20 PM**Study of Transient Microstructure Growth by Friction Stir Process for Dual Phase Advanced High Strength Steel**

K. Taniguchi, JFE Steel Corporation; Z. Feng and Y. C. Lim, Oak Ridge National Laboratory

3:40 PM**TiC Formation Due to Titanium Machining Chips Added with Other Compounds as Ingredient for FCAW Tubular Wires**

A. Bracarense and J. Fagundes, Universidade Federal de Minas Gerais

4:00 PM**Stainless Steel Plates Repair Welding and Post-Weld Characterization**

W. Tang, S. Chatzidakis, R. Miller, and J. Scaglione, Oak Ridge National Laboratory; C. Schrad, Grace College

4:20 PM**Polymer as Ingredient in Submerged Arc Welding Fluxes: Effect in Morphology, Diffusible Hydrogen and Weld Metal Microstructure**

A. Bracarense and P. Menezes, Universidade Federal de Minas Gerais

4:40 PM**Development of Innovative Powder Cored Tubular Wires for Additive Manufacturing and Welding**

E. Sullivan and S. Liu, Colorado School of Mines & Technology

WEDNESDAY, NOVEMBER 13**SESSION 10: PLENARY SESSION**

Session Chairs: Y.M. Zhang, University of Kentucky and J. Ramirez, Air Products

8:00 AM**Plenary – Metallurgical and Mechanical Characterization of Welded Structures Based on CFD Process Simulations**

S. Na, School of MSE, XJTU

8:45 AM**Plenary – Wave Phenomena Concepts to Advance Welding Processes, Weld Metallography, and Non-Destructive Evaluation**

D. Olson, Z. Yu, S. Liu, A. Lasseigne, J. Jackson, J. Poncelow, P. Kiattisaksri, Colorado School of Mines

SESSION 11: IN-SITU MEASUREMENT TECHNIQUES

Session Chairs: A. Ramirez, The Ohio State University and J. Farren, NSWC – Carderock

9:40 AM**Evaluation and Understanding of Localized Deformation in Grade 91 Steel Welds During Creep Testing**

Y. Wang, Y. Wang, W. Zhang, and Z. Feng, Oak Ridge National Laboratory

10:00 AM**In Situ Measurement of Phase Transformations During Heat Treatment of Precipitation Strengthened Additive Manufacturing Materials**

G. Faria and A. Ramirez, The Ohio State University

10:20 AM**In Situ Studies of Full-Field Strain/Residual Stress Evolution in Heat Affected Zone Using Digital Image Correlation**

H. Chen and S. Chen, Shanghai Jiao Tong University

10:40 AM**In-Situ Observation and Numerical Simulation of Creep-Fatigue Behavior for Grade 91 Weldments**

K. Zhang, W. Zhang, C. Whitt, and M. Mills, The Ohio State University

11:00 AM**Neutron Residual Stress Mapping of Repaired Spent Nuclear Fuel Welded Stainless-Steel Canisters**

S. Chatzidakis, W. Tang, J. Chen, R. Miller, A. Payzant, J. Bunn, and J. Wang, Oak Ridge National Laboratory

11:20 AM**In-Situ Measurement and Numerical Simulation of Linear Friction Welding of Ti-6Al-4V**

K. Zhang, W. Zhang, H. Fraser, S. Kuhr, The Ohio State University; M. Eff, EWI; A. Mann, Boeing Research and Technology

11:40 AM**Mechanical Behavior and Damage Zone Analysis of Ni-Base Superalloy Brazed Joints**

J. Wildofsky, The Ohio State University

SESSION 12: HONORARY SYMPOSIUM FOR PROF. D. OLSON I

Session Chairs: Z. Yu, Colorado School of Mines and S. Tate, EPRI

9:40 AM

Invited — Welding Consumables Research Under the Leadership of Prof. David L. Olson

S. Liu and Z. Yu, Colorado School of Mines

10:20 AM

Portable and Mobile Robot Hybrid Induction Arc Welding for Large Steel Structures, Such as Wind Towers and Ships, to Improve Welding Quality and Productivity

J. Jones, V. Rhoades, M. Mann, A. Cuneo, J. Gaffney, T. Surufka, S. Cornell, Energyntech, Inc; T. Holverson, P. Verhagen and B. Albrecht, ITW Welding North America; J. Dydo, Gatekey Engineering Inc.

