

# 2016 ADVANCE PROGRAM

NORTH AMERICA'S LARGEST METAL FORMING, FABRICATING, WELDING AND FINISHING EVENT

November 16-18, 2016  
Las Vegas, NV  
fabtechexpo.com



# SHARPEN YOUR EDGE

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Visit [fabtechexpo.com](http://fabtechexpo.com) for complete details. Register now!



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knowledge



fabricate  
solutions



weld  
relationships



finish  
strong

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Platinum  
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# Tungsten Electrodes

## Your Best Choice To Replace 2% Thoriated

The new tungsten electrode that outperforms other electrode types in most applications with no radioactive doping, resulting in a safer workplace environment.

***Thoriated Tungsten should be avoided!***

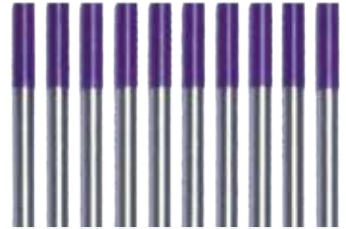
***Global Industry news from iiW***

**(56 Countries** from **5 Continents** are members of **The International Institute of Welding (iiW)** a global body for science and joining technology)

Doc. IIW-2509, recommended for publication by Commission VIII "Health, Safety and Environment" states in part:



The experts recommend that use of thoriated electrodes ceases as soon as is practicable and that, until that change is completed, special care is taken to inform workers of the hazards and to implement all the other protective measures which are detailed in the report. <http://link.springer.com/article/10.1007/s40194-014-0197-9>



Available From:



*AWS - The American Welding Society's* Safety and Health FACT Sheet No. 27 states in part:

**"HOW TO REDUCE EXPOSURE**

**Choose thorium-free tungsten electrodes** such as those containing **cerium, lanthanum, yttrium, or zirconium.**

<http://www.aws.org/technical/facts/fact-27-201405.pdf>



[www.e3tungsten.com](http://www.e3tungsten.com)

[www.astaras.com](http://www.astaras.com)



# SHARPEN YOUR EDGE

**FABTECH 2016** will provide the strategies and insight needed to hone your competitive edge for improved quality, productivity and profitability. Come broaden your perspective and experience the future of manufacturing through live product demonstrations, top-notch education programs and networking opportunities. You'll discover the tools for solving today's challenges and sharpen your skills to take on tomorrow.

**Get started today! REGISTER NOW at [fabtechexpo.com](http://fabtechexpo.com)**

## form knowledge

Gain valuable insight from more than 100 game changing sessions and special programs — taught by industry visionaries and in-the-trenches professionals.

## fabricate solutions

Discover new ways to improve quality, productivity and your bottom line as you compare equipment and solutions from more than 1,300 exhibitors.

## weld relationships

With more than 28,000 attendees and networking events on the floor and off, there's plenty of opportunity to meet new contacts and reconnect with old colleagues.

## finish strong

FABTECH is the number one place to find the latest trends and technologies. The long-term benefits of spending three days at FABTECH are enormous.

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# 3 DAYS AT FABTECH EQUALS BIG RETURNS

## FABTECH 2016 FEATURES:

- 1,300+ exhibiting companies
- 550,000+ net square feet of floor space
- 500+ new products
- 100+ educational programs
- Special events, unlimited networking opportunities and more!

### FABTECH BLUES, BREWS & BBQ



This unique outdoor meeting area located outside Central Hall, is the perfect place to take a break and make new connections.

Open during show days from 11:00 AM until show close.



## SEE IT ALL – UP CLOSE AND IN ACTION

- additive manufacturing/ 3D printing
- arc welding
- assembly
- 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 manufacturing
- 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

## FABTECH 2016 SHOW HOURS

**Wednesday, November 16**  
10:00 AM - 6:00 PM

**Thursday, November 17**  
9:00 AM - 5:00 PM

**Friday, November 18**  
9:00 AM - 4:00 PM

## LOCATION

Las Vegas  
Convention Center  
3150 Paradise Rd  
Las Vegas, NV 89109

## HOW TO REGISTER

Register today online at [fabtechempo.com](http://fabtechempo.com). Or, download a printer-friendly registration form from the web site and fax to (508) 743-9696.

## SHOW ADMISSION

Exhibit-only attendance is FREE through November 11, 2016. Beginning November 12, 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.

# MEET WITH EXHIBITING COMPANIES SHOWCASING HUNDREDS OF PRODUCTS AND UNLIMITED SOLUTIONS!

Exhibitor list by pavilion as of 07/22/16. Visit [fabtechexpo.com](http://fabtechexpo.com) for a complete exhibitor list.

## FINISHING & COATING

ACT Test Panels LLC  
Adhesive Systems Inc  
AFZ Finishing Systems  
AkzoNobel Powder Coatings  
Alconox  
Alliance Manufacturing Inc  
American Finishing Resources  
American Industrial Sales LLC  
Amberica Inc  
Anest Iwata USA Inc  
APEL International  
Argon Masking Corp  
Arkema Inc  
Asterion LLC  
Axalta Coating Systems  
AZZ Galvanizing Services  
Baril Coatings USA  
BASF Corp  
Bayco / Guspro Inc  
Bex Spray Nozzles  
Blast Cleaning Technologies  
Blasstechnik Pte. Ltd.  
Blaukman Robotics Ltd  
Bulk Chemicals Inc  
Burleigh Industries  
Calvary Industries Inc  
Caplugs  
Cardinal Paint and Powder  
Castrol  
Cataloform SA de CV  
Catalytic Combustion Corporation  
Catalytic Industrial Systems  
CFOM Canadian Finishing & Coatings Manufacturing  
Cheil Grinding Wheel USA Inc  
Chemetal US Inc  
Chemical Coaters Assoc. Int'l  
Chemtec North America LLC  
ClearClad Coatings LLC  
Clemco Danmark A/S  
Col-Met Engineered Finishing Solutions  
Columbus Industries Inc  
Combustion and Systems Inc  
Coral Chemical Co  
Custom Fabricating & Supplies  
Daifuku North America - Jervis B Webb Company  
Dan Am Company - Sata Spray Equipment  
Decoral System USA Corp  
DeFelsko Corp  
Dinamex Systems  
DMP Corporation  
Dosatron International Inc  
Doucet Machineries Inc  
Dubois Chemicals Inc  
Durr Systems Inc.  
Echo Engineering  
Eisenmann Corp  
Elcometer Inc  
Electrocoat Association, The  
Elis Paint Company  
Empire Abrasive Equipment  
Engineered Finishing Systems  
Enhancement Technologies / Migrolio Textile  
EPSI (Engineered Products & Services Inc)  
Ervin Industries  
Euroimpianti Srl  
Eurosider S.a.s.  
EXEL North America  
Express Chem LLC  
Fairsay Industrial Co Ltd  
Filtermedia SRL  
Finishing Brands  
Fischer Technology Inc  
Fluke Corporation  
Fluke Process Instruments  
Fostoria Process Equipment  
Fuji Tool Co  
Gema USA Inc  
General Automatic Transfer  
General Fabrications Corp  
George Koch Sons LLC  
Gibson Abrasive Equipment LLC  
Global Finishing Solutions  
Goff Inc  
Graco Inc  
HafcoVac  
Hammond Roto-Finish  
Hedson Technologies North America  
Henkel Corp  
Hentzen Coatings Inc  
Heraeus Noblelight LLC  
Herr Industrial Inc  
Hubbard-Hall Inc  
IFS Coatings Inc  
IGP North America LLC

## FINISHING & COATING

IHI Ionbond Inc  
Intek Corporation  
IntelliFinishing  
International Thermal Systems LLC  
IST International Surface Technologies  
Jamestown Coating Technologies  
Keyland Polymer Ltd  
Klinger Paint Co  
Kofene Corporation  
Kyzem Corporation  
LDPI Inc  
LPI Inc  
Magic Rack/Production Plus Corp  
Metal Coaters  
MetoKote Corp  
Micro-Surface Finishing Products  
Midwest Finishing Systems  
Mighty Hook Inc  
MOCAP  
NikoTrack LLC  
Nordson Corp  
Novacel  
Parker Ionics  
Paul Gardner Co  
Peening Technologies  
PEM Inc  
PhoenixTM LLC  
Plottersore  
Pneu-Mech Systems Mfg  
Poli-Film America  
Pollution Control Products Co.  
Polymer Molding Inc  
Powder Coating  
Powder Coating Institute  
Powder Parts Inc  
PPG Industries Inc  
Precision Quincy Ovens LLC  
PriceWalgren a division of George Koch Sons  
Products Finishing  
Prona Tools Inc  
Protech Powder Coatings  
Quaker Chemical Corporation  
QuickLabel Systems  
Raptor Blasting Systems  
Reading Technologies Inc  
Reliant Finishing Systems  
Rhodes Systems International Inc  
Richards-Wilcox Inc  
Roberts Sinto Corp  
Rohner  
RRAMAC Connected Systems  
Ruwac  
Sankyo Rikagaku Co Ltd  
Scalpt Nouveau  
Selas Heat Technology  
Sherwin Williams  
sia Abrasives  
Southern Systems Inc  
Spray Systems Inc  
Spray Tech/Junair  
Stanza Machinery  
SuperMax Tools  
System Technologies  
Teflon Industrial Coatings & TCI Powder  
Therma-Tron-X Inc  
Transmet Corp  
Trimac Industrial Systems  
Uni-Spray Systems Inc  
United Industries Inc  
United Surface Solutions  
V&S Galvanizing LLC  
Valmont Coatings  
Vincent Clad Metals Corporation  
Vitaflex Llc  
Vitacoat America Inc  
Vogel Industrial Coatings  
VULKAN Blast Shot  
W Abrasives  
Wagner Systems Inc  
Walker Pilot North America LLC  
Webb-Stiles Co  
Yingtan Jiangnan Copper Industry Co Ltd

## FORMING & FABRICATING

1960 Seravesi SRL  
Abas ERP  
Accurpress America Inc  
AccuStream Inc  
Advanced Machine & Engineering  
ADVANCED Motion Controls  
Aerospace Structural Research Corp  
Air Products  
Ajan Elektronik Servis Sanayi  
Ve Ticaret Ltd St  
AKS Cutting Systems Inc

## FORMING & FABRICATING

Alliance For American Manufacturing  
Alliance Machine and Engraving LLC  
Alliance Steel LLC  
Allied Machine & Engineering Corp  
Allied Powers LLC  
Allor Manufacturing Inc/  
Plesh Industries  
Alma CAM USA LLC  
Alro Steel Corporation  
Alternative Parts Inc  
AM Machinery Sales Inc  
Amada America Inc  
Ambrell Induction Heating Solutions  
American Cutting Edge  
American Photonics  
American Punch Co  
American Technical Publishers  
AMS Controls Inc  
ANDRITZ Herr-Voss Stamco Inc  
ANSYS  
AP Laser  
Apex Machine Group  
Apex Precision Technology Corp  
Armstrong Kover Kwick Inc  
ARNTZ Inc  
Arro-Mark Co LLC  
Arrowhead Manufacturers & Fabricators Assoc  
ASC Machine Tools Inc  
ASKO Inc  
ASTESA  
Athleder  
Atlanta Drive Systems Inc  
Automec Inc  
AXOOM GmbH  
Azarbond Inc  
Barton International  
Baykal Makine san ve tic A.S.  
Beck Automation  
Beckhoff Automation  
Behringer Saws Inc  
BEKO Technologies  
BELFAB  
Betenbender Manufacturing Inc  
Big Ass Solutions  
Big Steel Rack  
Black Hills Corporation  
Blasteck Inc  
Blue Water Engineering Pty Ltd  
Boldrini Srl - Roundo Division  
Bosch Rexroth Corp  
Boschert Precision Machinery Inc  
Burlin Manufacturing Inc  
Box On Demand  
Bradbury Co Inc  
Bradbury Group Australia  
Bradbury Group PuMa  
Bradbury Metal Tile Roofing Solutions  
Branner USA Inc  
Brass Knuckle Protection  
Burghardt + Schmidt GmbH  
Burns Machinery Inc  
Burns  
Burr King Manufacturing Co  
Busman Equipment  
BUTEX Bliss  
BUWV Coverings Inc  
Cystronic Inc  
C Marshall Fabrication Machinery Inc  
Cambco Inc  
Camlock Systems  
Carell Corporation  
CASTEM HOUSTON LLC  
Centricut  
CH Steel Solutions Inc  
Changzhou City Wansui Tools Works  
Chemtool Incorporated  
Chicago Slitter  
China Union Material (Shanghai) Co Ltd  
Choice Waterjet Parts  
Cidan Machinery Inc  
Cincinnati Inc  
CLARCOR Industrial Air I UAS  
Cleveland Punch & Die Co  
Cleveland Steel Tool Co  
CMF  
CMS North America Inc  
CNA Insurance  
COARE Inc  
COHERENT Inc  
Coldwater Machine Co  
COLLE-TUVE Inc

## FORMING & FABRICATING

Comblifit USA  
COMEQ Inc  
CONCOA Inc  
Controlled Automation Inc  
Cornerstone Capital Partners  
Cosen Saws  
Costa Sanders  
Cowles Tool Co  
Creafarm  
CT Kesme Teknolojileri ve mak san Tic Ltd STI  
CTD Machines  
Current Inc  
Custom Rollforming Corp  
Daiko USA Inc  
Dake Corporation  
Dalmeic Inc  
Darex LLC  
DAVI Inc  
DCM Tech Inc  
Desert Diamond Industries  
Design Data  
Design Storage & Handling Inc  
Design-2-Part  
Diamond Wire Spring  
Dimenco Coil Technologies Inc  
Dimplex Thermal Solutions  
Disston Tools  
DoALL Sawing Products  
Donaldson Torit - Donaldson Company Inc  
Doringor Cold Saws  
Douglas Steel Supply Co  
Dreistern Inc  
Durma USA  
Eagle Bending Machines Inc  
Eastern Metal Supply  
Ebbo Inc  
Eberle America Inc  
Econco/CPI  
Edwards Manufacturing Co  
EHRT North America  
Electrex Inc  
Elumatec North America Inc  
Emmergi USA Inc  
EpiLog Laser Corp  
Ercolina - CML USA Inc  
ERIEZ  
ESCO Tool Co  
Ezact JobBOSS  
Fab Shop Magazine Direct  
FAB Supply Inc  
Fabricating & Metalworking Magazine  
Fabricators & Manufacturers Association Int'l  
FabSuite LLC  
FabTron AN AVEVA Group Company  
Faccin USA Inc  
FANDELI Coated Abrasives  
FARO Technologies Inc  
Fascut Industries  
Felton Inc  
FJ Journal/Modern Metals  
Fiecp Corporation  
Firetowers  
Fladder-Hansen & Hundedol Inc  
Flexarm Inc  
Flow International Corp  
FluidForming Americas  
FormUSA  
Formlabs  
Framo Morat Inc  
FSInspection  
FST Fabrication Solutions & Technologies  
Fuji Electric Corp Of America  
Fujitsu Glovia Inc  
Gas Control Systems Inc  
Gasparini SpA  
Genius Solutions  
Gentec Electro-Optics  
Global Shop Solutions  
GMA Garnet USA Corp  
GMC Machine Tools Corp  
Gorbel Inc  
Graitec Inc  
Green Valley Manufacturing Inc  
Grinipal Fastening Systems  
GrishamWorks LLC  
GSM America Inc  
Guanghe Industry Co. Ltd  
H2O JET Inc  
Haberle / Ken Bergman & Associates LLC  
Haco-Atlantic Inc  
Hager Inc  
HAUFESLER AG Duggingen  
HAEFELDER Machine Inc  
Hako CNC Machine/Accurl (Anhui) Manufacturing Co Ltd

## FORMING & FABRICATING

Hangzhou Ailong Metal Products Co Ltd  
Hangzhou Xiangsheng Abrasive Machine Manufacturing Co. Ltd  
Han's Laser / Gromax Enterprises Corp  
Hans Weber Sales and Service Corp  
Hayes International  
HE&M Saw Inc  
Hexagon Manufacturing Intelligence  
Himalaya Machinery Pvt Ltd  
Hivin Corporation  
Hougen Manufacturing Inc  
Husky Rack & Wire  
Hyd-Mech Group Ltd  
Hypertherm Inc  
igus Inc  
il-VI Infrared  
IMSM Inc  
Inductaflex Ltd  
Industrial Assets Machinery  
Industrial Machine Trader  
Industrial Machinery Digest  
Industrial Magnetics Inc  
Industrial Market Place  
Industrial Molded Rubber Products  
Industrial Photonics, a Photonics Media publication  
Info/Sight Corp  
InnovMetric Software Inc  
Integrus Steel Software Solutions  
International Knife & Saw Inc  
International Technologies Inc  
INTERTEK Iowa Area Development Group  
IQMS  
ISB  
Iwatani Corp  
Jet Edge  
JETCAM-NestONE Solutions  
Jinan Bodor CNC Machine Co Ltd  
JMR Industrial  
JMT USA  
Jobscope ERP  
Jorgensen Conveyors Inc  
JFW Industries  
Kasto Inc  
KBS Dished Heads  
KD Capital Equipment LLC  
Keller USA Inc  
Kentek Corp Laser Safety Div  
Kern Laser Systems  
Ketek Precision Tooling Inc  
Keyfind Manufacturing Software Solutions  
Kinetic Cutting Systems Inc  
Kipp Inc  
KMT Waterjet Systems Inc  
Kolev Engineering Inc  
Laguna Tools  
Laizhou Hongyuan Bench Vise Manufacturing Co Ltd  
Lantek Sheet Metal Solutions  
LAP Laser  
Laser Experts / NUKON  
Laser Marketing Technologies LLC  
Laser Research Optics  
Laservision  
Lazer Safe Pty Ltd  
LENOX®  
Lincoln Electric Co  
LISSMAC Corp  
LS Industries Inc  
LT Ultra Precision Optics  
Lumentum  
LVD Strippit  
Machinery Dealers National Assco  
Malico Inc  
Manrepco Inc  
Manufacturing News  
Manufacturing Solutions  
Marion Die & Fixture Inc  
Marvel Manufacturing Co  
Master Magnetics  
Mate Precision Tooling  
Mazak Optonics Corp  
MB Metal Technologies LLC  
MC Machinery Systems Inc  
Measurement Systems Intl a Rice Lake Weighing Systems Brand  
Mecco  
MegaFab-Piranha-Whitney-Bertsch  
Messer Cutting Systems  
Metal Supermarkets  
Service Company Inc



## FORMING &amp; FABRICATING

MetalFinish LLC  
MetalForming Inc  
Metalux CAD/CAM Ltd  
Metalizer  
Metaltron Inc  
Metform International Ltd  
Metslaw Systems Inc  
Metreel Inc  
MG  
Midwest Tool Inc  
MIE Solutions Inc  
Millner Haufen Tool Company  
Mittler Bros Machine & Tool  
Modern Manufacturing Technologies Intl  
Mohawk Machinery Inc  
Morton Machine Works  
MPI Magnetic Products Inc  
MTC Bamieh Srl  
Muller - Load Containment Solutions  
MultiCam Inc  
Murata Machinery USA Inc  
MVD INAN Machine Tools Industry  
Nadella Inc  
Nantong Reliant Co Ltd  
Nebraska Public Power District  
New Electric  
New Hampshire Industries  
Ningbo Langyi Metal Products Co Ltd  
Nitto Kohki USA Inc  
Norlok Technology Inc  
North American Safety Products Inc.  
Nukon Lazer Makina Metal Sanayi Ve Ticaret AS  
Oasis Scientific Inc  
O'Brien Installations Ltd  
Ocean Machinery Inc  
Oerlikon Metco (US) Inc  
Ohio Laser LLC  
OMAX Corp  
OMCO  
OmegaCube Technologies  
Oncor  
Ophir Optics LLC  
Ophir Spiricon LLC  
Osai Usa  
Otto Trading Inc  
Oxford Instruments  
Pacific Press Technologies  
Packsize International LLC  
Pangborn Corporation  
Pannier Corp  
Paper-Less LLC  
Parker Hannifin - Gas Separation and Filtration  
Pat Mooney Inc  
Paulo Products Co  
PCI Gases  
Peddinghaus Corp  
PEP Technology  
Pernabro Global LLC  
Permadur Industries Inc  
Peter Prinzing GmbH  
Polyurethane Products Corp  
Precision Saws Inc  
Press Brake Safety  
Prima Power North America Inc  
Project Tool & Die Inc  
PythonX - A Lincoln Electric Company  
Qnect LLC  
Quantum Machinery Group  
Quard Ltd Lianyungang  
Radan  
RAS Systems LLC  
Raziol Zibulla & Sohn GmbH  
RDI Laser Blanking Systems  
Red Bud Industries  
Reservoirs Despres Tanks  
Retro Systems LLC  
Rhino Cutting Systems  
Richardson Electronics Ltd  
Rigidized Metals Corp  
Rocklin Manufacturing Co  
Rodman Drill  
Roller Die + Forming Co  
Roper Whitney  
Rosler Metal Finishing USA LLC  
ROUND0  
Rousseau Metal Inc  
RWM Casters Co  
Ryerson  
SafanDarley BV  
Saimen  
Sakura of America  
Salsco Inc  
Salvagnini America Inc  
Samco Machinery Ltd  
Sawblade.com  
SB Whistler & Sons Inc  
Schelling America Inc  
Schneider Electric  
Scotchman Industries Inc  
Sealeze A Unit of Jason Inc  
Semyx LLC  
Service Lamp Corp