11:00 AM

Invited — Diffusible Hydrogen Control Through the Management of Martensite Start Temperature Difference (-Ms) Between High Strength-Grade Pipe Steel and SS-FCAW Welds

W. Wang, Collins Aerospace and S. Liu, Colorado School of Mines

11:40 AM

FN Prediction and the WRC Diagram

T. Siewert, Siewert Solutions

SESSION 13: INDUSTRIAL TECHNOLOGY I

Session Chairs: C. Fink, The Ohio State University and C.C. Silva, Universidade Federal Ceará, Brazil

9:40 AM

Effect of Gravity on Characteristics and Formation of Porosity During VPPA Welding of Aluminum Alloys

Z. Yan, Beijing University of Technology

10:00 AM

Evaluating the Low-Cycle Fatigue Behavior of External Weld Repair for Coke Drums

S. Romo, S. Zhang and A.J. Ramirez, The Ohio State University; J. Penso, Shell Projects and Technology; D. Barborak, AZZ; H. Guo and S. Yuen, Suncor Energy Inc.

10:20 AM

Exploratory Investigation on Post Underwater Welding Heat Treatment by Underwater Induction Heating

E. Pessoa, LeTourneau University; H. Assunção and A. Bracarense, UFMG; V. dos Santos, PUC-Rio; R. Marinho, Petrobras

10:40 AM

Fundamental Relationship Between Indentation Techniques and Toughness Applied to Temper Bead Qualification

B. Smith and A. Ramirez, Ohio State Welding Engineering; S. McCracken and S. Tate, EPRI

11:00 AM

Simple — Single Manufacturing Platform Environment: Recent Advances in Real-Time Pulsed TIG Welding-Process Monitoring and the Classification of Process Variations

R. French, H. Marin-Reyes and B. Kitchener, University of Sheffield

11:20 AM

Study on Bypass-Current Wire-Heating Plasma Arc Welding of Titanium Alloy

J. Guo, Y. Miao, Z. Lin, J. Zou, and C. Li, Harbin Engineering University

SESSION 14: PROCESS SENSING AND CONTROL

Session Chairs: D. Bechetti, NSWC-Carderock and S. Chen, Beijing University of Technology

1:40 PM

A New Method for Welding T-Joint in High-Strength Steel Sandwich Panels: Flux Bands Constricting Arc Welding Key Technology Process and Mechanism of Weld Forming

L. Wang, J. Qiao and J. Chen, Lanzhou University of Technology

2:00 PM

Applying Adaptive Controls in the Quest Towards Zero-Defect Resistance Welding

R. Cohen, Canadian Centre for Welding and Joining

2:20 PM

Research on the Characteristics of Arc Acoustic Sensing in Rotating Arc Narrow Gap MAG Welding

W. Li, J. Wang and J. Wang, Jiangsu University of Science and Technology

2:40 PM

Adaptive Robotic Groove Welding

S. Robertson and W. Hamel, University of Tennessee Knoxville; D. Gandy, J. Tatman and G. Frederick, Electric Power Research Institute

3:00 PM

Quantitative Characterization of VPPAW Keyhole Dynamic Behavior with Acoustic-Visual Integration System

D. Wu, Shanghai University of Engineering Science

3:20 PM

Sensor Fusion and Automatic Control on the Arc Welding Processes (Some Applications and Results)

G. Bestard and S. Alfaro, Universidade de Brasília

3:40 PM

Study on the Mechanism and Inhibition of the Unfusion Defect in Ultra-Narrow Gap Laser Wire Filler Welding

L. Junfeng, Southwest Jiaotong University

4:00 PM

Virtual Reality Human-Robot Collaborative Welding

Q. Wang and Y. Zhang, University of Kentucky

4:20 PM

Predict Penetration State by Observing a New Feature of Weld Pool Image

Z. Jiang, Shanghai Jiaotong University

4:40 PM

A Simple Way to Recognize the Welding Penetration in K-TIG Welding

Y. Cui and Y. Shi, South China University of Technology

PROFESSIONAL PROGRAMS

SESSION 15: HONORARY SYMPOSIUM FOR PROF. D. OLSON II

Session Chairs: Z. Yu, Colorado School of Mines and U. Duman, LAM Research

1:40 PM**Invited — A Joint Effort to Tame Marine Corrosion**

G. Wang, gMarine

2:20 PM**Joining of Aluminum Sheets by Combined Solid State and TLP Bonding Processes**

J.E. Indacochea, University of Illinois

2:40 PM**In-Situ Radiography of Hydrogen Porosity Growth and Development in Aluminum Welds**

A. Barraza, C. Cross, C. Stull, and J. Martinez, Los Alamos National Laboratory; C. Fink, The Ohio State University

3:00 PM**Prediction of Stress Corrosion Cracking in Type 304 Stainless Steel Spent Nuclear Fuel Dry Storage Canisters by Method of the Controlled Environment Modified Implant Test**

S. Gordon, X. Wu, Z. Yu, and S. Liu, Colorado School of Mines

3:20 PM**Effects of Microstructure and Residual Stress on Pitting Initiation and Growth in 304 Stainless Steel**

Z. Yu, X. Wu, S. Gordon, S. Liu, D. Olson, and Z. Shayer, Colorado School of Mines; C. Alexander, University of South Florida; E. Schindelholz and C. Bryan, Sandia National Laboratories

3:40 PM**Update on the Use of Wave Phenomena Concepts for Non-Destructive Evaluation of In-Service Welded and Clad Components**

A. Lasseigne, R. Schaffler, W. Cochran, and J. Jackson, G2MT, LLC; D. Olson, Colorado School of Mines

4:00 PM**Solidification Characterizations in Dissimilar Metal Welds**

F. Hejripour, D. Aidun, B. Helenbrook, and D. Valentine, Clarkson University

4:20 PM**Recent Investigation on the LME Cracking in Perspective of Resistance Spot Welding for Zn-Coated AHSSs**

Y. Park, Dong-Eui University

SESSION 16: WELDABILITY II

Session Chairs: M. Tumuluru, US Steel and W. Tang, Oak Ridge National Laboratory

1:40 PM**Weldability Optimization of Nickel Base Alloys for Nuclear Propulsion Applications Via Modeling and Advanced Characterization**

A. Fraser and J. DuPont, Lehigh University

2:00 PM**Characterization of Weld Hydrogen Cracking Susceptibility**

J. Moulton and A. Dinovitzer, BMT Canada; M. Quintana, Independent Consultant

2:20 PM**Effect of Strain on Stress Relief and Service Age Cracking in Austenitic Stainless Steels and Nickel Base Superalloys**

J. Duch and J. DuPont, Lehigh University

2:40 PM**High-Throughput Weldability Screening and Evaluation of High Entropy Alloys for Structural High Temperature Applications**

A. Martin; T. Estep and C. Fink, The Ohio State University

3:00 PM**Physical Simulations and Weldability Predictions**

Y. Adonyi, Letourneau University and J. Andersson, University West

3:20 PM**Seamless Flux Cored Wire Designed for High Strength Pipeline Applications**

R. Fuchs, voestalpine Bohler Welding USA

3:40 PM**The Transverse Motion Weldability Test for Solidification Cracking**

C. Xia, Jiangsu University of Science and Technology; K. Liu, Shandong University; T. Soysal and S. Kou, University of Wisconsin