## FORMING &amp; FABRICATING

SES Salico Finishing and Processing LLC  
Shanghai Tongtai Precision  
Aluminum Alloy Mfg Co Ltd  
Shaoxing Inbon Machinery Co LTD  
Shop Data Systems Inc  
Shoptech Software  
SICK Inc  
SigmaTEK Systems LLC  
Site Location Partnership (SLP)  
Size Metal Inc.  
SKM Industries Inc  
Slatro Tools  
Smartware Group  
SME  
Soitaab USA Inc  
SPANCO Inc  
Special Springs LLC  
SPI Lasers  
Splawn Belting Inc  
Spotti Sergio Coil Processing S.R.L.  
Spraying Systems Co  
Spyraflo Inc  
SSC Controls Co  
Stainless Structural LLC  
STAM SpA  
State of Wyoming  
Steel King Industries Inc  
Sterling Machinery Strategies Inc  
Striker Systems  
STRUMS LLC  
Superfici America Inc  
Supra Machine Tool  
Syspro  
Tapeswitch Corporation  
TECHNI Waterjet  
Technical Translation Services  
Tecnomagnetec Inc  
TESAR S.p.A.  
The Bradbury Group  
The Extractor  
The FABRICATOR®  
The M K Morse Company  
The Right Corner of Texas  
TigerStop LLC  
Timesavers LLC  
Tooling U - SME  
Toolmen Corp  
Torchmate  
Total Cut CNC  
Travelers Indemnity Company  
Tribogenics Inc  
Tri-Chem Corp  
Trilogy Machinery Inc  
Trimble  
Trim-Lok  
TRUMPF Inc  
Tseng Yih Industrial Co LTD  
UniPunch Products Inc  
United Lens Co  
Universal Drilling & Cutting Equipment  
US Industrial Machinery Co  
Vartek Machinery  
Verisurf Software Inc  
VERNON Tool  
Viking Blast & Wash Systems  
Virtek Vision International  
VSUAL ERP Software  
VKS - Visual Knowledge Share  
Vortman Corporation  
VyTek  
Walker Magnetics  
Waterjet USA LLC  
Welsper Profile GmbH  
Wemo International B V  
Wheelabrator Group  
Wila USA  
Williams Metals and Welding Alloys Inc  
Wilson Tool International  
Worthington Industries  
xTuple-World's #1 Open Source ERP  
Yangli Group Co Ltd  
YESTOOL / Alois USA  
ZEISS Industrial Metrology LLC  
Zund America Inc

## METALFORM

AAF International  
ABC Metals Inc  
Accurate Die Design Software Inc./Logopress3  
Aesthon Machine Tools Inc  
AIDA-America Corp  
Alma Machinery Co  
Almco Inc  
Almetals Company  
Anchor Manufacturing Group Inc  
Anshan Hafei Co Ltd  
Materon Co. Ltd  
AP&T North America Inc  
ART Technologies Inc  
Atago USA Inc  
Autodesk Inc

## METALFORM

AutoForm Engineering USA Inc  
Automated Tapping Systems  
Bad Dog Tools  
Balluff Inc  
Backwood Press Co  
Benteler Maschinenbau GmbH  
Bestar LLC  
BestTech Tool Corp  
Bohler Uddeholm Corp  
Brown Boggs Machine Co  
Bruderer Machinery Inc  
Buderus Edelstahl GmbH  
Cedence Inc  
Century Spring Corp  
Champion Tools  
COE Press Equipment Corporation  
Colt Automation LTD  
Dallas Industries Inc  
DAYTON Lamina Corporation  
Deere Minmetal Group Co. Ltd  
Dees Hydraulic Industrial Co Ltd  
Delta Computer Systems Inc  
DG Associates  
Digital Lumens  
Dirinler AS  
Dongguan Changhong Metal Technology Co LTD  
Dongguan Gooming Mechanical Co Ltd  
Dongguan Pinyi Automation Technology Co Ltd  
Dongguan SYH Tooling Co Ltd  
DTC Products Corporation  
Durable Superior Casters  
Dyamic  
Eagle Brass Co  
EAS Mold & Die Change Systems Inc  
ECI M1  
ECCO Inc  
Empowering Technologies  
Engineered Components  
Engineering Technology Associates Inc  
Enprotech Industrial Technologies  
Enpor Software Corporation  
Erectastep  
Erickson Metals Corp  
ESI North America  
Etna Products Inc  
Eurolink Inc  
Excelsior Hardware & Plastic Co Ltd  
F & G Tool and Die Co  
Fagor Arrasate  
Feed Lease Corp  
Fibro Inc  
Forming Technologies Inc  
FORMTEK-ME  
Fox Valley Spring Co  
Fuchs Lubricants Co  
Fuxin Jiu Feng Hydraulic Co. Ltd  
Gefran  
Giponitech Company Limited  
GoMeasur3D  
Greenerd Press & Machine Company Inc  
Gruber Tool & Die Inc  
G-W Group  
Hangsterfer's Laboratories Inc  
Hefei Metalforming Intelligent Manufacturing Co Ltd  
Heim Group, The  
Hennig Inc  
Heraeus Electronics  
Hilma Div Carr Lane Roemheld  
HINMLI CO LTD  
Hitachi Metals America  
Hong Kong Metals Manufacturers Association  
Houghton International  
Hsin Fu Chia Industrial Co Ltd  
HTM Sensors  
Hutchison Tool Sales Co  
Hydraulic as  
Industrial Innovations Inc  
Intercomp  
Interlaken Technology  
International Mold Steel  
Jarvis Cutting Tools Inc  
Jet-Set  
Ji' An RuiPengFei Precision Technology Co. Ltd  
Jiaxing Everts Hardware Manufacturing Factory  
JIT Automation Inc  
J-Tech  
Kaesser Compressors Inc  
Kaysar Ltd  
Kinfine Tool & Die Manufacturer Co. Ltd.  
Kleen Performance Products  
Komatsu America Industries LLC  
Kosmek USA  
Kovatch Castings Inc  
Kovinoplastika Loz D.D.  
Kunshan Dersun Precision Mold Co Ltd

## METALFORM

Kunshan Eagle Precision Tooling Co Ltd  
Lakeside Casting Solutions LLC  
Lathrote Specialty Metals  
Distribution  
Laufer GmbH & Co KG  
Lee Contracting Inc  
Lenzkes Clamping Tools Inc  
Liaoning Fu-An Heavy Industry Co. Ltd  
Linear Transfer Automation Inc  
Link Electric & Safety Control  
Logopress3/Accurate Die Design Software Inc.  
LSP Industries Inc  
Lucky Harvest Co Ltd  
MachyMetrics  
Macrodyn Technologies Inc  
Mayfran International Inc  
Meccanica Rossi USA Corp  
Metalloid Corp  
MetalSurfGuard  
MJC Engineering & Technology Inc  
Moeller Precision Tool  
Multipress Inc  
Neff Press Inc  
Nidec Minster Corp  
Ningbo Gaowin Machinery Manufacturing Co Ltd  
ONG Industries  
OMCG North America  
Orimec Corporation of America  
Ortech Inc  
Overton Industries  
Ozok Hidrolik Makina San Ve Tic AS  
P/A Industries Inc  
Pacesseter Systems  
Pax Products Inc  
PEE WEE GmbH  
Penn United Technologies  
PennEngineering  
Peterson Spring  
Philpott Rubber/Lankhorst Mouldings  
Plex Systems  
Pottiez America LP  
Precision Metalforming Association  
Precision Punch Corp  
Precision Stamping Products  
Precision Steel Warehouse Inc  
Prescor LLC  
Press Room Equipment Co  
Pressroom Electronics Inc  
Pronic Inc  
Proto Labs Inc  
Punch Press  
QSP Auto Parts  
Ready Technology Inc  
Ross Controls  
Ross Technology Corp  
Ruf Briquetting Systems  
Ruian Jianxin Machinery  
Manufacturing Co Ltd  
Sangiacomo Presses Americas LLC  
SB Specialty Metals LLC  
Schuler Incorporated  
schwartz GmbH  
SeilLube  
Serapid Inc  
SERVI-America Inc  
Shenyang Metal Tech Co. Ltd  
Shenzhen HuaTuanDa Technology Co Ltd  
Shenzhen Meime Tool & Die Co Ltd  
Shop Edge Software Inc  
Shop Floor Automations Inc  
ShopFloorConnect  
SIMPAC America Co Ltd  
Solar Atmospheres  
Soph Inc  
Stamtec Inc  
Starratt Company  
Stripmatic Products Inc  
Strothmann Machines & Handling GmbH  
Superior Die Set Corp  
Sutherland Presses  
Telos Global LLC  
Toledo Integrated Systems  
Topline Precision Electronics Co Ltd  
Torque Technologies Inc  
Torspec International Inc  
Tower Oil & Technology Co  
Trans-Matic  
Tru-Chem Co Inc  
TURCK Inc  
Ulbrich Stainless Steels & Special Metals Inc  
Ultratech Tool & Design Inc  
Unistar Installation Technologies  
Unist Inc  
United Aluminum Corp  
United Performance Metals  
Van-Am Tool & Engineering LLC

## METALFORM

Vaughn Manufacturing Co  
Versatility Professional Tool Storage  
Via Information Tools Inc  
VibroDynamics LLC  
Victory Tool  
Vidir Machine Inc  
Voith Turbo Inc  
Weld Systems Integrators Inc  
Wilco Inc  
Wilson Tool International  
Wintriss Controls Group LLC  
Wuxi Micro Research Precision Press Parts Co. Ltd  
Wysong  
Xinyongxu Metal & Die (shenzhen) Co Ltd  
Yih Shen Machinery Co. Ltd (YSM)  
Yong Da Precision Mould (Dong Guang) Co Ltd  
Yuyao Jingqiao Hardware Factory  
Zapp Precision Strip+D615  
Zerust Corrosion Solutions  
Zhejiang Tasleen Precision Mould Co. Ltd.

## TUBE &amp; PIPE

3D Fab Light  
5 Star Engineering and Maintenance  
Accurate Technology Inc  
Accurex Measurement Inc  
Addition Manufacturing Technologies  
Advanced Tubular Technologies Inc.  
Ajax Tocco Magnethermic Corp  
Allied Powers LLC  
Alpine Bender Machinery  
Ampco Metal Inc  
ASMAG USA Inc  
Bend Tech  
Bihler of America Inc  
BLM GROUP USA Corp  
Bollhoff USA  
Bonal Technologies Inc  
Brandt Engineering Products Ltd  
Cambridge Vacuum Engineering  
Cefla North America  
CHIYODA / MARUKA  
Clark Fixture Technologies  
CMP Automation  
COB Industries Inc  
CombiLift USA  
Comco USA Inc  
Craters & Freighters  
Crippa USA LLC  
CTA Americas  
Current Tech  
Cy Laser America LLC  
Design Storage & Handling Inc  
Diamond Saw Works Inc  
Doerrenberg Edelstahl GmbH  
Edytech Systems Inc  
eidec LLC  
Eurobro USA  
FabPro1  
FD Machinery  
Flange Armour Inc.  
Fontjune Grotnes North America  
Formdrill USA Inc  
Fromm Packaging Systems  
Gem Tool Corporation  
Gild International  
HGG Profiling Equipment BV  
Horn Machine Tools Inc  
HOSO Metal Co Ltd  
Huth - Ben Pearson International LLC  
IMC Marks LLC  
Innovative Tube Equipment Corp  
INNOVO Corp  
J & S Machine Inc  
Kent Corp  
Kistler Machines  
LANS Compressors  
Lilbacka USA  
Lomar Machine & Tool Co  
Manchester Tool & Die Inc  
Manufacturing Solutions Industries Inc  
MARUHIDE KOKI CO. LTD.  
Metalloid Corp  
Metron Inc  
Mill Masters  
New Form Tools Ltd  
Nucor Building Systems  
Nullumance Inc  
OMNI-X USA  
Overton Industries  
Pan Taiwan Enterprise  
Passline Performance  
Patterson Fan Co  
PDM Steel Service Centers Inc  
Pensa Labs / D.I. Wire  
PHI  
Pillar Induction

## TUBE &amp; PIPE

Pines Engineering  
Polytec Inc  
Production Tube Cutting Inc  
PROTEM USA LLC  
Proto-1 Manufacturing  
Qatar Steel Industries Factory  
REA Elektronik Inc  
RIDGID  
Roland Industrial Electronics LP  
Roll Machining Technologies & Solutions  
Saar Hartmetall USA LLC  
Sage Automation Inc  
Samuel Packaging Systems Group  
Samuel Packaging Systems Group  
Sanderson Machines Ltd  
Schwarze-Robitex GmbH  
Schweissen & Schneiden  
SST Forming Roll Inc  
Stanley Black & Decker Inc  
T&H Lemont  
T-DRILL Industries Inc  
Tenury America Inc  
Teradiode Inc  
Thermaxtool Corp  
Tools for Bending  
Tube & Pipe Technology  
Tube Bending Concepts Inc  
Tube Form Solutions  
Tube Works Inc  
Tubeshark and Accu-Tapper  
Tubex Technology Machinery  
Tubing Central  
Tusco Tube  
Unison LTD  
Universal Tool & Engineering  
Universal Tube & Rollform Equipment Corp  
US JaClean Inc  
Vulcan Tool Corp  
WAFIOS Machinery Corp  
Walhonde Tools Inc  
Watts Specialties Inc  
Wauseon Machine & Manufacturing Inc  
Well Engineering North America  
Winton Machine Company  
Xuyi Titan & Material Co Ltd

## WELDING

3M  
ABB Inc-Robotics  
ABICOR BINZEL  
Ace Industrial Products  
AGT Robotics  
Aimtek Inc  
Airflow Systems Inc  
Airgas Inc  
Alabama Laser  
Alfra USA LLC  
A-Line Pipe Tools Inc  
Alrcyco  
Allegra Industries  
ALM Positioners Inc  
American Innovative Manufacturing LLC  
American Society For Nondestructive Testing  
American Torch To Co Inc  
American Welding Society  
American Wire Research  
AMET Inc  
Amico Power  
Andersen Industries Inc  
Anthony Welded Products Inc  
Antra Technologies Co Ltd  
Aqualor Corp  
Arc Machines Inc  
Arc Products  
ARC Specialties Inc  
ArcLabs Welding School  
ARCON Welding Equipment LLC  
Arotic  
ASSA ABLOY Entrance Systems  
Associated Technologies Weld Mount  
ATI Industrial Automation  
Auburn Manufacturing Inc  
AUTOIT Co Ltd  
Automatic Welding Wire Company, Inc.  
Avani Environmental Intl Inc  
AVS Industries LLC  
Axelent Inc  
AXXAIR USA  
B&B Pipe & Industrial Tool  
Becken Technology Development Limited  
Beijing Essen Welding & Cutting Fair  
Beijing Metals & Minerals Corp  
BESSEY Tools North America  
Beveler USA  
Beveltools  
Blackbird Robotics North Ameri  
Bluco Corp

## WELDING

Bob Dale Gloves  
Bore Repair Systems Inc  
Boss Products LLC  
Bradford Perusst Corp  
Broco Rankin  
BTC America Corporation  
BTM Company LLC  
Buffalo Shrink Wrap  
BUG-O Systems Inc  
Bullard  
Bullard Abrasives Inc  
Canaweld Inc  
CANTESCO®  
Capital Weld Cleaners  
CEI  
CEIA USA  
CENIT North America Inc  
Cepro International  
Cerbaco Ltd  
CGW-Camel Grinding Wheels USA  
Changzhou Asia Science & Technology Co Ltd  
Changzhou Golden Globe Welding & Cutting Equipment Co Ltd  
Changzhou Huarui Welding & Cutting Equip Co Ltd  
Changzhou Shine Science & Technology Co Ltd  
Changzhou Wow International Trade Co Ltd  
Changzhou Zhengyang Welding Material Co Ltd  
Chart Inc  
Chicago Pneumatic Tool Co  
Cibo NV  
CK Worldwide  
Clamptek USA Inc  
Cloos Robotic Welding Inc  
Cold Jet  
Complete Filtration  
Computers Unlimited  
Continental Abrasives  
Controlled Automation Inc  
COR-MET INC  
Coxreels Inc  
CS Unitec Inc  
Cyl-Tec Inc  
D/F Machine Specialties Inc  
Dakota Ultrasonics  
Dateda Inc  
DBM Automatizacion SA De CV  
Dengshaha America Corp  
Diagram MSP an ITW Company  
Diamond Ground Products Inc  
DIG Automation Engineering Co Ltd  
Dino-Lite Scopes (BigC)  
Dinse Inc  
Direct Wire & Cable  
DiversiTech  
Dr Shrink Inc  
DualDraw LLC  
Dynamic Laboratories  
Dynastorch Inc  
E. H. Wachs  
Easom Automation Systems Inc  
Eisele Connectors Inc  
Elderfield & Hall / Pro-Fusion  
Electron Beam Technologies Inc  
Element Materials Technology  
Encompass Machines Inc  
Engineered Body Gear  
Enstech  
ESAB Welding & Cutting Products  
ESTA Extraction USA LP  
Fagor Automation Corp  
Fairsky Industrial Co Ltd  
FANUC America Corp  
Farina (Jinan) Weldtec & Machinery Co Ltd  
Fastenal Company  
Fein Power Tools Inc  
Filter 1  
Flame Technologies Inc  
FlashCut CNC  
Flexovit USA Inc  
Forney Industries Inc  
Fronius USA LLC  
FumeVac  
Fusion Inc  
G&J Hall Tools Inc  
G.B.C. Industrial Tools S.p.A  
Ganzhou Hongfei Tungsten & Molybdenum Materials Co LTD  
GE Schmidt Inc  
Gemtex Abrasives  
Genesis Systems Group  
Genstar Technologies Inc  
Goff's Enterprises Inc  
Golden Eagle Minmetals(Beijing) Wldg Materials Co  
Goldland Industrial Co LTD  
Goss Inc  
Gudel Inc

## WELDING

Gullico International  
Hangzhou Topwell Technology Co. Ltd.  
Harbert's Products Inc/Allied Flux Reclaiming Ltd  
Harris Products Group  
HBS Studwelding Inc  
Hebei Xinyu Welding Co. Ltd.  
Heck Industries  
Helvi S.p.A  
Henan Huamao Metal Materials Co Ltd  
Hermes Abrasives Ltd  
Heron Machine & Electric Industrial Ltd  
Heshan Wode Tungsten & Molybdenum Co Ltd  
Hisco  
HIT Welding Industry Co Ltd  
Hobart Brothers  
Hobart Institute of Welding Technology  
Hotfoil EHS Inc  
Hypertherm Inc  
IBEDA/Supereflash Compressed Gas Equipment Inc  
Ideal Welding Systems LP  
igm Robotic Systems Inc  
Imperial Systems Inc  
Industrial Air Solutions Inc  
Infra S.A. de C.V.  
Innerspec Technologies  
Innovative Product Ideas LLC  
Interactive Safety Products Inc  
Intercon Enterprises Inc  
International Welding Technologies Inc  
InterTest Inc  
IPG Photonics  
IRCO Automation Inc  
Ironworkers Management Progressive Action Cooperative Trust (IMPACT)  
IVEC Systems  
JASIC Technologies America Inc  
Jiangsu Guotai International Group Guomao Co Ltd  
Jiangsu Haoguanjia Rubber Industry Co. Ltd  
Jiangyin Xinlian Welding Equipment Co Ltd  
Jinzhou Special Welding Electrode Co Ltd  
Jishong Electric Machinery Co Ltd  
JLH Electromot Pvt LLC  
John Tillman Co  
Jouysun Abrasives Co Ltd  
JP Nissen Co  
JR Automation Technologies  
Kalas Wire Inc  
Kawasaki Robotics (USA) Inc  
Kayo Products Co Ltd  
Kemper America Inc  
Kent Stud Welding Co Ltd  
Klimavent USA LLC  
KLINGSPOR Abrasives Inc  
Kobelco Welding of America Inc  
KUKA Robotics Corporation  
Laboratory Testing Inc  
LA-CO Industries Inc  
Laiwu Taishan Sunshine Welding Materials Co Ltd  
Laser Mechanisms Inc  
Laserline Inc  
Lasermet Inc  
LaserStar Technologies Corp  
Lianyungang Orientcraft Abrasives Co Ltd  
Liberty Glove and Safety Inc.  
Liburd Automation Inc  
Lincoln Electric Co  
Linemaster Switch Corp  
LONGEVITY Global Inc  
LORD Corporation  
Luvata Ohio Inc  
Lynn Welding  
Magnatech LLC  
Magnum Reels  
Makita Industrial Tools  
Maryland Brush Co  
Mathew Dearman  
Matsumoto US Technologies Inc  
McDantim Inc  
MCR Safety  
Meltric Corp  
Mercer Abrasives  
Meta Vision Systems Inc  
MetaBot Corp  
Metal Man Work Gear Co  
Metal Science Technologies Pty Ltd  
Michigan Pneumatic Tool Inc  
Micro Air  
Midalloy  
Miller Electric Mfg Co  
MK Products Inc  
Morris Engineering Works Ltd  
Motoyuki Co Ltd