4:00 PM**Mitigation of Stress Relaxation Cracking (SRC) in Thick Stainless-Steel Weldments for High Temperature Applications**

T. Pickle, X. Wu and Z. Yu, Colorado School of Mines; J. Vidal, National Renewable Energy Laboratory

4:20 PM**Gas Tungsten Arc Weldability of L-PBF Fabricated 304L Stainless Steel**

D. Gonzales, Blue Origin; S. Liu, Colorado School of Mines; D. Javernick and M. Johnson, Los Alamos National Laboratory

4:40 PM**Using Fixed-Displacement Thermal Cycling to Simulate Welding Thermo-Mechanical Histories Leading to Ductility-Dip Cracking**

S. Luther and B. Alexandrov, The Ohio State University

THURSDAY, NOVEMBER 14**SESSION 17: HIGH-ENERGY DENSITY PROCESSES**

Session Chairs: S. Tate, EPRI and A. Black, Los Alamos National Laboratory

8:00 AM**Benefits of Deep Penetration Keyhole Mode Weldments Under Reduced Ambient Pressures — Experiments and Modeling**

M. Jiang and Y. Chen, Harbin Institute of Technology; T. DebRoy, The Pennsylvania State University

8:20 AM
Effects of Element Distribution for Mechanical Properties in Al-Li Alloy Laser Welded Joints

Y. Kang, Y. Zhao, F. Wang, Q. Gao, and X. Zhan, Nanjing University of Aeronautics & Astronautics

8:40 AM
The Effects of Laser Power and the Number of Weld Layers on Residual Stresses in Ti-6Al-4V Joint Welded by Laser Beam

F. Wang, T. Yan, J. Liu, Y. Kang, and X. Zhan, Nanjing University of Aeronautics & Astronautics

9:00 AM
Physics Understanding of Electron Beam Welding and Optimization Criteria of Parameter Selection with Scanning

M. Luo, R. Hu, T. Liu, and S. Pang, Huazhong University of Science and Technology; B. Wu, AVIC Manufacturing Technology Institute

9:20 AM
Laser Welding of Additive Manufactured 304L Stainless Steel

C. Hawk and S. Liu, Colorado School of Mines; D. Javernick, Los Alamos National Laboratory

9:40 AM
Bending Property Weakening Mechanism of Laser-Welded Joints of Low-Alloy Ultrahigh Strength Steel

C. Luo, Tsinghua University

10:00 AM
Shifting Dissimilar Weld Solidification Mode Through Galvanometric Laser Scanning

D. Tung, Sandia National Laboratories

10:20 AM
Pulsed Laser Enhanced Metal Transfer of Aluminum Alloy in GMAW

Y. Jia, Beijing University of Technology

10:40 AM
Experimental Investigation on Variable Polarity Plasma Arc Welding with Pulsed Plasma Gas

F. Jiang and S. Chen, Beijing University of Technology; Z. Yan, University of Alberta

11:00 AM
The Evolution Mechanism of Porosity Induced by the Instability of Keyhole in Laser-MIG Hybrid Welding for Invar Alloy

Q. Gao, T. Yan, Y. Kang, H. Shen, and X. Zhan, Nanjing University of Aeronautics & Astronautics

11:20 AM
Experimental and Numerical Investigation on Ultrasonic Vibration Assisted Keyholing PAW Process

C. Wu, Institute of Materials Joining, Shandong University

SESSION 18: INDUSTRIAL TECHNOLOGY II

Session Chairs: X. Yue, ExxonMobil Upstream Research Company and W. Tan, The University of Utah

8:00 AM
Design & Manufacturing Industrial Scale Aluminum Parts by Vacuum Diffusion Bonding

U. Duman, LAM Research; J. Pfeiffer, C. Eckardt and P. Müller, PVA TePla

8:20 AM
Seamless Cored Wires — The Next Step of Evolution in Cored Wire Consumables

J. Stoll, voestalpine-Bohler Welding

8:40 AM
16-8-2 History, Production and Use

C. Patrick, ALS Maverick Testing Laboratories Inc.

9:00 AM
Deoxidation & Welding Implications in Super-Austenitic Grades

D. O'Donnell, Rath Gibson

9:20 AM
Improper Weld Field Fabrication Leading to Plant Shutdown

A. AlShawaf, SABIC

9:40 AM
HF Weld Process Optimization

O. Tupalo, ThermoTool Corp.

10:00 AM
How Clean is Clean?