## WELDING

MSC Software Corp  
MTA-USA LLC  
Multi-Contact USA  
Murphyskirk Systems Inc  
Nation Wide Products  
National Standard  
Navus Automation  
NBM Metals  
Nederman LLC  
Nelson Stud Welding Inc  
New Fire Co Ltd  
Newland (Tianjin) Welding Wire & Metal Products Co Ltd  
Ningbo Kimpin Industrial Pte Ltd  
Ningbo Powerway Alloy Material Co Ltd  
Ningbo Qisheng Welding Tools Plant  
Ningbo Starex Welding & Cutting Tech Technologies  
nLIGHT Corp  
Norton I Saint-Gobain  
Nuova C.M.M. Srl  
OCTOPUZ Inc  
Olympus  
Optrel Inc  
OR Lasertechnology Inc  
Orbitalum Div / EH Wachs OT-AMT (Wenling) Machinery Co Ltd  
OXY DAIHEN Inc  
Oxlync Inc  
Pador Marketing Group  
Panasonic Factory Solutions Company of America  
Pandjiris Inc  
PDS Barteck Inc  
Pearl Abrasive Co  
PFERD INC  
Phoenix International Inc  
Plasma Automation Inc  
plasma USA LLC  
Plymvent Inc  
Polymet Corp  
Prazair Inc  
Precitec Inc  
Pro Spot International  
PROFAX / LENC0  
Puro Corp  
Pyro Shield Inc  
Qingdao Everbest Trading Co Ltd  
Radyne Corp  
Rasco FR  
Red Rock / Romar / MEC LLC  
Red Quality Products Inc  
Revco industries Inc (Black Stallion / BSX)  
Rex-Cut Abrasives  
Rite Hite Machine Guarding  
Robotmaster  
Robots At Work  
RoboVent  
Rolled Alloys  
RoMan Manufacturing Inc  
rose plastic USA LLLP  
Saf-T-Cart Inc  
Sandvik Materials Technology  
SanRex Corp  
Schaefer / Pinnacle Climate Technologies  
Schneidloerier Maschinenbau GmbH  
SciAps Inc  
Seltstrom Manufacturing Co  
Servo-Robot Inc  
SFA Companies  
Shandong Aotai Electric Co Ltd  
Shandong Huaye Tungsten & Molybdenum Co Ltd  
Shandong Julu Welding Co LTD  
Shanghai Gas Welding Equipment Co Ltd  
Shanghai Huawei Welding & Cutting Machine Sales Co. Ltd.  
Shanghai TAYOR Heavy Industry (Group) Co Ltd  
Shenzhen Action Welding Technology Co Ltd  
Shenzhen Donyun Welding Equipment Co Ltd  
Shenzhen Yaorong Technology Co Ltd  
Sherwin Inc  
Sideros Engineering Sri SMA Speciality Manufactured Abrasives  
SMC Corp Of America  
Southern Copper & Supply  
Southern Stud Weld Inc  
Special Metals Welding Products Co  
Spectro Analytical Instruments  
Staubli Corp  
Steelmex Tools  
Steiner Industries  
Strong Hand Tools  
Strong Hold Products  
Suhner Industrial Products Inc

## WELDING

Sumig USA Corporation  
Sunmer Manufacturing Co Inc  
SUNNS International LLC  
Superior Abrasives LLC  
Tanis Inc  
Taylor-Winfield Technologies Inc  
Team Industries Inc  
TEC Welding Products  
Techflex Inc  
TECMEN Electronics Co Ltd  
Tennessee Rand Inc  
Thermacut Inc  
Thermal Dynamics  
Thermion Inc  
Tianjin Golden Bridge Welding Materials Group  
Tianjin Xinsen Welding Materials Co Ltd  
Tip Tip USA LLC  
TJ Snow Co  
Tongling Xinxin Welding Materials Co Ltd  
Top Cat Air Tools  
Trafimet Group S.p.a.  
Trendex Information Systems Inc  
Tri Tool Inc  
TRU-FIT Products TRU-Weld  
Trystar Inc  
Tyrolit Industrial Abrasives  
UltraTech International Inc  
U-Mark Inc  
UNIARC  
Uniarc Limited  
United Abrasives Inc /SAIT  
Universal Robots USA Inc  
Uniweld Products Inc  
Up In Smoke Welding Apparel Inc  
Uvel Technologies Co Ltd  
VDM Metals USA LLC  
Veronec LLC  
Victor  
Victory Plasma Systems  
Vizion Manufacturing Solutions Inc - A Lincoln Electric Company  
voestalpine Bohler Welding USA Inc  
VSM Abrasives Corp  
Water Surface Technologies  
Washington Alloy Co  
Watts Specialties Inc  
Wayne Trail Technologies  
Weiler Corporation  
Weld Engineering Co  
Weld Pride USA For Weldbrush  
Weld-Aid Products  
Weldco Co LLC  
Weldcoa  
WeldCompur  
Welding Alloys USA  
Weldlogic Inc  
Weldobot Ltd  
Weldsafe LLC  
Welker Engineered Products  
Wendt USA LLC  
West Chester Protective Gear  
West Cryogenics Inc  
Western Enterprises  
Wire Wizard  
WireCrafters  
Wise Welding Technology & Equipment Co Ltd  
WITT Gas Controls  
Wolf Robotics LLC - A Lincoln Electric Company  
Worthington Industries Cylinders  
Wuhan Temo Welding Consumables Co Ltd  
Wuhan Welhel Photoelectric Co Ltd  
Wuxi Yincheng Science & Technology Co Ltd  
Wuzhou Aily Protect Co Ltd  
Xiris Automation Inc  
Yaskawa America Inc  
York Portable Machine Tools  
Yuyao Tianyi Special Carbon Fiber Ltd Co  
Zhejiang Changzheng Project Carbon Electrodes Co Ltd  
Zhejiang Jingwei Welding & Cutting Technology Co Ltd  
Zhejiang Jinhua Cumet Abrasive Co Ltd  
Zhejiang Juba Welding Equipments Manufacturing Co Ltd  
Zhengzhou Anxin Abrasives  
Zornort International Inc



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Section – C11108



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## WEDNESDAY, NOVEMBER 16

### OPENING KEYNOTE

## THE POWER TO WIN!

**Speaker:** Sugar Ray Leonard

**Location:** FABTECH Theater, Central Hall Lobby

**Time:** 9:00 - 10:00 AM

Boxing Legend, Successful Entrepreneur and Author, *The Big Fight: My Life In and Out of the Ring*, Sugar Ray Leonard shows us how to achieve greatness by setting our fears of the unknown aside with preparation, focus, discipline, determination and the right attitude. Using real-life stories, his message motivates audiences to be the best they can be.



Sponsored by:



### FEATURED EXPERT PANEL SESSION

## STATE OF THE INDUSTRY: POST-ELECTION ANALYSIS

**Location:** FABTECH Theater, Central Hall Lobby

**Time:** 12:30 - 1:30 PM

Our expert panel will review the 2016 election results and discuss the impact on the manufacturing industry and the business climate for capital investment, tax updates, and what it means to your business. At stake in this election is not only the White House and Congress, but control of the U.S. Supreme Court, which will decide many controversial rules long after President Obama leaves office. What does the government have in store for you in 2017?

**Panel:** **Chris Kuehl**, Managing Director, Armada Corporate Intelligence

**Ned Monroe**, Senior VP External Relations,  
National Association of Manufacturers

**Omar S. Nashashibi**, Partner, The Franklin Partnership, LLP



## WEDNESDAY, NOVEMBER 16 - THURSDAY, NOVEMBER 17

### WELDERS WITHOUT BORDERS: WELDING THUNDER TEAM FABRICATION COMPETITION

**Location:** Silver Lot

**November 16:** 9:00 AM - 5:00 PM

**November 17:** 7:00 AM - 1:00 PM



The 2016 Welding Thunder Team Fabrication Competition will be the event of the year for college and high school welding student fabricators. Students will compete to weld and cook off their fabrication project for judges as required. Awards will be given to the teams with the most accurate fabrication project as determined by judges.

**THURSDAY, NOVEMBER 17**

## WOMEN OF FABTECH BREAKFAST WITH TECH TOUR

**Speaker: Jennifer Cipolla**, Center for Additive Technology Advancement, GE

**Time:** 7:30 - 10:30 AM

**Location: FABTECH Theater**, Central Hall Lobby

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. Includes a continental breakfast and tech tour on the show floor. Price: \$15.



### FEATURED EXPERT PANEL SESSIONS

## DEVELOPMENT TRENDS IN ADDITIVE MANUFACTURING AND 3D PRINTING

**Location: FABTECH Theater**, Central Hall Lobby

**Time:** 8:30 - 9:30 AM

Our panel of experts will explore the technology and materials driving practical solutions and innovations using 3D printing. The manufacturing environment is demanding more customization and faster solutions. Using available and affordable additive manufacturing technologies can increase manufacturing efficiencies of complex products, improve performance, decrease cost and reduce waste. The expert panel will take questions and provide answers; based on real world case studies.

**Moderator: Carl Dekker**, President, Met-L-Flo, Inc.

**Panel:** **Jennifer Cipolla**, Center for Additive Technology Advancement Leader, GE  
**David Lakatos**, Chief Product Officer, Formlabs  
**Robert Henderson**, Director of Additive Manufacturing, Linear AMS  
**Bryan Crutchfield**, Vice President and General Manager, Materialise USA

## ADVANCED MANUFACTURING: CREATING COMPETITIVE ADVANTAGES FOR FABRICATORS

**Location: FABTECH Theater**, Central Hall Lobby

**Time:** 12:30 - 1:30 PM

This expert panel will discuss what it takes to remain competitive in today's environment and to succeed in the future of making things. Advanced manufacturing is high productivity, high profit, high wage, technology rich, and relatively high value added fabrication of globally competitive products that creates wealth and builds and sustains communities. Whether it be innovation, new technologies, design or educating the workforce, advanced manufacturing is the next industrial revolution to improve products or process.

**Panel:** **Diego Tamburini**, Manufacturing Industry Strategist, Autodesk  
**Jerry Foster**, CTO, Plex Systems  
**Lonnie Love**, Group Leader, Oak Ridge National Laboratory Manufacturing Demonstration Facility

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### NETWORKING EVENT

## HAPPY HOUR

**Location: Exhibit Halls**

**Time:** 3:00 - 5:00 PM

Mix and mingle with other attendees and exhibitors during Happy Hour. Held on the exhibit hall floor, Happy Hour is a great way to network with peers in a relaxed, entertaining environment while perusing the technology in exhibitor booths.

*Complimentary beverage ticket included with event registration.*

## FRIDAY, NOVEMBER 18

### RUN4MFG 5K RUN/WALK

**Location:** Town Square Las Vegas, 6605 Las Vegas Blvd.

**Registration Opens:** 6:30 AM

**5K Start Time:** 7:00 AM

Join FABTECH at the 4th RUN4MFG 5K and show your support for the future of manufacturing! Run or walk this 3.1 mile course route through Town Square Las Vegas on the south end of the famed Las Vegas Strip. It's a great way to meet up with FABTECH attendees and exhibitors while supporting a worthy cause.

**Cost\*:** \$35 includes FABTECH 2016 RUN4MFG T-shirt

\*\$50 after November 4

*Note: Run and t-shirt selection is part of online attendee registration at [fabtechexpo.com](http://fabtechexpo.com).*

### SHOP TALK WITH COUNTING CARS

**Location:** FABTECH Theater, Central Hall Lobby

**Time:** 9:00 - 10:00 AM

From the hit reality series *Counting Cars*, show stars **Kevin Mack** and "**Horny**" **Mike Henry** will be at FABTECH to talk shop with attendees, meet with fans, sign autographs and take pictures. Stop by and get to know the guys who build cool cars and bikes at Las Vegas-based custom chopper and hot rod dealer Count's Kustoms.



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# PRICING INFORMATION

## EXHIBITS ONLY

**Attendance is FREE through November 11.** Beginning November 12, 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.

## SPECIAL EVENTS

### WOMEN OF FABTECH BREAKFAST WITH TECH TOUR THURSDAY, NOVEMBER 17

Tickets for FABTECH Attendees are \$15 and include a continental breakfast.

### RUN4MFG 5K

### FRIDAY, NOVEMBER 18

Registration for FABTECH Attendees is \$35\* and includes a FABTECH 2016 RUN4MFG T-shirt. (\*After Nov. 4 registration increases to \$50.)

## EDUCATION PROGRAMS

### FINISHING, CUTTING, LASER, LEAN, ADDITIVE MANUFACTURING, WORKFORCE DEVELOPMENT, MANAGEMENT, JOB SHOP SOLUTIONS, AUTOMATION, FORMING & FABRICATING, AND STAMPING TRACKS

Packages (Buy More and SAVE!)	Member	Non-Member
1 Session	\$175	\$200
2 Sessions	\$300	\$350
3 Sessions	\$405	\$480
4 Sessions	\$500	\$600*
5 Sessions	\$600	\$725*
<b>Full Conference:</b> (6 or more sessions) <i>Includes (1) \$25.50 lunch ticket. Best Value!</i>	\$690	\$840*

**NOTE:** The rate for the 1/2-Day Laser Welding for Today's Fabricator Workshop (Session AWF100) is \$335 for Members and \$420 for Non-Members.

\*Non-Member rates for **4 or more sessions** include a one-year complimentary membership to one of the co-sponsoring associations (FMA or SME only).

## WELDING TRACK

	Member	Non-Member <sup>a</sup>
1-Day AWS Educational Sessions	\$150	\$235
1/2-Day Seminar or Workshop	\$335	\$420
1-Day Conference or Seminar	\$550	\$635
2-Day Conference or Seminar	\$775	\$860
2-Day RWMA Resistance Welding School	\$775	\$860
1-Day Professional Program	\$150	\$235
3-Day Professional Program	\$225	\$310
Student Professional Program	\$75	\$90 <sup>b</sup>
AWS Awards Luncheon	\$30	\$30
AWS Prayer Breakfast	\$10	\$10

<sup>a</sup> Non-Member price for AWS Sessions only includes a one-year AWS Individual Membership.

<sup>b</sup> Non-Member Student Professional Program price includes a one-year AWS Student Membership.

**CONFERENCE CANCELLATION POLICY:** Cancellations must be made in writing and faxed to Attn: FABTECH Conference Cancellation at (313) 425-3407 no later than November 2, 2016 to receive a full refund minus a \$50 administrative fee. Cancellations received after this date are non-refundable. Substitutions allowed.





## ABOUT THE EDUCATION PROGRAM

The Fabricators & Manufacturers Association, Int'l (FMA), SME, Precision Metalforming Association (PMA), and Chemical Coaters Association International (CCAI) cosponsor the sessions on finishing, stamping, laser, cutting, lean, management, job shop solutions, workforce development, forming and fabricating, additive manufacturing, and automation. All sessions are two hours in length, offering practical knowledge you can use right away. Sessions with Tech Tours combine classroom instruction followed by 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 and thermal spray. Events include conferences, 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 2016. Note that you can use the following key to find the programs that meet your needs.

**B Basic** – Recommended for the attendee who is new to the industry or needs a refresher on the topic.

**I Intermediate** – Designed for the attendee who already has a basic understanding of the subject matter.

**A 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 & 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 cosponsor associations and membership benefits by visiting their web sites today!



[aws.org](http://aws.org)



[fmanet.org](http://fmanet.org)



[sme.org](http://sme.org)



[pma.org](http://pma.org)



[ccaiweb.com](http://ccaiweb.com)

**WEDNESDAY, NOVEMBER 16**

TECHNOLOGY	8:00 AM – 10:00 AM	10:30 AM – 12:30 PM	1:30 PM – 3:30 PM
FINISHING		<b>C20:</b> The Basics of a Successful Powder Coating Operation <b>B</b>	<b>C30: NEW!</b> Improving Powder Coating Processes <b>I</b>
		<b>C21:</b> The Basics of a Successful Electrocoating Operation <b>B</b>	<b>C31: NEW!</b> Pretreatment Chemistries & Operation Basics <b>B</b>
		<b>C22:</b> The Basics of a Successful Porcelain Operation <b>B</b>	<b>C32:</b> Conveying Parts Efficiently <b>I</b>
CUTTING	<b>F10: NEW!</b> Waterjet Cutting Advancements and Technology <b>I</b>		
LASER	<b>F11: NEW!</b> Overview of Solid State/ Fiber Laser and Selection for Design Considerations <b>B</b>	<b>F21: NEW!</b> High Power Laser Applications <b>B</b>	<b>F31: NEW!</b> Robotic Laser Design and Concept Applications <b>I</b>
LEAN	<b>F12:</b> Lean Principle: Strategic Planning and Organizational Alignment <b>I</b>	<b>F22:</b> Lean Principle: Developing People and Processes <b>B</b>	<b>F32:</b> Lean Tools: Flow and Pull <b>B</b>
ADDITIVE MANUFACTURING		<b>F23: NEW!</b> Fundamentals of Additive Manufacturing for Fabricators <b>B</b>	<b>F33: NEW!</b> Big Area Additive Manufacturing and the Future <b>I</b>
WORKFORCE DEVELOPMENT	<b>F14: NEW!</b> Next-Gen Workforce and Conflict Management <b>B</b>	<b>F24: NEW!</b> Creating Front-line Leadership for a Performance-Based Organization <b>I</b>	<b>F34: NEW!</b> Accelerating Workforce Performance Through Best Practices in Learning and Development <b>I</b>
MANAGEMENT	<b>F15: NEW!</b> Accelerating Profitability for Successful Manufacturers <b>I</b>	<b>F25: NEW!</b> Preparing for Industry 4.0 <b>B</b>	<b>F35: NEW!</b> Marketing 101 for Fabricators <b>B</b>
JOB SHOP SOLUTIONS	<b>F16: NEW!</b> Smart Machines and Manufacturing Applications <b>B</b>	<b>F26: NEW!</b> Selecting the Right Partners & Overcoming Challenges in China for Manufacturing Businesses <b>I</b>	<b>F36: NEW!</b> Lean Principle: Design Sustainability for the Job Shop <b>I</b>
AUTOMATION	<b>F17: NEW!</b> Connected Enterprise for the Factory Floor 4.0 <b>I</b>	<b>F27: NEW!</b> Machine Monitoring and Cyber Risks for the Factory Floor <b>I</b>	<b>F37: NEW!</b> Robotic Automation Systems <b>I</b>
FORMING & FABRICATING	<b>F18:</b> Advancements in Press Brake Technology <b>A</b>	<b>F28:</b> Coil Processing: Leveling and Slitting <b>I</b>	<b>F38:</b> Roll Form Tooling Installation, Troubleshooting and Lubricants <b>I</b>
		<b>F29:</b> Press Brake Selection <b>I</b>	<b>F39: NEW!</b> Tube Fabricating 101 <b>I</b>
STAMPING	<b>S10: NEW!</b> Lubricant Application and Cleaning <b>B</b>	<b>S20: NEW!</b> Material Properties <b>B</b>	<b>S30: NEW!</b> Tool Steel and Heat Treatment <b>B</b>
	<b>S11:</b> Improving Formability <b>I</b>	<b>S21:</b> Error Proofing <b>B</b>	<b>S31:</b> In-Die Technologies <b>I</b>
<b>WELDING</b>			
SEMINARS	<b>W10:</b> D1.1 - Code Clinic . . . . .		8:30 AM – 4:30 PM
	<b>W11:</b> Crash Course of Welding Inspection Technology Seminar (WIT) . . . . .		8:30 AM – 4:30 PM
	<b>W12:</b> D17.1 - Code Clinic . . . . .		8:30 AM – 4:30 PM
	<b>W13:</b> The Why and How of Welding Procedure Specifications – Beginner . . . . .		8:00 AM – 12:00 PM
	<b>W14:</b> The Why and How of Welding Procedure Specifications – Advanced . . . . .		1:00 PM – 5:00 PM
	<b>W15:</b> The Why and How of Welding Procedure Specifications – Both . . . . .		8:00 AM – 5:00 PM
	<b>W16:</b> ASME Section IX, B31.1 & B31.3 Code Clinic – Day 1 . . . . .		8:30 AM – 4:30 PM
CONFERENCES	<b>W25:</b> Destructive and Non-Destructive Testing Conference . . . . .		8:00 AM – 5:00 PM
	<b>W26:</b> Thermal Spray Coatings - FREE . . . . .		1:00 PM – 5:00 PM
	<b>W27:</b> So You're the New Welding Engineer - Day 1 . . . . .		8:00 AM – 5:00 PM
PROFESSIONAL PROGRAM	<b>W31: Session 1:</b> Welding Metallurgy & Weldability Session A . . . . .		2:00 PM – 5:00 PM
	<b>Session 2:</b> Modeling . . . . .		2:00 PM – 5:00 PM
	<b>Session 3:</b> Arc Welding . . . . .		2:00 PM – 5:00 PM
EDUCATIONAL SESSIONS	<b>W36:</b> National Center for Welding Education and Training, Weld-Ed . . . . .		9:00 AM – 3:30 PM
SPECIAL PROGRAMS	<b>W38:</b> AWS Prayer Breakfast . . . . .		7:00 AM – 8:30 AM
	<b>W39:</b> 40th International Brazing and Soldering Symposium – FREE . . . . .		8:00 AM – 5:00 PM
	<b>Welders Without Borders:</b> Welding Thunder Team Fabrication Competition . . . . .		9:00 AM – 5:00 PM