F. Cea, RoboVent

10:20 AM
Resistance Weld Monitoring for Improved Product Quality

M. Boyle, Amada Miyachi America Inc.

10:40 AM
Framework for CAD to Part of Large-Scale Additive Metals Manufacturing in Arbitrary Directions

J. McNeil and W. Hamel, University of Tennessee-Knoxville

11:00 AM
Assessment of Electrical Power Quality for Both AC and MFDC Resistance Spot Welding Processes

O. Rosa and L. Vilarinho, Federal University of Uberlandia

11:20 AM
Weld Fume Safety Practices for Working in Enclosed Spaces

D. Beaumont, Translas Canada Industries Ltd.

AWS POSTER SESSION

The AWS Poster Session is an integral part of the AWS Professional Program. Graphic displays of technical achievements are presented for close, first-hand examination in the Poster Session. Posters present welding results and related material, which are best communicated visually, as well as research results that call for close study of photomicrographs, tables, systems architecture, or other illustrative materials.

EDUCATION SESSIONS

TUESDAY, NOVEMBER 12**9:00 AM – 4:30 PM****AWS/WELD-ED EDUCATORS CONFERENCE – USING ADVANCED WAVEFORMS IN WELDING EDUCATION****8:30 AM – 8:45 AM****Welcome / Introductions**

Monica Pfarr, Executive Director, AWS Foundation

8:45 AM – 9:15 AM**Waveform Technology in Welding Education**

Rick Polanin, AWS Vice President, Chair Education and Training Committee

9:15 AM – 10:15 AM**Advanced GMAW Waveforms****10:15 AM – 10:30 AM – BREAK****10:30 AM – 11:30 AM****Plummer Lecture****Innovative Approaches to Welding Education**

Daniel Turner, Yuba College

11:30 AM – 12:15 PM**Advanced GTAW Waveforms**

Nick Peterson, Miller Electric

12:15 PM – 1:00 PM**Lunch - Plasma Systems**

Jim Colt, Hypertherm

1:00 PM – 2:00 PM**Advanced SAW Waveforms****2:00 PM – 3:00 PM****Applications of Advanced Waveforms****3:00 PM – 3:45 PM****Career Information Resources for Educators****Fabricators and Manufacturers Association****Boy Scout Merit Badge****Summer Workshop Resources****3:45 PM – 4:00 PM****Best Practice Discussion****Weld-Ed Partners****4:00 PM – 4:15 PM****Wrap-Up & Evaluations**

Rick Polanin and Monica Pfarr

AWS SOCIETY EVENTS

MONDAY, NOVEMBER 11**7:00 AM – 8:30 AM****W30: AWS PRAYER BREAKFAST**

This year's speaker at the AWS Prayer Breakfast will be Mr. Rob Purvis. Currently, he is the AWS Director, for District 22, in Northern California, and is extremely proud of his almost 34 years of membership.

9:00 AM – 10:00 AM**AWS OPENING SESSION / ANNUAL BUSINESS MEETING**

During the AWS Opening Session and the 100th Annual Business Meeting, 2019 AWS President Dr. Thomas J. Lienert, will give the Presidential Report and Robert W. Roth, will be inducted as the AWS President for 2020. Following the induction, the 2019 Class of AWS Counselors and Fellows will be introduced. This meeting is open to all AWS members and show registrants.