## THURSDAY, NOVEMBER 17

TECHNOLOGY	8:00 AM – 10:00 AM	10:30 AM – 12:30 PM	1:30 PM – 3:30 PM
FINISHING	<b>C40: NEW!</b> Adding Finishing to a FAB Shop – Design Criteria <b>B</b>	<b>C50: NEW!</b> Adding Finishing to a FAB Shop – Part Cleaning & Spray Booths <b>B</b>	<b>C60: NEW!</b> Adding Finishing to a FAB Shop – Coating Application & Curing <b>B</b>
	<b>C41: NEW!</b> Efficient Paint & Powder Coating Batch Operations <b>B</b>	<b>C51: NEW!</b> Pretreatment Regulations <b>I</b>	<b>C61: NEW!</b> Hooks, Racks & Stripping Technologies <b>B</b>
	<b>C42: NEW!</b> Advanced Electrocoating Concepts <b>A</b>	<b>C52:</b> Efficient Curing with Infrared <b>B</b>	
CUTTING			<b>F60:</b> Comparative Cutting With a Tech Tour <b>B</b>
LASER	<b>AWF100: NEW!</b> Laser Welding for Today's Fabricator Workshop <b>I</b>		<b>F61: NEW!</b> Laser Joining Applications <b>I</b>
LEAN	<b>F42: NEW!</b> Lean: Lessons in Kata and Visual Workplace for Managing Fabrication <b>I</b>	<b>F52:</b> Value Stream Mapping: Addressing the Differences Between the Office and Shop Floor <b>I</b>	<b>F62:</b> Lean Tools: Quick Changeover and TPM <b>B</b>
ADDITIVE MANUFACTURING	<b>F43: NEW!</b> Laser Metal Fusion and Laser Metal Deposition for Additive Manufacturing <b>B</b>	<b>F53: NEW!</b> Design and 3D Merging Technologies for Additive Manufacturing <b>I</b>	
WORKFORCE DEVELOPMENT	<b>F44: NEW!</b> Building Teams and a Quality Culture for Team Leaders <b>B</b>	<b>F54: NEW!</b> Delegate, Influence and Motivate Employees for Effective Management <b>B</b>	<b>F64: NEW!</b> Manufacturing Workforce: Veterans, Skilled Labor and Resources for Dedicated Employees <b>B</b>
MANAGEMENT	<b>F45:</b> Create Lasting Strategic Business Value <b>I</b>	<b>F55: NEW!</b> Research Like a Pro to Grow Your Business <b>B</b>	<b>F65: NEW!</b> Leveraging Disruptive Technologies to Become the Fabricator of the Future <b>I</b>
JOB SHOP SOLUTIONS	<b>F46: NEW!</b> Software Solutions for Fabricators <b>I</b>	<b>F56:</b> Structural Fabrication Technology <b>B</b>	<b>F66: NEW!</b> A Competitive Roadmap and Strategic Plan for the Fabrication Industry <b>B</b>
AUTOMATION	<b>F47: NEW!</b> Automating the Shop Floor and Reducing Lead Time <b>B</b>	<b>F57: NEW!</b> Robotic Joining Technology <b>I</b>	<b>F67: NEW!</b> Predictable and Virtual Concepts and Design <b>A</b>
FORMING & FABRICATING	<b>F48:</b> Press Brakes for Engineers <b>B</b>	<b>F58:</b> Tube Producing/Joining <b>B</b>	<b>F68:</b> Roll Forming Basics and Justification <b>B</b>
	<b>F49:</b> Tube Laser Processing 101 <b>B</b>	<b>F59:</b> Press Brake Safeguarding: Changes to ANSI B11.3 <b>I</b>	<b>F69:</b> Punching <b>I</b>
STAMPING	<b>S40: NEW!</b> Formability Analysis <b>B</b>	<b>S50: NEW!</b> Solving Progressive Die Problems <b>A</b>	<b>S60:</b> Lubrication Technology <b>I</b>
	<b>S41:</b> Sensor Basics <b>B</b>	<b>S51:</b> Press Maintenance <b>I</b>	<b>S61: NEW!</b> ANSI Z244.1 <b>I</b>
WELDING			
SEMINARS	<b>W16:</b> ASME Section IX, B31.1 & B31.3 Code Clinic – Day 2 . . . . .	8:30 AM	– 4:30 PM
	<b>W17:</b> D1.5 – Bridge Code Clinic – 2015 . . . . .	8:30 AM	– 4:30 PM
	<b>W18:</b> Ethics Seminar for Certified Welding Inspectors – Part A. . . . .	8:00 AM	– 12:00 PM
	<b>W19:</b> What to Expect as a New Certified Welding Inspector – Part B. . . . .	1:00 PM	– 5:00 PM
	<b>W20:</b> Ethics Seminar for Certified Welding Inspectors & What to Expect as a New Certified Welding Inspector (Part A & B). . . . .	8:00 AM	– 5:00 PM
	<b>W21:</b> Better Understanding of Welding Symbols (A2.4 and A3.0) . . . . .	8:30 AM	– 4:30 PM
	<b>W22:</b> The <b>NEW</b> Visual Inspection Workshop . . . . .	8:00 AM	– 5:00 PM
	<b>W23:</b> Fundamentals of Liquid Penetrant Testing for CWI's and Quality Assurance Personnel . . . . .	8:30 AM	– 4:30 PM
CONFERENCES	<b>W27:</b> So You're the New Welding Engineer – Day 2 . . . . .	8:00 AM	– 5:00 PM
	<b>W28:</b> Distortion Control Conference. . . . .	8:00 AM	– 5:00 PM
RWMA SCHOOL	<b>W29:</b> RWMA Resistance Welding School – Day 1. . . . .	7:45 AM	– 5:00 PM
PROFESSIONAL PROGRAM	<b>W32: Session 4:</b> Plenary Session. . . . .	8:00 AM	– 10:00 AM
	<b>Session 5:</b> Battery Welding . . . . .	10:00 AM	– 12:00 PM
	<b>Session 6:</b> Honorary Symposium for Prof. T. Eagar – Session A . . . . .	10:00 AM	– 12:00 PM
	<b>Session 7:</b> Mechanical Properties . . . . .	2:00 PM	– 4:30 PM
	<b>Session 8:</b> Honorary Symposium for Prof. T. Eagar – Session B . . . . .	2:00 PM	– 5:00 PM
	<b>Session 9:</b> Sensing and Analysis . . . . .	2:00 PM	– 5:00 PM
EDUCATIONAL SESSIONS	<b>W37:</b> AWS Education Sessions . . . . .	8:30 AM	– 5:00 PM
SPECIAL PROGRAMS	<b>W40:</b> AWS Awards Luncheon. . . . .	12:00 PM	– 2:00 PM
	<b>Welders Without Borders:</b> Welding Thunder Team Fabrication Competition . . . . .	7:00 AM	– 1:00 PM

FRIDAY, NOVEMBER 18			
TECHNOLOGY	8:00 AM – 10:00 AM	10:30 AM – 12:30 PM	1:30 PM – 3:30 PM
FINISHING	<b>C70: NEW!</b> Pretreatment Performance & Analysis <b>I</b>	<b>C81: NEW!</b> Trends in Liquid Industrial Finishing <b>A</b>	
	<b>C71: NEW!</b> Presentación en Español: En Polvo Automatización, Eficiencia y Control de Procesos — Ideas para Su Compañía ( <i>Powder Coating Automation, Efficiency, and Process Control — Ideas for Your Company</i> ) <b>I</b>	<b>C82: NEW!</b> Safety First & Maintenance Predictability <b>A</b>	
CUTTING	<b>F70: NEW!</b> Technical Advancements in Plasma Cutting <b>I</b>	<b>F80: NEW!</b> Cutting Tools and Applications <b>B</b>	
LEAN	<b>F72:</b> Lean Tools: 5S Workplace Organization and Standardization <b>B</b>	<b>F82: NEW!</b> Lean Principle: Working Together with Six Sigma and Case Studies on Transformation and Continuous Improvement <b>I</b>	<b>F92: NEW!</b> Lean Principle: Transformation and Productivity <b>B</b>
WORKFORCE DEVELOPMENT	<b>F74: NEW!</b> Workforce: Funding and New Contract Labor Rules <b>B</b>		
MANAGEMENT	<b>F75:</b> Succession Planning 101 <b>B</b>	<b>F85: NEW!</b> Social Media and Branding 101 <b>B</b>	<b>F95: NEW!</b> Operating in the Manufacturing Environment: Risk Assessment and New Rules for R&D Tax Credits <b>B</b>
JOB SHOP SOLUTIONS	<b>F76: NEW!</b> Marketing and Sales for Fabricators <b>B</b>	<b>F86:</b> Sustainable and Revenue Savings for The Job Shop <b>B</b>	<b>F96:</b> Safety Strategies for Fabricators <b>B</b>
AUTOMATION	<b>F77: NEW!</b> Deburring Materials for Automated Systems <b>B</b>		
FORMING & FABRICATING	<b>F78:</b> Press Brake Tooling <b>I</b>	<b>F88:</b> Advanced Roll Forming Tooling and Line Troubleshooting <b>A</b>	
	<b>F79: NEW!</b> Steel Metal 101: Mill to Fabricator <b>B</b>	<b>F89:</b> Advanced Metals & Materials <b>A</b>	
STAMPING	<b>S70:</b> Springback Analysis <b>A</b>	<b>S80: NEW!</b> AHSS Tooling Technology <b>B</b>	
	<b>S71: NEW!</b> Modern Press Technology <b>I</b>	<b>S81:</b> In-Die Sensing <b>B</b>	
<b>WELDING</b>			
SEMINARS	<b>W24:</b> Fundamentals of Radiographic Inspection for CWI's and Quality Assurance Personnel . . . . . 8:30 AM – 4:30 PM		
RWMA SCHOOL	<b>W29:</b> RWMA Resistance Welding School – Day 2 . . . . . 8:00 AM – 4:30 PM		
PROFESSIONAL PROGRAM	<b>W33: Session 10:</b> Dissimilar Joining Applications . . . . . 8:00 AM – 12:00 PM <b>Session 11:</b> Solid-State Processes. . . . . 8:00 AM – 12:00 PM <b>Session 12:</b> Overlay and Additive Manufacturing . . . . . 8:00 AM – 12:00 PM <b>Session 13:</b> Welding Metallurgy & Weldability Session B. . . . . 1:00 PM – 4:30 PM <b>Session 14:</b> Applied Technologies . . . . . 1:00 PM – 4:30 PM <b>Session 15:</b> Advanced Controls and Systems. . . . . 1:00 PM – 4:30 PM		
SPECIAL PROGRAMS	<b>AWS Certification Exam</b> ( <i>advance application required</i> ). . . . . 7:00 AM – 6:00 PM		





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## FINISHING

## WEDNESDAY, NOVEMBER 16

## 10:30 AM - 12:30 PM

**C20: THE BASICS OF A SUCCESSFUL POWDER COATING OPERATION** **B**

This presentation will discuss the requirements of a well-designed, high-performing powder coating system from pretreatment, powder material selection to powder application and recovery to curing. Learn how to make the right choices for a system to best meet your needs.

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

**C21: THE BASICS OF A SUCCESSFUL ELECTROCOATING OPERATION** **B**

Electrocoat is the process of using an electrical field to migrate charged colloidal particles onto an oppositely charged conductive electrode. It is highly efficient and has the ability to give uniform film thickness and to coat complex objects. This session will review the two types of electrocoating processes, anodic and cathodic, as well as both epoxy and acrylic based paints and their usage along with the equipment used for an electrocoating operation.

Gary Orosz - PPG Industries, Inc. and Chad Andreae - Therma-Tron-X, Inc.

**C22: THE BASICS OF A SUCCESSFUL PORCELAIN OPERATION** **B**

This presentation reviews the recent developments in porcelain enamel materials and processing. The unique chemical bond of the glass coating to the metal leads to the excellent durability of porcelain enamel in severe environments. Several keys to successful design and manufacture of porcelain enameled parts/products will be discussed; costs and features are compared with alternative coating materials.

Cullen Hackler - Porcelain Enamel Institute

## 1:30 PM - 3:30 PM

**C30: NEW! IMPROVING POWDER COATING PROCESSES** **I****Six Root Causes for a Powder Failure**

This session will cover all the things you must look for to achieve an optimal powder coating and how to identify the root cause of a powder coating failure in the most expedient way. Learn the six potential root causes of all failures.

Rodger Talbert and Steve Houston - Col-Met Engineered Finishing Solutions

**Technological Advances in Powder Spray and Recovery Offers More Production Flexibility and Output**

This presentation will focus on the advancements in automatic coating systems resulting in improvements in system efficiency relative to the application process. An overview of the latest technology used for accurate application of powder coatings and facilitation of quick and contamination free color changeover will be provided.

Jeffrey W. Hale - Gema USA Inc.

**Powder Coating in a Manufacturing Cell**

Manufacturers are looking to implement lean technologies into their manufacturing process, but the powder coating process has been difficult because of the size and scope of typical monument systems. Using infrared and a focus on reducing time on the line, powder coating systems can be designed to work in a cellular application. Imagine reducing your conveyor length by 40%. Come learn if cellular powder coating is for you.

Marty Sawyer - Trimac Industrial Systems

**C31: NEW! PRETREATMENT CHEMISTRIES & OPERATION BASICS** **B****Operation and Troubleshooting of Your Modern Pretreatment System**

This presentation will provide fundamental information about cleaning, rinsing, pretreatment and seal technologies and how they interact with modern powder and liquid coatings systems. Learn the importance of cleaning, the critical influences of rinses, and the parameters which must be monitored for successful pretreatment. Basic troubleshooting techniques, what to do in the case of an emergency, and when to call in the experts will also be discussed.

David Schimpff and Michelle Bloomfield - DuBois Chemicals

**Novel and Efficient Options Available in a Pretreatment Process**

This presentation will discuss the successful chemistries that are currently used to remove a myriad of soils found on metal surfaces prior to applying a conversion or a paint bonding treatment. The soils can vary; from laser oxide scale on steels to silicone oils and lubricants on aluminum castings, to welding smut and residues. Learn how to concurrently apply a metal finishing pretreatment that will provide excellent paint adhesion and corrosion protection.

Sergio Mancini - BCI Surface Technologies (Bulk Chemicals, Inc.)

**C32: CONVEYING PARTS EFFICIENTLY** **I****Material Handling Solutions for the Finishing Industry**

Selecting the appropriate material handling solution when specifying a paint finishing system is one of the keys to the long term success of the system. Identifying the best solution begins with defining product size, weight, and system throughput. From there, defining the required paint process for achieving the quality requirements of the product will drive the selection decision. We will walk through many of the options you have when selecting the best conveyor solution.

Richard Goelz - Eisenmann Corp.

**Choose Your Conveyor Wisely**

This session will explore the capabilities and limitations of Monorail, Power & Free, and the Chainless Power & Free conveyors. Learn which questions to ask when designing your finishing system. Review the advantages of each and see each style of conveyor in comparison to the others. Learn which variables are important in selecting the right overhead conveyance method for your finishing system.

Joshua Gilmore – IntelliFinishing

**THURSDAY, NOVEMBER 17****8:00 AM – 10:00 AM****C40: NEW! ADDING FINISHING TO A FAB SHOP – DESIGN CRITERIA B**

This 3-session series is directed to any fabrication shop that is even remotely thinking about adding a finishing operation. The first session will provide an in-depth overview of the issues to be addressed when considering a paint or powder, manual (batch) or conveyORIZED finishing system. Key elements will be presented to make sure critical details are considered and understood. This will include evaluating production rates, cost considerations, standards and regulations, safety issues and training. In addition, specific information will be presented on the various material handling options available.

**Overview and Key Concepts**

Nicholas Liberto – Powder Coating Consultants

**Material Handling Criteria - Overhead & Carts**

Chad Andraea – Therma-Tron-X, Inc.

**C41: NEW! EFFICIENT PAINT & POWDER COATING BATCH OPERATIONS B****Building a Basic Manual Finishing System**

This presentation is for those considering the installation of a basic manual (batch) finishing system. It will cover racking of parts on carts or a manual system, paint & powder booths and ovens. Production methods and the pros and cons of each will be discussed.

Martin G. Powell – Engineered Finishing Systems

**Powder Coating with Manual Guns – Troubleshooting and Application Techniques to Optimize Your System**

With any manual powder coating application, there are different tools and techniques used to get the most out of your system. This presentation will cover which manual system works best with certain applications, best practices in troubleshooting, as well as application tips to get the most powder on your parts.

Frank P. Mohar – Nordson Corp.

**Selecting the Best Liquid Manual Application Technology**

This presentation will cover the full range of liquid application technology for a batch operation. It will include manual applicators ranging from conventional to electrostatic, including HVLP. Delivery systems will also be discussed from simple pressure pots to 2K/3K proportioned feed

systems. Advantages and limitations to each approach will be presented.

Jeff Cummins – Wagner Industrial Solutions

**C42: NEW! ADVANCED ELECTROCOATING CONCEPTS A**

This session will discuss the cutting-edge concepts to consider for electrocoating. The latest trends in electrocoat innovation necessary to meet the current anti-corrosion standards set forth by vehicle manufactures will be covered. The considerations for new substrates being used to meet lightweighting demands will be addressed. Information will be provided to operators and line designers on proper rack design and maintenance, and how to manage weldments and laser cut edges from fabrication.

James R. Gezo, Gary Orosz, and Nathan Silvermail – PPG Industries, Inc.

**10:30 AM – 12:30 PM****C50: NEW! ADDING FINISHING TO A FAB SHOP – PART CLEANING & SPRAY BOOTHS B**

The second session in the 3-session series will provide an in-depth understanding of the part cleaning process, including chemistries, manual cleaning equipment and multi-stage washer options. Attendees will learn about the critical decisions that need to be made during the evaluation and selection process, such as wastewater requirements, appropriate personal protection equipment and testing equipment options. Information about paint and powder coating booths will be presented. It will include the range of manual to automated booth technologies, including color change options. Booth sizing criteria will also be provided.

**Pretreatment Selection Criteria**

Kirk Beaster – Chemetall US, Inc.

**Pretreatment Equipment**

John Kapsner and Kelly McCabe – Pretreatment Equipment Manufacturing Inc.

**Overhead Washer**

Kevin Coursin – Engineered Finishing Systems

**Booth Criteria Selection**

Robert Hauck – Spray Systems, Inc.

**C51: NEW! PRETREATMENT REGULATIONS I****New, Safe, Vapor Degreasing Solvents for 2016 and Beyond!**

As existing solvents are regulated and new solvents emerge, it is important for the user to understand the benefits and guidelines for using these governmental approved solvents in conjunction with available cleaning systems on the market today. This presentation will provide a current comprehensive look at current EPA / OSHA / NESHAP solvent regulations; emerging NEW solvents; market trends for solvent cleaning; state-of-the-art equipment; and what is the future of solvent cleaning into the 2020's.

Joe McChesney – KYZEN

**THURSDAY, NOVEMBER 17****10:30 AM – 12:30 PM****C51: NEW! PRETREATMENT REGULATIONS (CONT'D) I****Effectively Manage Transitions from Conventional Phosphates to Advanced "Phosphorus-Free" Pretreatments**

Advanced pretreatments offer significant overall process cost savings due to reduced energy requirements, wastewater treatment and labor costs, as well as other operational expenses. This presentation will highlight Management of Change (MOC) steps to assure that the proper considerations are addressed before changes are implemented, including: the technical basis for the proposed change; impact of the change on safety and health; modifications to operating procedures; necessary time period for the change; authorization requirements for the proposed change; training of affected personnel prior to implementation; modifications to safety information and performance requirements; modifications of washers per a completed audit. Suresh Patel - Chemetall US, Inc.

**Be Nice to Mother Earth! How to Remove Oils & Soils from Industrial Wastewater and Recycle Aqueous Cleaning Solutions**

This session will cover basic oil/soil removal options and membrane filtration. In the past, capital costs, maintenance requirements and integration complexities precluded widespread membrane implementation. However, after decades of success in "end-of-pipe" wastewater treatment applications, today's membrane materials-of-construction often thrive at higher temperatures and wider pH ranges = point-of-use capabilities! These advancements, plus operator-friendly, less attention-demanding equipment and ever-decreasing H<sub>2</sub>O availability, make WWT/recycling not only practical and potentially profitable, but almost necessary.

Raymond J. Graffia, Jr. - The Arbortech Corp.

**C52: EFFICIENT CURING WITH INFRARED B**

This session will review the basics of IR including what it is, how it is produced and its characteristics. It will include all equipment sources of infrared followed by a discussion of the wide variety of IR applications, which showcase the many ways in which IR can be utilized in today's industrial environment. Learn several ways to troubleshoot with infrared technology.

John Podach - Fostoria Process Equipment, Tim O'Neal - Selas Heat Technology Company, LLC and Michael Stowe - Advanced Energy

**1:30 PM – 3:30 PM****C60: NEW! ADDING FINISHING TO A FAB SHOP – COATING APPLICATION & CURING B**

The third and final session in the 3-session series will provide a thorough understanding of the various paint and powder coating application equipment options. This will include manu-

al operations and automated systems, including gun moving and triggering options. The importance of ground from a safety and performance perspective will be presented. The complete scope of curing technologies will also be addressed for both paint and powder coatings. Critical design considerations will be discussed to understand permit requirements, overall footprint and coating performance results. This session will conclude with a "next steps" discussion to ensure a smooth transition from equipment selection to implementation.

**Liquid Application**

Steve Romer - Exel NA

**Powder Application**

Joe Glassco - Wagner Industrial Solutions

**Curing Criteria**

Ron Cudzilo - George Koch Sons, LLC

**Next Steps**

Nicholas Liberto - Powder Coating Consultants

**C61: NEW! HOOKS, RACKS & STRIPPING TECHNOLOGIES B****Get Grounded and Make Contact**

This session will cover everything from the simple "S" hook to the most complex robotic fixture. Discussion will include basic designs, best designs, material handling options and ways to improve your bottom line. We will dive into considerations for tooling designs that will not only promote performance and ergonomics but provide overall best value for the life of the fixture. Case study discussions with actual paint line improvements will be shared along with impacts of these projects with examples on how to evaluate your current paint line fixtures and how to justify new fixtures for improvements and productivity.

Bill Oney - American Finishing Resources

**Paint Stripping Methods for Hook, Rack, and Fixture Cleaning and Their Impact on Production Quality and Tooling Life**

Thermal, chemical, and thermochemical methods will be reviewed, with the pros and cons of each presented. The degree of cleanliness of hooks, racks, and fixtures achieved by the various stripping processes will be examined. Residues present on the stripped racks will be examined and evaluated. Parameters will include conductivity, adhesion, etc. to predict whether residues may be a source of coating contamination. Physical changes in the tooling as a result of repetitive exposure to various cleaning techniques will also be considered.

James Malloy and Louis Pignotti - Kolene Corp.

**In-Line Hook & Rack Stripping**

With continued pressure to improve process efficiency and reduce cost, companies are looking at new ways to maintain their hooks and racks. This is where in-line paint stripping comes into play. This session will compare the traditional hook & rack management options to this relatively new concept of streamlining the process. To prove the benefits of in-line paint stripping a real life success story of a customer who recently switched to this new process will be presented.

Larry Ensley - Hubbard-Hall



## FRIDAY, NOVEMBER 18

### 8:00 AM – 10:00 AM

#### **C70: NEW! PRETREATMENT PERFORMANCE & ANALYSIS** **I**

##### **Iron Phosphate Coating Formation and Performance**

Iron phosphate operating parameters for a proposed process cannot be arbitrarily picked. Conditions are often tested based on the fundamentals of coating formation to match a target specified coating weight. On the other hand, not all manufacturers have coating weight specifications, thus a matrix of varying conditions needs to be processed to find the optimal coating for the application. This testing is designed to explore which conditions and chemistries have the largest impact on coating formation and overall corrosion performance with two general manufacturing DTM powder paint chemistries.

Joe Caiozzo - Henkel Corp.

##### **Understanding Water Quality and Optimizing Water Usage**

The best way to maximize your first pass efficiency is to control the process inputs and operation. Water is the greatest used resource for your finishing process. This session will provide an understanding of the significance of water quality, identify water treatment options, and discuss various strategies for optimizing water usage.

Donald LaFlamme - Coral Chemical Company

##### **Case Study: Relating Routine Bath Analysis to ZrO<sub>2</sub> Corrosion Resistance**

This case study involves the application of a zirconium oxide treatment. Weekly bath samples were taken for over a year. The bath samples were taken at the same time panels were painted for B117 Neutral Salt Fog testing to determine the significance of the analytical parameters to the corrosion study results. The bath analysis included various physical parameters as well as the assessment of active product ingredients as well as contaminants. Want to see what mattered? Join us for this presentation to find out.

Ken Kaluzny - Coral Chemical Company

#### **C71: NEW! PRESENTACIÓN EN ESPAÑOL: EN POLVO AUTOMATIZACIÓN, EFICIENCIA Y CONTROL DE PROCESOS - IDEAS PARA SU COMPAÑÍA (POWDER COATING AUTOMATION, EFFICIENCY, AND PROCESS CONTROL — IDEAS FOR YOUR COMPANY)** **I**

Cómo lograr la mejor eficiencia de transferencia en la primera pasada (HTE) con el polvo correcto. Control automático de dosificación de químicos en líneas de pintura en polvo. ¿Está usted utilizando el polvo correcto? Cambio de color rápido ¿Es lo indicado para su compañía? ¿Qué tipo de curado es el indicado para usted?

Hugo Cambren - PPG Industries, Inc., Antonio Tapia - Coral Chemical Company, Rosie Orellana - Akzo Nobel, Sal Garcia - Nordson, and Antonio Gallegos - George Koch Sons, LLC

### 10:30 AM – 12:30 PM

#### **C81: NEW! TRENDS IN LIQUID INDUSTRIAL FINISHING** **A**

##### **Turn-key Paint Shop Solutions**

In today's competitive manufacturing environment, efficiency is essential to both survival and growth. Inconsistent finish quality, inefficient pumping technologies, and material degradation can quickly erode margins. Learn how simple it can be to improve the efficiency and control of your painting operation by easily automating processes within your paint shop.

Bill Heuer - Graco Inc

##### **Improvements in Liquid Coatings**

This presentation will provide detailed information on the direction for waterborne and high solids paint, including creative solutions like wet-on-wet technology. Environmental and performance characteristics for these chemistries will be discussed in detail.

Jason Bolz - Valspar

##### **Paint Testing Evaluation: Not All Paints Are Created Equal**

In the world of surface treatment, paint quality is the key to successful corrosion protection with a properly applied pretreatment. Global specification testing has shown the possibility that not all paints give the same performance even though the base chemistry class is the same. This testing is designed to compare paints from multiple sources of the same class. Three different paint classes from three different sources will be compared using one base pretreatment. These were then tested using cyclic corrosion to determine how paints of the same class perform compare to its peers.

Joe Caiozzo - Henkel Corp.

#### **C82: NEW! SAFETY FIRST & MAINTENANCE PREDICTABILITY** **A**

##### **NFPA 33 — What's New and What Affects You**

There were many changes in the 2016 current issuance of the NFPA 33: The Standard for Spray Application Using Flammable or Combustible Materials. These changes affect your company, your finishing system, and safe processes. The changes to be discussed include: scope, definitions, location in other occupancies, spray booths in basements, nitrocellulose, powered vehicles, luminaires, enclosed spray booths, updated figures, routing of exhaust ducts, recirculation of exhaust, mix rooms, protection, maintenance, powder, temporary membrane enclosures, and international fire code changes.

Martin G. Powell - Engineered Finishing Systems

## FINISHING

## FRIDAY, NOVEMBER 18

10:30 AM – 12:30 PM

**C82: NEW! SAFETY FIRST & MAINTENANCE PREDICTABILITY (CONT'D)** **A****Personal Protection Equipment – What Finishers Need to Know**

Personal Protection Equipment (PPE) is the single most important defense against operator injury. This session will discuss the PPE options to protect operators in many different coating activities. Media Blasting, Spray Wand Pretreatment, Powder Coating, and Liquid Coating operations will all be evaluated for PPE options to ensure shop personnel are properly protected to prevent injury and meet OSHA safety guidelines.

Nicholas Liberto - Powder Coating Consultants

**Preventative Maintenance**

This session will discuss the benefits, challenges, and solutions of using tiered maintenance and smart tools to help any size company or team achieve their maintenance targets. Topics include monitoring, infrared, vibration and IIoT.

Frederic Baudart - Fluke Corp.



CUTTING

## WEDNESDAY, NOVEMBER 16

8:00 AM – 10:00 AM

**F10: NEW! WATERJET CUTTING ADVANCEMENTS AND TECHNOLOGY** **I****Abrasive Recycling for Waterjet Cutting: Advancements in Technology Provide Cost Savings While Maintaining Performance**

Waterjet abrasive recycling technology can now reduce cost while maintaining the most important cutting characteristics of the abrasive material. This session will review some of the microscopic details of the cutting profile which allows the re-use of this relatively expensive and consumable costs. Learn how you can save money by stretching the use of your abrasive and at the same time put less of it in your local landfills.

Arion Vandergon - Hypertherm, Inc.

**Capabilities and Advancements in Waterjet Technology**

Waterjet has unique characteristics that have made it one of the fastest growing manufacturing technologies. This session will cover these new advancements, as well as provide a brief

overview of pure waterjet and abrasive waterjet technology, and how they compare to other machine tool processes.

Chip Burnham - Flow International Corp.

## THURSDAY, NOVEMBER 17

1:30 PM – 3:30 PM

**F60: COMPARATIVE CUTTING WITH A TECH TOUR** **B****Waterjet Cutting**

Learn about the latest in waterjet technology and applying waterjet technology to new applications, as well as how to get the most out of your waterjet and the future of waterjet technology. New advancements as well as a brief overview of waterjet technology and how they compare to other machine cutting processes will be covered.

Dave Dumas - Hypertherm, Inc.

**Laser Cutting**

This session will focus on changes in both fiber and CO<sub>2</sub> lasers, machines and automation. Cutting speeds and operating costs for both types of lasers will be covered to provide manufacturers with the knowledge to make better decisions.

Dru Schwartz - MC Machinery Systems, Inc.

**Plasma Cutting**

Discover how new advancements in plasma plate cutting technology have increased pierce thickness, allowing plasma to replace oxy-fuel in materials to 2" with faster speeds, lower costs, and often better cut quality. Recent improvements that make it possible to drill holes in plate to 1" thick with no secondary operations required will also be reviewed. Learn how these new advancements can help be more efficient, accurate and save costs with the right plasma cutting technology.

Jim Colt - Hypertherm, Inc.

## FRIDAY, NOVEMBER 18

8:00 AM – 10:00 AM

**F70: NEW! TECHNICAL ADVANCEMENTS IN PLASMA CUTTING** **I****Engineered System Optimization: The Changing Face of Technological Development in Mechanized Plasma Cutting**

Technological advances in plasma cutting technology have focused on maximizing productivity, delivering improved cut quality and consistency, minimizing costs and improving reliability. This presentation documents the most recent of these developments and specifically highlights: market trends that are driving greater focus on engineered system optimization, recent advances in this new frontier, and a brief look into the future. Information presented will enable attendees to better understand where plasma cutting is heading and why this is happening.

Phillip N. Parker - Hypertherm, Inc.

## Plasma Gouging and Marking: Getting the Most out of Air Plasma Cutting Systems Through Expanded Applications

This presentation covers technical aspects for generating a plasma arc at lower amperes for precision metal gouging, methodical technique for spot weld removal and metal separation. Additionally, it explains expanded applications for new air plasma systems to mark metal used for part identification or artistic applications, along with metal cutting and gouging. It will highlight how compressed air could save in gas cost versus using expensive gases such as argon or H5. Furthermore, it will review effects of using air or argon on metal like mild steel, stainless, and aluminum and the advantage of using one gas over the other.

Harry Mellott and Shreyansh Patel - Hypertherm, Inc.

## 10:30 AM – 12:30 PM

### F80: NEW! CUTTING TOOLS AND APPLICATIONS **B**

#### A 3-D Approach to Flat Material Cutting

The benefits of a 3-D approach allow for more accurate time estimates, ability to optimize cutter path, integration with press brakes, and much more for software that also connects to multiple process profile cutting machines, multiple axis machines, and sheet cutting machines with high-tech automation. Examples of bevel plasma tables, 5-axis waterjets, plate processing tables with milling and drilling capabilities, and multi-axis lasers which can be impacted greatly by a shift in viewpoint from 2-D to 3-D visualization will be presented.

Jandre TerreBlanche - SigmaTEK Systems

#### Today's Nesting Software: A Key Element of Your Company's Fabricating Ecosystem

This presentation will cover benefits of integrating nesting software to create a fully-functional fabrication ecosystem; with outcomes including improved material utilization, better part quality, lower operating costs, and increased productivity. The information covered will allow nesting programmers, production managers, shop foremen, and others, to return to the workplace with a vision and plan for getting more from their nesting software.

Derek Weston - Hypertherm, Inc.

#### Cutting Fluid Application in Band Saw Application

Cutting fluid (CF) helps to reduce the temperatures, remove chips and acts as a lubricant. The effectiveness of a CF largely depends on the selection of the CF, and its method of application. A comprehensive understanding of the role of CF and its method of application can be beneficial for manufacturing industries. Band saw users can benefit from having a good understanding of the CF application intricacies.

Chandra Sekhar Rakurty - The M. K. Morse Company



LASER

## WEDNESDAY, NOVEMBER 16

### 8:00 AM – 10:00 AM

#### F11: NEW! OVERVIEW OF SOLID STATE/FIBER LASER AND SELECTION FOR DESIGN CONSIDERATIONS **B**

#### High Speed Processing with Fiber Lasers, Including Material Handling and Down Stream Considerations

This session will cover the current state of fiber lasers and their expanding capabilities. Game changing technology now enables fiber lasers to cut thick materials at the same speeds and edge quality as CO<sub>2</sub> lasers. Technical advances in fiber lasers and how they are evolving at a rapid pace as they become more mainstream will also be covered. The benefits include lower operating cost, faster and more efficient processing, and expanding capabilities such as cutting copper and brass.

Jason Hillenbrand - Amada America, Inc.

#### Fiber Lasers in the High Production World

Learn how fiber lasers can increase productivity in a shop. The use of maintenance free heads, beam manipulation, mode manipulation, and automation will be addressed. The presenter will conclude with information about the remote monitoring available to the customer to keep track of production in real time.

Dru Schwartz - MC Machinery Systems, Inc.

#### Integration Considerations for Fiber Laser Selection and Process Design

This presentation covers an overview in the selection process of a fiber laser source and the considerations in the integration of that source for a successful process solution. Attendees will learn how to ask the right questions to source an appropriate fiber laser solution for their application.

Daniel Capostagno - SPI Lasers

## 10:30 AM – 12:30 PM

#### F21: NEW! HIGH POWER LASER APPLICATIONS **B**

#### The Challenge of Focus Shift in High Power Laser Material Processing

This presentation will identify critical system elements of a high power laser production system and highlight elements that can change over time and how to measure them. Periodic measurement and long-term monitoring of key laser variables, including laser output power, focused spot size, and focus spot temporal location provide the data you need to increase accuracy and optimize your process.

Gary Wagner - Ophi-Spiricon

**WEDNESDAY, NOVEMBER 16****10:30 AM – 12:30 PM****F21: NEW! HIGH POWER LASER APPLICATIONS (CONT'D) B****High-Power Diode Lasers and Innovative Industrial Applications**

Diode lasers have evolved in output power and beam quality, opening new and innovative applications for this efficient and robust laser source. With the significant power increase in the laser sources, up to 50 kW, thick material welding and large area surface treatment is now possible. Furthermore, diode lasers have become the industry standard for highly innovative applications like carbon fiber tape placement.

Oleg Raykis - Laserline Inc.

**Metal Cutting and Joining Using Next Generation Industrial Fiber Lasers**

This session will describe the key features of next generation fiber lasers, including back-reflection protection for uninterrupted processing of highly reflective materials, high-speed modulation for precise heat deposition into the work piece, and high beam quality for optimization of the laser spot size and thus processing speed and quality. Examples of how to use these lasers to increase productivity and decrease costs of production in a variety of metal fabrication applications will be provided.

Dahv Klirner - nLIGHT Corp.

**1:30 PM – 3:30 PM****F31: ROBOTIC LASER DESIGN AND CONCEPT APPLICATIONS I****New Design in Robotic Laser Equipment and Control Integration**

Improved quality and reduced processing time is a benefit of direct laser control synchronization through the robot motion controller. Other benefits include single point UIF Teach pendant operation and more integral safety interlocks. This presentation will cover the design, equipment and control integration in the automation process.

Michael Sharpe - FANUC America Corp.

**Robotic Laser Joining Concepts and Applications**

Advantages of the laser process will be presented through industry applications and examples. These include keyhole and conduction welding modes in addition to hybrid and autogenous welding. Typical challenges encountered when automating traditional weld processes include cracking mechanisms, joint access, distortion and long processing times. Many times laser can produce results not achievable with these traditional lower energy density processes.

Erik Miller - Miller Electric

**Applications of Seam Tracking: Semi-Automatic, Robotic, and Integrated Laser Solutions**

This presentation will address various means of how seam tracking technology is applied in main stream processes such as MIG, TIG, Laser, and

Sub arc as well as focus on which solutions might work best to meet the end user's needs. Varying points of view will be discussed on usage of tactile and optical seam tracking solutions and their impact to gantry based, robotic, and standalone motion control packages.

Tom Graham - Abicor Binzel

**THURSDAY, NOVEMBER 17****8:00 AM – 12:30 PM****AWF100: NEW! LASER WELDING FOR TODAY'S FABRICATOR WORKSHOP I***\$335 for Members and \$420 for Non-members*

This very extensive workshop will cover everything from basic understanding of laser welding to laser sources, systems overview, product design, implementation, material selections, hybrid welding, standards and new additive technologies. Come hear these experts share their combined experience for everything you need to know about laser welding for today's fabricator.

**Introduction to Industrial Laser Welding**

Mark Taggart - Laser Mechanisms, Inc.

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

Jean-Philippe Lavoie - Coherent

**System Overview for Laser Welding**

Mark Rodighiero - Amada Miyachi America

**Product Design Principles & Implementation Considerations**

David Havrilla - TRUMPF Inc.

**Material Selection for Laser Welding**

Geoff Shannon - Amada Miyachi America

**Hybrid Laser Welding**

Paul Denney - Lincoln Electric

**Standards for Laser Welding**

Todd Palmer - Penn State University

**Laser Welding and Additive Technologies**

Scott Poeppel - Joining Technologies, Inc.

**1:30 PM – 3:30 PM****F61: NEW! LASER JOINING APPLICATIONS I****Keys to Wire Feeding for Laser Based Processes**

This presentation will focus on varying aspects to address wire delivery methods (via drums or spools), single versus multidrive packages, delivery options of the wire at the process (tip holders, gas delivery, etc.), and communication methods for controlling the wire feeding process. Wire feed packages can range from simple to complex and the end user needs to understand how best to specify what is needed to optimize the process.