10:30 AM – 11:30 AM**COMFORT A. ADAMS LECTURE**

The Comfort A. Adams lecture this year is titled "The Emergence of Quantitative Defect Acceptance Criteria as the Enabler from Dissimilar Materials Joining to Additive Manufacturing" by Dr. Pingsha Dong. Dr. Pingsha Dong is a professor of naval architecture, marine engineering, and mechanical engineering at the University of Michigan. His research and teaching interests include advanced fatigue and fracture assessment methodologies and computational methods for integrated manufacturing process simulation ranging from manufacturability to structural performance evaluations.

6:30 PM – 8:30 PM**AWS OPENING RECEPTION**

On behalf of the AWS president and first lady, we invite you to attend the AWS Opening Reception. This reception is the official kick off to FABTECH 2019 for AWS members. Attendees will have the opportunity to shake hands with our AWS officers and CEO, as well as network with AWS members from across the globe.

TUESDAY, NOVEMBER 12**12:00 PM – 2:00 PM****AWS AWARDS/AWS FOUNDATION LUNCHEON**

As the Society and the Industry it serves have grown, so has the need to recognize outstanding scientists, engineers, educators, and researchers. Join us as we celebrate their incredible accomplishments. The AWS Foundation will also recognize recent scholarship, grant, and fellowship recipients, along with major donors who support the AWS Foundation's mission to advance the welding industry through education and research. The cost for attending the ceremony is \$30 and is open to all registrants. Tickets will also be available at the door.

2:00 PM – 3:00 PM**AWS NATIONAL NOMINATING COMMITTEE – OPEN MEETING**

AWS members are requested to submit their recommendations for national officers to serve during 2021. Nominations must be accompanied by 20 copies of biographical material on each candidate, including a written statement by the candidate as to his/her willingness and ability to serve if nominated and elected.

WEDNESDAY, NOVEMBER 13

10:00 AM

THOMAS MEDAL LECTURE

This year's lecture will be given by Doug Kautz on "Developing Standards for New Technologies."

Kautz is a graduate of Colorado School of Mines.

He has worked for Rockwell International, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, and now, Leidos Inc.

10:30 AM (*Immediately following the Thomas Medal Lecture*)

AMERICAN COUNCIL OF IIW

American Council of the IIW is the meeting of the U.S. member body of the International Institute of Welding.

12:00 PM - 2:00 PM

AWS EXCELLENCE IN WELDING AWARDS CEREMONY AND LUNCHEON

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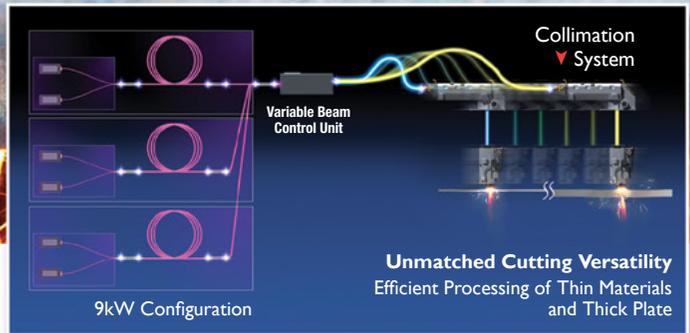
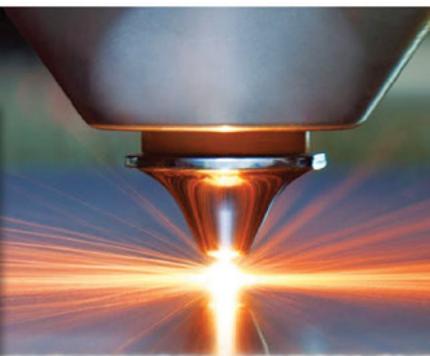
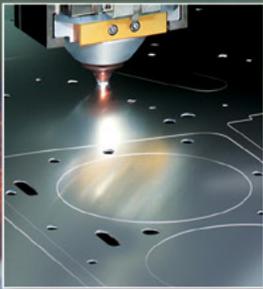
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