Tom Graham - Abicor Binzel

## Tri-Focal Fiber Lasers for Automotive Brazing

The presentation gives an overview of the newest technology, brazing application examples, and potential other uses as laser brazing is now a highly established process in the automotive industry for joining applications. Help eliminate where the weld seam will be visible to the customer. Case studies discussing how one manufacturer has developed a new fiber laser product that enhances laser brazing by way of a triple spot configuration, which improves process speeds and braze quality.

Michael Wiener - IPG Photonics

## Benefits of Remote Laser Joining

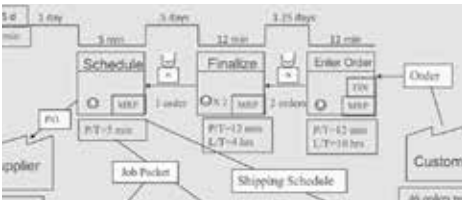
Remote laser joining installed in a high volume automotive production line has shown to reduce cycle time, floor space and robot numbers compared to resistance spot welding. Remote laser joining can achieve 3 to 4 welds per second compared to 1 weld every 3 seconds with resistance spot welding allowing higher productivity. This case study will showcase the benefits of remote laser welding and illustrate how productivity can be increased.

Scott Heckert - II-VI HIGHYAG

## Laser Joining Applications in Sheet Metal

This presentation will cover the benefits of laser joining technologies. Today a new purpose for the laser is growing in popularity amongst sheet metal manufacturers: laser welding. Known for its speed, strength, aesthetic appeal and substantially reduced production costs by way of the elimination of downstream processes, conventional welding applications are quickly being replaced by this ever-growing technology.

Brett Thompson - TRUMPF Inc.



LEAN

WEDNESDAY, NOVEMBER 16

8:00 AM – 10:00 AM

## F12: LEAN PRINCIPLE: STRATEGIC PLANNING AND ORGANIZATIONAL ALIGNMENT I

### The Roles and Responsibility of Leadership in Guiding Your Company

This presentation discusses how any company and its leaders can benefit from focusing on how to improve leadership performance. Even if you currently are not in a leadership position, you will still benefit as the concepts discussed apply in many situations and also help prepare future leaders.

Joseph M. Mazzeo - Integrated Lean and Quality Solutions, LLC

## Leading Your Business Forward: Aligning Goals, People, and Systems for Sustainable Success

Learn how to apply GPS-based methods to mobilize operations while incorporating “destination-focused” initiatives. The presenter will explain why the companies who merit the descriptor “high-performing” devote such enormous energy toward three vital components: goals, people and systems. Attendees will learn to incorporate measurable goals into their company’s daily regime and will have the management tools to maintain teams that are engaged, focused, accountable - and poised to drive results.

Korey Zawadzki - Competitive Solutions, Inc.

10:30 AM – 12:30 PM

## F22: LEAN PRINCIPLE: DEVELOPING PEOPLE AND PROCESSES B

### Build Teams on Fire: Freedom Teams and Freedom Systems

Learn how to build a team that complements your strengths and compensates for your weakness, and how to build systems to automate and optimize your performance. In this session, you will learn to identify the opportunities and challenges you and your company are facing, the most highly and best use of your time, and action plans that allow you to focus on priorities with time frames, budgets, and explicit tasks assigned to specific people and getting it done (GID) going from planning to action.

Jon Goldman - Brand Launcher

### Systems and People: Building Process Systems and Behavior for a Better Business

The presentation will cover the aspect of system design and implementation. It will discuss the need for both great systems and people, the fact that one is of limited value without the other. The alignment of systems and employees with the goals of the company is important. It is also important not to expect a system alone to bring world-class results. It is only through the right goals, systems, and people being brought together in alignment that the best results can be realized.

Kenneth G. LaBruyere - Lee Contracting

1:30 PM – 3:30 PM

## F32: LEAN TOOLS: FLOW AND PULL B

### Creating Flow in High-Variety Environments

Learn how to apply advanced lean principles to create a value stream of multiple product flows at the pull of the customer with a step-by-step process. This session also covers product family selection, Takt capability, sequenced FIFO lanes, offset scheduling, interval, and guaranteed turnaround times for shared resources. Concepts in action through real-world case studies of complex manufacturing operations that have gone beyond basic value stream mapping to create a future state that supports mixed model production will also be discussed.

Kevin Duggan - Institute for Operational Excellence



**WEDNESDAY, NOVEMBER 16****1:30 PM – 3:30 PM****F32: LEAN TOOLS: FLOW AND PULL (CONT'D) B****An Alternative to Value Stream Mapping for Implementing Lean in a High-Mix Low-Volume (HMLV) Fabrication Facility**

Value Stream Mapping (VSM) is a lean tool that may be effective for planning the implementation of lean in a low-mix high-volume (LMHV) repetitive manufacturing facility. This presentation will introduce a new computer-aided method and provide a tutorial on implementing VSM. We will map the complete set of Value Streams for a single large and complex fabricated product that consists of three major welded sub-assemblies.

Shahrukh Irani - Lean & Flexible, LLC

**THURSDAY, NOVEMBER 17****8:00 AM – 10:00 AM****F42: NEW! LEAN: LESSONS IN KATA AND VISUAL WORKPLACE FOR MANAGING FABRICATION I****Kata: Medieval Lessons in Improving Today's Lean Habits**

Learn the original intent of Kata and how this applies to drive a culture in your organization. Explore how the concept of Kata can be applied to lean tools and systems, such as 5S, pull systems, TPM, and Lean Management. Looking at the various methods of lean from the Kata perspective will open your eyes to a new level of understanding lean and how this applies to other lean tools.

Chad Vincent - American Railcar Industries

**Lean Principle: Visual Workplace for Managing Fabrication**

Participants will gain a deeper understanding of visual workplace and answer the fundamental questions of "Why do we need a visual workplace?", "What are we supposed to 'see'?", and "What do we do when we 'see it'?" When the principles are part of the method of implementing these tools, the sustained success of the tools and systems are greatly increased.

Chad Vincent - American Railcar Industries

**10:30 AM – 12:30 PM****F52: VALUE STREAM MAPPING: DIFFERENCES BETWEEN THE OFFICE AND SHOP FLOOR I**

While Value Stream Mapping's (VSM) roots are in production, a deeper look reveals that almost all of our Value Streams include non-production (support) areas such as engineering, purchasing, service and sales (to name just a few). And many more of our Value Stream don't directly touch the products we produce (think HR, finance and marketing). Many who have tried VSM in non-production areas have stumbled due to the different nature of office processes. Success in these arenas requires a different approach at most every step.

Mike Osterling - Osterling Consulting, Inc.

**1:30 PM – 3:30 PM****F62: LEAN TOOLS: QUICK CHANGEOVER AND TPM B****Create a Maintenance Culture That Yields Total Productivity**

TPM rests on 8 principles (pillars) and this overview will help you assess and plan your journey toward a more productive outcome, why TPM principles form the required foundation for a sustainable system and implement complete maintenance plans. Also learn how to develop strategies for failure analysis, and ways to improve productivity/lead change and ideas for improvement metrics that are aligned to business needs.

Bill Artzberger - Tooling U-SME

**Increase Your Production Capacity Without Additional Capital**

Learn the advantages and challenges of improving your changeover performance, including; what factors are critical for quick changeover success, the required steps to successfully implement a quick changeover program, how to maximize your results, and how to sustain your progress. Adopting a quick changeover process can improve your production capacity without additional capital investment. A faster changeover time will also allow you to be more responsive to your customers and varied product demands.

Bill Artzberger - Tooling U-SME

**FRIDAY, NOVEMBER 18****8:00 AM – 10:00 AM****F72: LEAN TOOLS: 5S WORKPLACE ORGANIZATION AND STANDARDIZATION B**

Understand how the 5S system will help you correctly apply the lean techniques through making waste visible and supporting standardized work requirements. Learn the purpose behind each step and the criteria to evaluate how well each "S" has been implemented. Get a structured format to start using this technique right away in your organization in order to create a pathway for lean implementation. Be able to start the 5S practices and permeate that throughout the organization to make it part of your company culture. Be able to start the 5S practices and permeate that throughout the organization to make it part of your company culture.

Anthony Manos - 5S Supply

**10:30 AM – 12:30 PM**

**F82: NEW! LEAN PRINCIPLES: WORKING TOGETHER WITH SIX SIGMA AND CASE STUDIES ON TRANSFORMATION AND CONTINUOUS IMPROVEMENT I**

**Lean & Six Sigma: Working Together for a Competitive Advantage**

There is a common misperception in the manufacturing world that Lean and Six Sigma are distinct and separate entities. Learning to leverage Lean and Six Sigma by involving everyone, everywhere, every day, can create a competitive advantage for manufacturers of all sizes, in all industries. The presenters will present a summary of a new white paper; Lean and Six Sigma: Working Together for a Competitive Advantage.

Jeannine Kunz - Tooling U-SME and Anthony Manos - 5S Supply

**Lean Epiphanies: A Collection of Case Studies on Continuous Improvement**

Lean Epiphanies is a collection of 50 stories from the 1000+ kaizen (continuous improvement) events that the presenter has facilitated. This multi-media session will be a lively, engaging and entertaining combination of stories, cases studies and videos describing the 'Lean' journey of a wide selection of organizations.

Gary B. Conner - Gary Conner Consulting

**Lean Journey: A Case Study**

Learn how a welding and machining company went through the first three years of the journey as a family-owned company with 450 employees and three plants. The instructors will use the lean transformation curve to demonstrate how the company went from learning to doing. Each year the senior leadership team uses the lean transformation curve to map progress. The presentation will begin where the company began, trying to keep pace with competitors and meet customers' expectations.

Jeff Sipes - Back2Basics, LLC and Richard Steel, Jr. - Miller Welding & Machine

**1:30 PM – 3:30 PM**

**F92: NEW! LEAN PRINCIPLES: TRANSFORMATION AND PRODUCTIVITY B**

**Lean Alignment & Metrics**

Learn to define performance measures and gather data to specify the problem/opportunity in your operations. Coverage will include measuring ongoing performance to confirm sustainability and how to find opportunities to leverage the improvement learning across other processes.

Jeff Sipes - Back2Basics, LLC

**Why Most Companies Fail to Create Successful Lean Transformation (and What to Do About It)**

In this session, learn to recognize the different mistakes companies make and what systems to put in place to ensure your success. Topics include: the top mistakes companies make when attempting transformation, what transformation really is, the Transformation Curve™ and how to know what stage you are in along the curve, The Strategy Execution Engagement™ process and how to keep your team excited as you continue

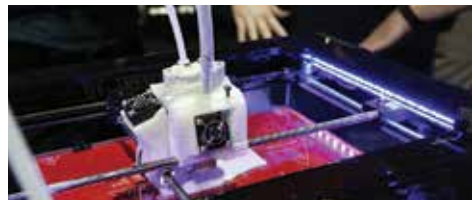
to improve your results, how to integrate best practices to ensure that you obtain and sustain results that thrill you!

Pete Winiarski - Win Enterprises, LLC

**The Missing Element of Lean Manufacturing- Improve Productivity & Reduce Injury**

This is actually a two part presentation: The first evaluates, creates, implements and maintains a customized injury prevention/productivity enhancement program, which has the worker as one with the equipment. The second is a system of communicating in such a way that new habits are truly embraced improving the corporate culture. This system produces a 100% success rate and the systems sustain them for years. The results are increased high-quality productivity, decreased waste and an average of 50% to 90% reduction in injuries.

Barry Carlin - Best Performance Systems



**ADDITIVE MANUFACTURING**

**WEDNESDAY, NOVEMBER 16**

**10:30 AM – 12:30 PM**

**F23: NEW! FUNDAMENTALS OF ADDITIVE MANUFACTURING FOR FABRICATORS B**

Review the fundamental practices for modeling and fabricating parts with AM. Learn about the latest equipment and material cost-benefit analyses taking place in the industry. New design and software rules and limitations, intellectual property issues and the difficulties associated with business case justifications will be discussed.

Carl Dekker - Met-L-Flo Inc.

**1:30 PM – 3:30 PM**

**F33: NEW! BIG AREA ADDITIVE MANUFACTURING AND THE FUTURE I**

**Question Everything: BAAM (Big Area Additive Manufacturing) Technology and the Future of Additive Manufacturing**

Presenters will cover the basics of 3D printing, Big Area Additive Manufacturing, how 3D printing has grown from little plastic parts to building houses and cars, the principles of additive manufacturing and how they might be holding back the industry, material properties and consideration, and the use of mass collaboration to accelerate development. Includes case studies.

Rick Neff - Cincinnati Inc. and Lonnie Love - Oak Ridge National Laboratory Manufacturing Demonstration Facility

**THURSDAY, NOVEMBER 17****8:00 AM – 10:00 AM****F43: NEW! LASER METAL FUSION AND LASER METAL DEPOSITION FOR ADDITIVE MANUFACTURING B****Powder Based Additive Manufacturing Methods LMF/LMD - Comparison, Requirements and Applications**

This presentation will introduce the process basics, capabilities and limitations and the required knowledge and equipment to newcomers in the additive manufacturing world. In the field of AM with metal powders the methods Laser Metal Fusion and Laser Metal Deposition are widely used. Each process offers a variety of advantages as well as limitations. Given the high complexity of the medium used, metal powders and lasers, the complexity of the entire process chain requires users to have a broad materials, software and process knowledge to be successful and competitive.

Frank Geyer - TRUMPF Inc.

**Metal Laser Powder Bed Fusion at LLNL**

The development and optimization of laser powder bed fusion is driven by the opportunity to produce net-shape, fine-featured, complex architectures with high material efficiency. Challenges inherent in process optimization are both powder-dominated and materials-specific. Hear our approach towards process optimization through a broad discussion, with the introduction of case studies performed at Lawrence Livermore National Laboratory.

Amanda S. Wu and Holly Carlton - Lawrence Livermore National Laboratory

**Designing for the Direct Metal Laser Sintering (DMLS) Process**

Direct metal laser sintering (DMLS) is an emerging additive manufacturing (AM) technology that has great potential to change the way parts are manufactured. To achieve this, we must put aside conventional manufacturing design rules and look for ways to take advantage of the AM process. Some benefits of AM lead to reduction of weight and quicker assembly times. Complex features and internal channels that are impossible to machine can also be created. It is important to understand the limitations of the process, such as surface finish, internal features, stresses, and support requirements, in order to design accordingly. Knowing how to work around these limitations will open up many design opportunities.

Jonathan Bissmeyer - Proto Labs

**10:30 AM – 12:30 PM****F53: NEW! DESIGN AND 3D MERGING TECHNOLOGIES FOR ADDITIVE MANUFACTURING I****3D Printing Metal at Room Temperature**

Ultrasonic Additive Manufacturing (UAM), a rather new 3D printing technology, uses ultrasonic energy to produce metallurgical bonds between layers of metal foils. This session covers recent advancements in 3D printing of metals and how

this has enabled one hundred percent dense metal parts to be produced at room temperature.

Mark Norfolk - Fabrisonic

**Can OEM's Replace Machined Components with Additive Manufacturing?**

The steps to convert a part or an assembly from a machined metal part to a plastic part requires the use of advanced design tools and methodology to guarantee performance, increase functionality and make it a more attractive alternative to the conventional machined part. The presenter will share with you a number of inspiring applications and case studies that will help you see a practical use of the technology in your day to day design work.

Tharwat Fouad - Anubis 3D

**From Prototype to Production, How Will Desktop 3D Printers Be Used in 2017?**

Traditionally, designing components for the industry with the help of 3D printers meant investing vast sums of money for prototypes that rarely offered any scope for modification. With desktop 3D printers reaching performance benchmarks of industrial 3D printers in quality, reliability and accuracy, the landscape of installed 3D printers is changing rapidly. We'll take a look at what's happened in 3D printing this year and see where we are headed next year, as desktop 3D printers enable a wide variety of use cases and areas, from manufacturing, to fabrication, to design.

Dávid Lakatos, Formlabs

**WORKFORCE DEVELOPMENT****WEDNESDAY, NOVEMBER 16****8:00 AM – 10:00 AM****F14: NEW! NEXT-GEN WORKFORCE AND CONFLICT MANAGEMENT B****Managing a Multi-Generational Workforce**

This session reveals straightforward strategies to bridge the gap between employees who are 40 years apart. Understand the expectations of Boomers, Xers, and Yers and avoid becoming a referee between bickering employees, utilize the power of recognition across generational lines to create an effective workforce and prosper.

Jon Goldman - Brand Launcher

**How Effective Leaders Manage Conflict**

Through a self-assessment, case studies, and participant interactions, techniques for dealing with difficult behaviors, conflicts and situations, while creating a culture of transparency and accountability, will be shared. Learn to address inappropriate behaviors with less drama, greater objectivity, and positive impact, identify their dominant con-

flict management style and assess its impact on their teams' productivity, performance, and profits.

Liz Weber - Weber Business Services, LLC

**10:30 AM - 12:30 PM**

**F24: NEW! CREATING FRONTLINE LEADERSHIP FOR A PERFORMANCE BASED ORGANIZATION I**

**Finding Your Leadership Style to Lead a Performance Based Organization**

This presentation will discuss what defines a performance based organization and how to improve accountability and responsibility. With a focus on improving performance, leaders will also be able to develop their own personal leadership style and apply the concept of situational leadership for success.

Joseph M. Mazzeo - Integrated Lean and Quality Solutions, LLC

**Something Is Going to Change Around Here — The Five Stages to Leveraging Your Leadership**

Through client examples, exercises, and assessments, the presenter will share The Five Stages of Focused Leadership Development™ model. This model helps managers identify why their teams under-perform and depend upon them so heavily. Attendees may take a free on-line leadership assessment to learn their current stage of leadership and receive a free virtual coaching program after the event to help them continue their learning.

Liz Weber - Weber Business Services, LLC

**1:30 PM - 3:30 PM**

**F34: NEW! ACCELERATING WORKFORCE PERFORMANCE THROUGH BEST PRACTICES IN LEARNING AND DEVELOPMENT I**

This presentation will discuss best-in-class Worker Qualification Programs and other attributes that create High Impact Learning Cultures, which will meet developmental requirements for the new manufacturing workforce. Return on investment of learning and how the cost of learning programs can be justified to leadership will also be discussed.

John Hindman - Tooling U-SME

**THURSDAY, NOVEMBER 17**

**8:00 AM - 10:00 AM**

**F44: NEW! BUILDING TEAMS AND A QUALITY CULTURE FOR TEAM LEADERS B**

**Driving a Built-In-Quality Culture**

Lean manufacturing focuses on adding value to products and services, identifying and reducing waste, and improved support for workers across the organization. A key component of lean focuses on improving quality with the stated objective of: "Do not Accept/Build/Ship a Defect". True gains in quality are ultimately achieved when an organization embraces and works toward a Built-in-Quality culture. This session will explain the concept of BIQ and what is needed to achieve it in any organization.

Joseph M. Mazzeo - Integrated Lean and Quality Solutions, LLC

**Team Building for Fabricators**

Leadership has to ensure success happens by creating the right teams working in the right atmosphere. We trust that this blend of team expertise will lead to original ideas and solutions that can be profitably implemented into our businesses. Explore strategies for team building to help fabricators find innovative solutions to the issues they face, and consider several ways team leaders can manage cross-functional, intra-departmental and even multi-cultural team situations to realize meaningful business results.

Cullen Hackler - Porcelain Enamel Institute

**10:30 AM - 12:30 PM**

**F54: NEW! DELEGATE, INFLUENCE AND MOTIVATE EMPLOYEES FOR EFFECTIVE MANAGEMENT B**

**Delegation Strategies to Help You Be a More Effective Manager**

Managing people is one of the most challenging and rewarding roles. Most managers have had little formal training for this critical role. This session will share some proven techniques to help us be more effective delegators. In addition, we will address questions such as: Why do we hesitate to delegate? Why do we take on too much work ourselves? How can I find the time to train someone when it is faster and easier to do it myself?

Mark Ernst - Ernst Enterprises

**How to Create Employee Engagement**

This session details how members can create employee engagement. You'll learn: How to make your employees' work like a game. How to spell out what each employee and department needs to do on a daily, weekly, monthly basis to be pulling their weight to hit the targeted profit levels and bonuses. How to tie pay to performance throughout your company, how to create accountability and record-breaking performance.

Charles W. DeBettignies - Gainsharing Inc.

**Employee Engagement: How to Harness Business' Most Underestimated Performance Driver**

This session aims to help leaders demystify the complex undertaking that is understanding and affecting the behaviors and attitudes that drive engagement and underpin company culture with real world examples of driving change in context. Key topics include: How leaders get motivation wrong, seeing change through the process to the organizational structure, moving past haphazard attempts to address engagement to involve your people.

Martin Gauvin - Macresco

**Successfully Influence and Motivate Worker Behavior**

You will learn: A simple 6 step system to influence and motivate desired behaviors, how to keep the new habits alive as long as you want, and how to influence workers to influence positive behavior in each other. If you can influence the workforce to learn, understand, remember, and do what you want them to do, you will have less stress in the workplace, less injuries, and greater productivity.

Barry Carlin - Best Performance Systems

## THURSDAY, NOVEMBER 17

1:30 PM – 3:30 PM

**F64: NEW! MANUFACTURING WORKFORCE: VETERANS, SKILLED LABOR AND RESOURCES FOR DEDICATED EMPLOYEES** **B**

### The World at Work – Engaging Engineering Talent with Global Insights from Kelly Services

The labor landscape has changed considerably over the past few years, is your organization keeping pace? You'll gain insight into what engineering talent is looking for from employers, how to get on board with the concept of work-life design, the top soft skills to consider when hiring and why the first 15 minutes of an interview is critical.

Joseph W. Lampinen - Kelly Services Inc.

### Workshops for Warriors Is Rebuilding America's Advanced Manufacturing Workforce, One Veteran at a Time!

Workshops for Warriors manufactures manpower by providing quality training, educational programs and opportunities to earn third party nationally recognized credentials in advanced manufacturing fields. The advanced manufacturing industry is suffering from the shortage of a skilled workforce. Let us provide your organizations with trained and certified manpower using the best raw material in the world...Veterans. We are all responsible for maintaining our countries national security and by providing quality education and training we will be able to rebuild America's advanced manufacturing industry, together.

Hernán Luis y Prado - Workshops for Warriors

### Skilled Labor: How to Create an In-House Manufacturing Skills Program

This presentation will detail the steps necessary to reverse and establish an effective program for manufacturing skills development. The current crisis in manufacturing skills can be seriously corrected by establishing an internal Manufacturing Skills Training Academy. By offering an intensive 90 days of specific skills training, a manufacturing company can take a new employee, with the requisite minimum skills - into a specialty position in metal stamping, fabricating or welding requiring precision skills.

George Keremedjiev - Tecknow Education Services, Inc.

### How to Find Experienced, Credentialed and Dedicated Employees...Grow Your Own!

We have found an abundance of entry-level work force for industrial maintenance and welders, yet a shortage of experienced folks who have put in the time to gain the knowledge and experience that only being on-the-job can provide. The question becomes, how can we combine these two? We grow them ourselves; learn how in this interactive session.

Jeffrey B. Cutchin and Curtis Marshal - Olney Central College

## FRIDAY, NOVEMBER 18

8:00 AM – 10:00 AM

**F74: NEW! WORKFORCE: FUNDING AND NEW CONTRACT LABOR RULES** **B**

### Want It? Get It! Grant Funding Strategies

The strategies learned in this session will be on industrial and educational organizations. Attendees will learn how to position programs for grant funding through well-designed, well-written and highly competitive grant proposals. We will focus on current trends in grant funding for education, how to research organizations and approach funders, and provide funders with what they are really looking for. Learn how to incorporate evaluations into your grant proposal and also what's coming in 2017 in grant funding.

Sarah Evans - Lincoln Electric and Robert Visdos - Workforce Institute, Inc.

### Closing the Job Gap: Demystifying Relationships Between Employers and Schools

Employers want and need to establish relationships with their local community and technical colleges in order to have a reliable training and recruiting resource, but they often don't know how to get started. This presentation will focus on practical advice from the point of view of educators that will help employers take the right steps. Giving guidance on all types of training, providing insight into how to define what you need, share ideas about pre-training assessment, and how to pay for the training you need.

Nick Graff - Dallas County Community College District and Stuart Templeton - Harper College

### Labor Management and the Impact of the NLRB's New Joint-Employer Liability Rules

In 2015, the National Labor Relations Board ("NLRB"), the federal agency responsible for regulating labor law, issued a controversial landmark decision that has the potential to upend traditional labor relations. Understand the nature of the traditional NLRB joint-employer test. Learn how changing practices in the use of temporary workers, contract employees, and independent contractors, and growing activity in the on demand or 'gig' economy.

Richard Alaniz, JD - Alaniz Schraeder Linker Farris Mayes, L.L.P.

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## MANAGEMENT

## WEDNESDAY, NOVEMBER 16

8:00 AM – 10:00 AM

**F15: NEW! ACCELERATING PROFITABILITY FOR SUCCESSFUL MANUFACTURERS** **I**
**A Roadmap to Revive, Accelerate and Win the Profitability Journey**

Review core business assessment tools and solid strategies for financial, product or competitive benchmarking. This session will provide strategies and tools to move up the curve by managing expectations. A copy of the presenter's book "Accelerating Profitability" will be provided as a take away.

Alan Lund - CORE Business Management Solutions

**Building Greatness: Leading Your Organization to Profitability**

Learn proven strategies to leading a profitable organization and building greatness while improving profitability. It will allow each organization, regardless if it is tech, manufacturing, trucking, or software, to use matrixes that will help an organization succeed & flourish. Leave the session rejuvenated & excited to succeed.

Mark Hamade - Vivaris Ltd.

10:30 AM – 12:30 PM

**F25: NEW! PREPARING FOR INDUSTRY 4.0** **B**
**How to Prepare Your Business for Industry 4.0**

Industry experts are considering a range of technology advances, like Big Data, the Internet of Things and value chain integration, as components of industry 4.0. In this session, manufacturers will learn how to maximize the opportunities provided by these innovations, from the back office to the shop floor. To further demonstrate, findings of a survey in collaboration on the current IT infrastructure of manufacturers will be shared.

David Lechleitner - Epicor Software Corp.

**Winning Management Buy-In for a New Digital Shop Floor Management System**

This session will benefit discrete manufacturers with complex manufacturing environments where accurate and timely communications of requirements is critical to on-time delivery and streamlining processes. We will share our experiences and perspectives for communicating across your company to the various management roles about the very real opportunities and reasonableness of having heightened expectations of manufacturing execution systems (MES).

Mike LeRoy - Paper-Less, LLC

**Is Your Manufacturing Company Ready to Go Digital?**

Digital is the silver bullet for improving productivity, customer relationships and revenue. This session will provide an overview on how to evolve your manufacturing business for the digital age, including a case study.

Josh Fischer - xTuple

1:30 PM – 3:30 PM

**F35: NEW! MARKETING 101 FOR FABRICATORS** **B**
**New Rules of Relationship Marketing**

Today's prospect is considering lookalike proposals from lookalike businesses and unless you can provide a compelling reason to choose you, every sale will be a struggle. The secret lies in Relationship Marketing methodically building and cementing solid connections with current and prospective customers. Find out real-world tools and techniques to implement immediately.

Jon Goldman - Brand Launcher

**Marketing for the Small to Mid-sized Manufacturer**

Marketing is not a luxury afforded to only large manufacturers that have the budget for a full team of marketing professionals. There are small and affordable strategies you can begin today to put your company's best foot forward. A few easy-to-implement strategies can elevate your manufacturing company to be fully representative of your capabilities and core values to help you win business.

Debbie Schwake - KeyedIn Manufacturing

**Creating Fanatical Fans of Your Brand – A Proven Inside-out Approach That Leads to Productive Employees and Referral-generating Customers**

Today's reality is you've got two groups of customers to keep happy – your employees and your buyers. It's proven that unmotivated employees result in unhappy customers. In this session, discover practical insights based on real-life case studies of what to do to ensure your company wins BIG on both fronts. The result is more new business and sustainable growth.

Bridget Lazlo - Guardian Business Solutions, Inc.

## THURSDAY, NOVEMBER 17

8:00 AM – 10:00 AM

**F45: CREATE LASTING STRATEGIC BUSINESS VALUE** **I**
**Creating Strong Strategic Value for Long Term Success in Manufacturing**

This presentation defines Strategic Value and why it is so important to the ongoing success of manufacturing companies in today's uncertain environment. It identifies the factors that create Strategic Value and provides a proven tool and methodology that participants can use to assess their current Strategic Value and to develop a plan to maximize it. Case studies of manufacturing companies provided.

Joel Strom - CKS Advisors LLC

**THURSDAY, NOVEMBER 17****8:00 AM – 10:00 AM****F45: CREATE LASTING STRATEGIC BUSINESS VALUE (CONT'D) I****Business Builders Workshop: Develop a Winning Strategic Architecture**

Learn how to build a winning strategic architecture that will bring clarity to what you sell, how you supply it, who buys it, and why they buy it from you. The answers to these simple questions describe and clarify the complexities that combined become your competitive advantage. This session will prepare you for meaningful introspection upon return to your organization, bringing the right people together to help develop your winning strategic architecture.

Mark Frasco - COACT Associates, Ltd.

**Trust to Win Business – A Case Study**

Trust plays an important role in growing your business. Learn how and why trust is important and how there is a “tax” on businesses that operate with low trust. A 3rd generation fabricator will share a case study of how trust helped their business move to the next level.

Mark Ernst, JD - Ernst Enterprises and Matthew Koester - Koester Metals

**10:30 AM – 12:30 PM****F55: NEW! RESEARCH LIKE A PRO TO GROW YOUR BUSINESS B**

Through case studies, learn how to evaluate which forces of the economy can help or hurt your business, whether you are doing strategic planning, budgeting, or analysis of potential new customers, customer segments or new markets. Learn how to better understand market needs and manufacturing trends to grow your business.

Chris Kuehl - Armada Corporate Intelligence

**1:30 PM – 3:30 PM****F65: NEW! LEVERAGING DISRUPTIVE TECHNOLOGIES TO BECOME THE FABRICATOR OF THE FUTURE I****Leveraging Disruptive Technologies to Become the Fabricator of the Future**

Attend this session lead by ERP industry experts and review the latest trends that will affect manufacturing systems of the future and how these trends will re-invent the way manufacturers interact with customers, receive orders, manage/schedule the shop floor, and replenish inventory. Take away 5 practical ways you can start leveraging technology and automation today to gain a competitive advantage.

David Lechleitner and Christine Hansen - Epicor Software Corp.

**Uberize Your Remote Equipment – Leveraging the Industrial Internet of Things to Redefine Your Business**

The Industrial Internet of Things (IIoT) can be loosely defined as the Uberization of industrial equipment. It's about creatively using connectivity to reduce costs, increase revenue streams, or provide competitive differentiation. This session

will address the connectivity and security concerns with solutions that are acceptable to most end user IT departments. Learn how your company can start an IIoT initiative quickly and easily with minimal investments and measurable ROI.

Tom Craven - RRAMAC Connected System

**Augmented Reality: Improving Fabrication Performance**

Augmented Reality (AR) is making an equally titanic shift in the way engineers, designers, and planners, communicate with people building, inspecting, operating, and maintaining fabrication equipment, plants and facilities. Companies that begin today to learn, understand and experiment with the power of AR technology will gain a significant competitive advantage over their rivals.

Dexter Lilley - Index AR Solutions

**FRIDAY, NOVEMBER 18****8:00 AM – 10:00 AM****F75: SUCCESSION PLANNING 101 B****Business Succession Planning - Common Issues Facing Capital Intensive Firms and How to Navigate the Maze of Family, Shareholders and the Tax Laws**

Succession is inevitable and being proactive about succession is essential for continued success. Planning provides a host of important benefits for the company's owners, employees, and family members. Control it while you can. Learn about all the many benefits, common issues, what elements are needed, sale, gift, legal documents. It's all covered in this session.

Jonathan Michael, JD - Burke, Warren, MacKay & Serritella

**Avoid Negative Sticker Shock – Understand What Creates a Company's Market Value and How to Maximize It**

This presentation will help participants understand what factors truly create an enterprise's market value and how the various types of potential buyers evaluate a company's attractiveness and worth. A process will be shared that owners can use to change their perspective in order to build a plan that will result in strong market interest and enterprise value whenever they decide to transition their business. Numerous examples of companies that have successfully maximized their market value will be used to illustrate the process

Joel Strom - CKS Advisors LLC

**Business Valuation and the Exit Planning Process**

Learn how to value your business and how to increase value in the future. Find out how to enhance the Financial and Marketing aspects of your business in order to increase value. Determine how to transfer equity to family and employees in a favorable manner. Learn about the steps in the sale-of-business process for future planning.

Allen Oppenheimer - A. M. Oppenheimer, Inc.

**10:30 AM – 12:30 PM****F85: NEW! SOCIAL MEDIA AND BRANDING 101** **B****Building a Differentiated Global Brand**

Learn how global manufacturers can leverage marketing and global branding to increase their competitiveness, including in-depth case studies of two industrial manufacturers who have implemented customer insight studies, global rebranding and content marketing initiatives to improve top-line direct and distribution sales efforts. An additional examination of industrial marketing best-practices provides attendees with actionable takeaways for immediate and impactful marketing investment improvements.

Andrea B. Olson - Pragmadik Marketing

**Enhance Your Online Presence & Drive Success Through Your Website and Social Media**

This session offers a real-world perspective on how you can create a positive impression and maximize impact of your website and social programs, merge your marketing efforts together, and ultimately enhance results. Benefit from an interactive, hands-on approach that encourages actionable thinking relating to your brand and offers immediate takeaways that make sense in your market.

Nicole Wagner - Stevens & Tate Marketing

**Using LinkedIn to Drive Amazing Manufacturing Leads**

Few manufacturing/industrial marketers have tapped into the amazing power of LinkedIn to grow their business. This step-by-step walk-through will show real data on industries like yours. A guide on creating your own company-wide LinkedIn program to start leveraging this powerful platform right away will be provided.

Bill Sterzenbach - Upward Brand Interactions

**Actionable Strategies Proven to Improve Marketing Results**

This presentation will explore a series of proven principles and tactics designed to attract prospects in a crowded manufacturing industry. You'll learn cohesive and integrated strategies that work in combination to create the ideal platform for enhanced success, specifically focused on inbound-driven techniques. Attendees will learn direct takeaways proven to push them ahead by pulling prospects in leadership & accountability.

Dan Gartlan - Stevens & Tate Marketing

**1:30 PM – 3:30 PM****F95: NEW! OPERATING IN THE MANUFACTURING ENVIRONMENT: RISK ASSESSMENT AND NEW RULES FOR R&D TAX CREDITS** **B****The How to Guide for Effective Safeguarding Risk Assessment**

Understand the collaborative Risk Assessment process and who in your organization should participate and what are their roles. Benefit by using this guide to safeguard risk assessment for fabrication industries.

Douglas Raff - Paragon Industrial Controls, Inc. and Brian Roberts - CNA Risk Control Services

**Rule Changes: Benefit from the R & D Tax Credit for Manufacturers!**

This presentation will discuss how broad the definition of "R&D" is for tax credit purposes, where R&D is taking place, and how metals manufacturers can qualify for the R&D Tax Credit. We will explain the rule changes, provide case studies of other metals manufacturers showing examples of qualifying projects and the dollar value of their credits received, and talk about the types of documentation a company would want to keep in order to substantiate an R&D Tax Credit claim.

Scott Schmidt - Black Line Group

**JOB SHOP SOLUTIONS****WEDNESDAY, NOVEMBER 16****8:00 AM – 10:00 AM****F16: NEW! SMART MACHINES AND MANUFACTURING APPLICATIONS** **B****Mobile, Social, Data: Enabling Flexibility and Collaboration in Machine Manufacturers**

Machine manufacturers are wrestling with massive amounts of data that they need to find better ways to access, analyze and share both internally and externally with both suppliers and customers. Attendees will learn how to prepare for and leverage mobile, social, and analytics that will go a long way toward determining how effectively they use the massive amount of data contained in their ERP systems.

Christine Hansen - Epicor Software Corp.

**How to Apply Technology to Reach Your Manufacturing Revenue Goals**

The application of the right technology can support your revenue goals by automating processes and managing critical data. In this session, participants will understand: how to align your biggest challenges with technology that can help you address them, how to apply technology to supplement your manufacturing goals, what is really required to make technology work for your operation.

Lauri Klaus - KeyedIn Solutions

**Beyond the Desktop: CMMS Mobile App Technologies Give an Edge to Maintenance Pros on the Go**

Advanced mobile applications offer core CMMS functionality to help manufacturing businesses become even more effective and efficient in their operations and processes, wherever their maintenance teams are located. The presenter will walk you through developments in mobile maintenance apps and how companies can capitalize on this latest suite of features.

Paul Lachance - Smartware Group, Inc.

**WEDNESDAY, NOVEMBER 16****10:30 AM – 12:30 PM****F26: NEW! SELECTING THE RIGHT PARTNERS & OVERCOME CHALLENGES IN CHINA FOR MANUFACTURING BUSINESSES I****Selecting the Right Partner and Protecting Your IP While Doing Business in China**

Get advice for selecting the right Chinese partner and how to protect your interests when exporting and importing to/from China. The presentation will focus on real-life examples of how to reduce costs and leverage technology to increase global competitiveness, while protecting your intellectual property (IP). Case studies provided.

Carl Breau - Saimen

**How U.S. Manufacturers Can Overcome Challenges Expanding into China Markets**

Many U.S. metalworking and fabrication equipment manufacturers recognize that China possesses huge business opportunities but remain stagnant due to perceived challenges in logistics, administrative requirements and intellectual property protection. In this session we will discuss how U.S. manufacturers can overcome these challenges and effectively sell their products to the Chinese market.

Raymond Cheng - Toolots, Inc.

**1:30 PM – 3:30 PM****F36: NEW! LEAN PRINCIPLE: DESIGN SUSTAINABILITY FOR THE JOB SHOP I****Reducing Costs Through Innovative Sheet Metal Design**

Designing parts without knowledge of new innovative design impacts costs and prevents machines from being used to their full potential. This presentation will change the way a designer thinks about the part design process from start to finish. Machines and software are the tools to implement design changes. New designs must be innovated by beginning with the end in mind. The end goal is to reduce processes, mistakes, and ultimately costs.

Grant Hagedorn - TRUMPF Inc.

**Design for Sustainability**

This case study filled presentation will provide insight into the ways that the Design for Sustainability guidelines can help. From selecting low-impact materials, reducing material usage, optimizing production techniques and distribution systems and expanding product life and designing for disassembly, the Design for Sustainability guidelines are intended to help companies improve profit margins, product quality, market opportunities, environmental performance, and social benefits.

Shelly Martin – EARTHSHIFT and Robin Tindall Hypertherm, Inc.

**Achieving Sustainable Practices in Manufacturing Through Lean Techniques**

Attendees will be given an overview of how lean manufacturing techniques and tools can be applied to focus on sustainable initiatives, while

also helping manufacturers remove the production wastes commonly found in their processes. This session will not only examine the initial cost benefits of implementing a lean program, but will clearly illustrate the overall environmental and humanistic impact of sustainable practices. Longer term return on investment (ROI) justifications for sustainable manufacturing often overlook appropriate costs on items such as disposal, health, energy, etc.

Bill Shema - Paper-Less, LLC

**THURSDAY, NOVEMBER 17****8:00 AM – 10:00 AM****F46: NEW! SOFTWARE SOLUTIONS FOR FABRICATORS I****How to Plan for a Minimally Impactful ERP Implementation**

The potential for downtime in a manufacturing facility for an ERP software implementation can be scary, but what if there were ways to avoid significant downtime with a well planned and executed ERP implementation. With helpful tips and tricks, you're manufacturing team will be able to go into an ERP implementation confidently and actively implement ERP software successfully.

Nancy Brehmer - KeyedIn Solutions

**Successful Manufacturers Moving from Paper and Excel Spreadsheets to the New Digital Frontier**

ERP and MES hold promise for improving accuracy and accessing previously untapped treasures of production information. Attend this session and make the move towards achieving your business and production goals. Successful digital transformation examples will be presented and discussed. You will leave this session with actionable insight and a clear pathway to next steps for optimal results.

Ann M. Krauss - Paper-Less, LLC

**Bridging the Gap: Integrate Business Systems with Machines Powered by Software in a Fabrication Job Shop**

It is critical to ensure your data is accurate in order to make the right decisions. This session will explore topics such as data flow automation, optimized manufacturing execution, connecting business systems with software that drives equipment and how this aligns with Industry 4.0 trends.

Monty Brown - SigmaTEK Systems

**10:30 AM – 12:30 PM****F56: STRUCTURAL FABRICATION TECHNOLOGY B****Machine Tool Technology That Powers Structural Steel Fabrication**

Special focus on how the technology is used to enable complex steel structures such as stadiums to be built. All facets of structural fabrication will be discussed, including drilling, thermal cutting, punching and all-encompassing machines designed to empower fabricators looking for solu-

tions with reduced scrap and greater versatility than traditional structural fabricating machines.

Elliott Bass - Peddinghaus Corp.

### **Vikings Score Touchdown with Structural Steel**

From concept to completion, this presentation will focus on constructing the Minnesota Vikings new state-of-the-art football stadium -- named U.S. Bank Stadium -- and scheduled to open August 28th (pre-season game). Topics to include all the challenges and issues in erecting a major stadium and in particular how other case studies used structural steel fabrication technology to overcome them.

Matt Rovnak and Rick Torborg - LeJeune Steel Company

### **1:30 PM – 3:30 PM**

#### **F66: NEW! A COMPETITIVE ROADMAP AND STRATEGIC PLAN FOR THE FABRICATION INDUSTRY **B****

##### **Business Builders Workshop: Moving Ideas to Action**

Learn how to build a demand side strategies, structure and processes that produce more predictable, consistent business growth results. Moving ideas to action - this session will supply you with a framework that you can take back to your organization and implement for improved business growth results.

Mark Frasco - COACT Associates, Ltd.

##### **The Importance of Strategic Planning for the Job Shop**

Effective planning allows you to pursue the right opportunities and not waste time or resources on potential opportunities that won't produce results. The presentation will be using the step by step method of developing the strategic plan and using Koester Metals as the case study.

Mark Ernst - Ernst Enterprises and Matthew Koester - Koester Metals

##### **U.S. Manufacturing Road Map on Advanced Joining and Forming to Competitive Advanced Technologies in the Fabrication Industry**

The Roadmap was developed by canvassing leading U.S. manufacturers engaged in materials joining and forming, academia, industry and professional associations, and other stakeholders. These interactions helped in identifying and ranking current joining and forming challenges to develop a list of prioritized R&D topics that will create differentiating competitive advantages and produce substantive economic impact. This presentation will introduce a completed technology roadmap on advanced joining and forming for the U.S. manufacturing industry.

Hyunok Kim - EWI Forming Center and Peter Ulintz - Precision Metalforming Association

## **FRIDAY, NOVEMBER 18**

### **8:00 AM – 10:00 AM**

#### **F76: NEW! MARKETING AND SALES FOR FABRICATORS **B****

##### **Outsourcing Selling - Maximize Effectiveness with Rep Networks**

Attendees will learn about sales and marketing tactics with reps, leveraging synergistic products, selecting, recruiting & hiring the rep, partnerships & expectations, motivating representatives, good communication with reps, planning, pioneering & performance.

Charles Cohon - Manufacturers' Agents National Association

##### **Internet Marketing for Industrial Companies**

A detailed presentation on industrial internet marketing, website usability, and how to use data for continuous improvement. Real case studies will be shared.

Tim Doyle - TopSpot

##### **The New Way to Market for Manufacturing**

Manufacturers are facing a huge opportunity to gain market share and grow revenue if they can learn how to leverage modern marketing strategies, tactics, teams and technology. This presentation is about how to transform the marketing function from a small team of designers, writers and event coordinators into a revenue generating, strategic component of the manufacturing firm

Bruce McDuffee - Manufacturing Marketing Institute

### **10:30 AM – 12:30 PM**

#### **F86: SUSTAINABLE AND REVENUE SAVINGS FOR THE JOB SHOP **B****

##### **The Hidden Profitability Killer: The Impact of Inventory Accuracy on Sales, Profits and Acquisition Valuation**

This session starts with the basics of inventory management including what costs are tied to inventory, and why accuracy of the inventory is so mission critical. Discover the importance of implementing a cycle count program - and how cycle counting can enable your company to improve customer service, insure a more efficient operation, reduce inventory levels, achieve a higher return on your investment, eliminate physical inventories and save time in just about every department in your organization.

Bridget Lazlo - Guardian Business Solutions, Inc.

##### **Beyond Energy Efficiency: Task Lighting in Manufacturing**

Since task lighting is a necessity for machining, quality and inspection areas, it is critical to have the right tool for the job. Sustainable lighting solutions for cost saving, efficiency and quality will be covered in this session.

Mike Robinson - Big Ass Solutions



**FRIDAY, NOVEMBER 18****10:30 AM – 12:30 PM****F86: SUSTAINABLE AND REVENUE SAVINGS FOR THE JOB SHOP (CONT'D) B****The Scrap Revenue Stream and Scrap Management - Choosing the Right Vendor and Maximizing Revenue**

Maximize your scrap revenue by choosing the right vendor and find out how scrap is managed internally, how to upgrade material, paperwork for controls, understanding pricing, and more.

Thom Romer - Worthington Industries

**Disruptive Working Capital Deployment: Economic Transformation of Coil Storage Warehouses from Square Feet into Cubic Feet**

Hear strategies for storing nearly three-times the number of coils in the same area. Case studies focus on transforming a warehouse's floor space footprint into a highly-efficient, cubic storage system, while dramatically improving safety and housekeeping.

Michael K. Baach - Philpott Rubber Company and Jim Ralston - COILPLUS Ohio, Inc.

**1:30 PM – 3:30 PM****F96: SAFETY STRATEGIES FOR FABRICATORS B****New Firefighting Technology for Class D Metal Fires: Encapsulator Agents**

As more fabricators work with magnesium, titanium, zirconium, tantalum and lithium, they must be aware of the potential hazards associated with these Class D metals and how to deal with fires. Once ignited, the extreme temperatures of these metals create challenges for firefighters. Encapsulator Agents are the modern, convenient solution to this problem, rapidly cooling Class D metals before the fire spreads.

Michael T. Greiner - Hazard Control Technologies

**Occupational EHS Management: Manage with Efficacy, Be More Productive... and Save Lives!**

Effectively managing EHS means saving lives, reducing the number of minor accidents to eliminate serious injury, projecting a responsible corporate image, and promoting sustainable values while being efficient economically. See how the integration of an occupational EHS management system allows you to comply with the basic principles of these standards and achieve significant results at every level.

Maxime Ouellet - CONFORMIT

**Safety and Security by Design**

Learn to properly design solutions that meet your customer's security requirements. See how locks work and how to prevent picking and maintain access control. It does not matter whether you make bubble gum towers, server cabinets, ATM's, slot machines, ticket kiosks, electrical panels, gun safes, or kiddie rides. This is a hands-on session to understand the safety and security risks of the product you designed and built.

Tom DiVito - Camlock Systems Inc.

**AUTOMATION****WEDNESDAY, NOVEMBER 16****8:00 AM – 10:00 AM****F17: NEW! CONNECTED ENTERPRISE FOR THE FACTORY FLOOR 4.0 I****What Is the Value of Factory 4.0 and Big Data?**

The Smart Factory is becoming a reality with Industry 4.0. Industry 4.0 fuses automation with digitalization for more efficient production methods, making it possible to produce small batch sizes of customized products cost effectively. This presentation provides real-world examples of how cutting system users are applying Industry 4.0 and analyzes the considerations and costs.

Holger Hahn - ESAB Welding & Cutting Products

**Real Time Data and Industry 4.0**

The presentation will cover real time data, the advantages of ROI and the competitive landscape. The capability of sharing data from one system to another in real time has enabled decision makers to adapt to real conditions based on data made available instantaneously. This concept is revolutionizing the fabrication industry for early adaptors and giving them an advantage over the competition.

Mitch J. VanZuiden - Bystronic Inc.

**Why Metal Fabrication Management Should Be Paying Attention to the Industrial Internet of Things (IIoT) & Industry 4.0**

This presentation will break down the basics of IoT and Industry 4.0, briefly review key supporting technologies, and discuss simple decisions you can make today to start enabling your factory for flexible manufacturing, efficient production and the tools to be competitive in today's market.

Will E. Healy, III - Balluff Inc.

**10:30 AM – 12:30 PM****F27: NEW! MACHINE MONITORING AND CYBER RISKS FOR THE FACTORY FLOOR I****How to Achieve Value from Machine Monitoring**

This presentation will cover a variety of topics relating to the benefits of machine monitoring, including successful approaches to rolling a system out, and how to achieve the desired results to gain value from the system. Topics include the advantages of Cloud based machine monitoring, how the Cloud strategy enables easy startup,

growth, scalability, and ROI. In addition, integration with other systems will be discussed along with an overview of MTConnect and how it can provide value for machine monitoring.

Josh Davids - Scytec Consulting Inc.

### Mitigating Cybersecurity Risks on the Shop Floor and Warehouse

This presentation will focus on what can be done to mitigate cyber-attacks in an operational environment, where machines are being connected to the internet and cybercrime is not seen as a priority. Our shop floors and warehouses are usually not up to par with the protections we use to protect sensitive data, credit card transactions and other delicate information. However, Operating Technology (OT) is way more prone to attacks than normal IT systems, and the chances of blackmailing as well as disruption are very real. Attendees will take away important points illustrated through case studies.

Rob Dolci - Aizoon

**1:30 PM – 3:30 PM**

### F37: NEW! ROBOTIC AUTOMATION SYSTEMS **I**

#### Robot Based Automation Systems

Learn about various robotic based flexible automation systems including a who's who, a brief history and an illustration of the various types and applications of commercially available industrial robots. Learn the basics of how a robot functions, brief fundamentals of programming and anticipated maintenance. Review the components of a flexible automation system, the reasons to choose flexible automation, successful implementation and the potential road blocks to success. The 10 common mistakes in robot integration will also be covered.

Bob Rochelle - Nachi Robotics

#### Robotic Programming for High-Mix Applications

Robotics have long been used for high-volume, low-mix applications where time consuming, complex programming is required. Recent advancements in offline programming have drastically simplified the process, enabling robots to be used in high-mix environments. Learn how new robotic programming techniques are being used to expand the use of robotics in manufacturing.

Chahe Bakmazjian - Hypertherm Robotic Software Inc. and Peter Brahan - Hypertherm, Inc.

## THURSDAY, NOVEMBER 17

**8:00 AM – 10:00 AM**

### F47: NEW! AUTOMATING THE SHOP FLOOR AND REDUCING LEAD TIME **B**

#### Build Velocity, Not Inventory

This presentation will present the basics of QRM and provide examples of companies that have successfully adopted it to achieve better customer service while improving financial performance and growing market share. Quick Response Manufacturing (QRM) is a strategy that helps compa-

nies design their business to build products and provide services much faster so they can serve their customers more effectively without tying up as much cash and resources.

Bill Ritchie - Tempus Institute

### Using Life Cycle Assessment to Answer Burning Questions

In this interactive session, learn what a Life Cycle Assessment is and what questions it can help companies answer. Hear case studies about how Hypertherm is using LCA to identify the hot spots in their product, reduce environmental impacts throughout its supply chain, guide their communications around sustainability, and incorporate tools to enable product developers and others, not just LCA experts, to understand the environmental impacts of future design changes.

Shelly Martin - EARTHSHIFT and Robin Tindall - Hypertherm, Inc.

### Make It Better, Keep It Better; The Short & Long Term Benefits of Automatically Collecting OEE Data

This presentation describes the fundamentals of a rock-solid automatic data collection system, and explains how to overcome the two most common roadblocks. This session will introduce the single most important concept for identifying the actionable items that will lead to real change. The only way to collect data real-time is to do it automatically.

Keith R. Magnant - ShopFloorConnect

**10:30 AM – 12:30 PM**

### F57: NEW! ROBOTIC JOINING TECHNOLOGY **I**

#### New Concept in Robotic Arc Joining Equipment Integration and Dress-Out

This discussion will provide an overview of the design problems of integrating typical welding equipment and how this challenged the designers to come up with a new and unique solution that benefits the customers with ease of use and improved maintainability and uptime.

Michael Sharpe - FANUC America Corp.

#### How State-of-the-Art Robotic Joining Technology Can Solve Your Welder Labor Shortage: A Case Study

Hear a case study on "Oil Filter Recyclers" which outlines how the manufacture went from no robotic welding automation to a system that incorporates most of the advanced welding technologies available. This robotic technology has increased weld quality while reducing the demand for qualified welders.

Zane Michael - Yaskawa America Inc.

**THURSDAY, NOVEMBER 17****10:30 AM – 12:30 PM****F57: NEW! ROBOTIC JOINING TECHNOLOGY (CONT'D) I****Poka-Yoke & Error-Proofing in Automated Joining with a Focus on Weld Nut Detection**

This presentation will compare and contrast different sensing technology solutions used for error proofing applications in automated welding. In automated manufacturing, part quality issues can be a weekly discussion across North America. Using real world examples, experiences and photographs, suggested technologies for each application and situation will be discussed.

Will E. Healy, III and Dave Bird - Balluff Inc.

**1:30 PM – 3:30 PM****F67: NEW! PREDICTABLE AND VIRTUAL CONCEPTS AND DESIGN A****Predictable Manufacturing**

Predictable Manufacturing provides the opportunity to completely concept, design and visually experience a manufacturing process that encompasses all the disciplines, aspects and nuances found in production regardless of industry or product. Several methods are currently used to plan your manufacturing environment. While these solutions may get you to part of your goal, they come up drastically short in accurately predicting all of your manufacturing requirements.

Robert J. Axtman - Visual Components North America Corp.

**Virtual World – Proof of Concept, Design and Process at Your Fingertips!**

The key to automation success starts early in the part design process. Studies on our team immerses themselves in virtual reality to get an early start on the proof of concept, design and process for our customer & automation solutions. 3D Simulation, reach studies, weld distortion analysis, offline programming have proven successful. We will share a customer success story where the virtual tools led our customer thru a successful laser welding automation project.

William Reid and Justan Each - Genesis Systems Group, LLC

**FRIDAY, NOVEMBER 18****8:00 AM – 10:00 AM****F77: NEW! DEBURRING MATERIALS FOR AUTOMATED SYSTEMS B****Why Leveling and Deburring of Materials Is So Important in Today's Manufacturing Environment**

This session provides an overview of what one sees after cutting or blanking materials and what needs to be done in order to meet the print tolerances required by today's manufacturing environment. Learn how to meet customer demands, quality of work and why leveling and deburring is important in the manufacturing environment.

Nicholas Miller - ARKU Coil Systems, Inc.

**Automated Flat Part Deburring - 101**

This session will discuss the different types of burrs, options for automation, current abrasive technology, grain finishing, and a few case studies to bring everything together. Automation does not have to be expensive with feed-through machines. The typical payback/ROI of automating is less than 3 years, but we will show you two customers that paid for their \$100K+ investment in 6 months. Even if you are not in the market for a new machine, this is an excellent opportunity to learn about flat part deburring equipment and abrasive technology from the experts.

Greg Nykiel - Timesavers, LLC and Erik Vanstrum - 3M

**FORMING & FABRICATING****WEDNESDAY, NOVEMBER 16****8:00 AM – 10:00 AM****F18: ADVANCEMENTS IN PRESS BRAKE TECHNOLOGY A****Automating the Bending Process**

Learn how to incorporate different levels (programming, tool changing, part handling, etc.) of bending automation into your current fabrication process. This presentation includes case studies and a cost justification process to help determine what level of automation is right for your company. Advances in angle detection on press brakes will also be covered.

Scott Ottens - Amada America Inc.

**Boosting the Bends Per Hour: Tips and Technologies for Reducing Press Brake Setup Time**

Shrinking lot sizes and rising part variability are dramatically increasing the share of a press brake's production time dedicated to setup. This session will analyze what tasks create unproductive time on press brakes and how you can reduce the setup time to boost press brake productivity.

Vincent Iozzo - TRUMPF Inc.

**Electric Press Brake Technology**

Learn about the origin of the electric press brake, its construction and operation, common applications, and important features and benefits that can help justify incorporating one into a unique operation.

Alan Gildemeister - International Technologies, Inc.

**Understanding Modern Press Brakes**

This presentation will cover the recent evolution of ram drive systems, back gauge drive systems, and crowning drive systems. In addition, tips on reducing setup times to increase capacity, availability, and maintain pace with high-speed bending will be shared.

Paul LeTang - Bystronic Inc.

**10:30 AM – 12:30 PM****F28: COIL PROCESSING: LEVELING AND SLITTING I****Basic Concepts of Leveling Metals**

This presentation dives into the basic concepts of roller and stretch leveling including an introduction to metallurgy of metals, giving you a greater understanding of the leveling process. The geometry of defects and quantification methods will also be discussed.

Thomas Hazen - T. F. Hazen Consulting

**Innovations in Roller Leveling**

Using tension during leveling creates stress free, laser flat material. Understand how the latest technology helps measure flatness by monitoring the material surface and equalizes internal stresses by using an automatic leveler adjustment to prevent low bow in a cut-to-length line.

Brownie Cox - The Bradbury Company

**Slitting Advanced High Strength Steel**

Learn how to process the new high strength materials that are being used today. What are we slitting? How can we slit it? What do we need to slit it? OK is not good enough anymore.

AI Zelt - ASKO Inc.

**Brain Surgery with a Bulldozer: The Art & Science of Slitting**

This session will cover different problems commonly experienced while slitting steel including common horizontal and vertical clearance problems. The effects of clearances that are too tight and too wide and how to correct them to produce a better slit product, the proper use of rubber stripper rings with different gauges of steel, and the problems caused by improper sizing and how to fix them will be covered. How to minimize the negative effects that occur when there is excessive knife deflection and arbor deflection will be discussed.

Jim Wilcox - Wilcox & Associates

**F29: PRESS BRAKE SELECTION I**

Learn the four essential steps of working with a press brake that will allow you to never deal with a damaged press brake again. Discover how to calculate the forming tonnage the job requires, identify your rolling load limits, calculate the sinking tonnage limit, and calculate the press brakes load limit.

Steve Benson - ASMA LLC

**1:30 PM – 3:30 PM****F38: ROLL FORM TOOLING INSTALLATION, TROUBLESHOOTING AND LUBRICANTS I****Roll Form Tooling Installation and Trouble Shooting**

Learn how to properly install and adjust roll form tooling. Trouble shooting the roll form tooling, setup problems, roll form machine issues, some material considerations, and documentation will be discussed.

Steve Ebel and Travis Ebel - Roll Form Solutions Inc.

**Modern Lubricants for Roll Forming Processes**

Review the latest technologies in lubricants and coolants available for metal roll forming processes. This presentation covers the main categories of lubricants and the most recent advances within each one. Also, a seven step selection process for finding the best lubricant will be discussed, along with best practices in coolant maintenance.

David Kinnard - Tower Oil & Technology Co.

**F39: NEW! TUBE FABRICATING 101 I****Novel Lubrication for Mandrel Tube Bending**

There are many variables that help determine what lubricant to use in mandrel tube bending to achieve desired process results. What is best for your process to reduce tool wear and downtime? Find out how to narrow down to the best options through friction evaluation tools and industry best practices. Modern lubricant regimes and real world case histories will be discussed as well as time allowed for individual focus on attendee processes.

Christopher Fletcher - Tower Oil & Technology

**THURSDAY, NOVEMBER 17****8:00 AM – 10:00 AM****F48: PRESS BRAKES FOR ENGINEERS B**

Ever wonder how an air-bend radius turns sharp at 63% of the material thickness? This presentation will answer just that. Learn where this number comes from, the effects operationally and the development of a correct flat pattern.

Steve Benson - ASMA LLC

**F49: TUBE LASER PROCESSING 101 B****TruLaser Tube: Advancements in Laser Tube Processing**

Laser processing can affect how parts fit into assemblies and future design possibilities for new products. The accuracy and part repeatability of laser processing often reduces the amount of rework required in the final part assembly. The final cost justification is in the cost of quality. The tight tolerances achieved with laser processing can reduce multiple setups and additional downstream operations. While ensuring complete laser safety, the unique beam guard concept provides optimal access to the machine and therefore high operator convenience and productivity

Ryan Welcome - TRUMPF Inc.

**3D Laser Cutting Flexibility for Large Tube, Pipe, & Structural Applications**

Learn how whether cutting large round or square tube/pipe, I-beams, or other structural products, 3D laser cutting systems have delivered increased productivity, simplified and strengthened component assembly, and improved component tolerances through precise laser cutting.

Mark Mercurio - Mazak Optonics Corp.

**THURSDAY, NOVEMBER 17****8:00 AM – 10:00 AM****F49: TUBE LASER PROCESSING 101 B****Fiber Laser Tube Processing for Cutting Applications**

Fiber laser processing allows cutting of any metal with superior results. New 3D cutting head technology allows for tilt cutting thick wall steel for weld preparations or for making angle bracing or joints in tubular structures while allowing for parts separation in different positions.

Mauro Corno - BLM Group USA

**10:30 AM – 12:30 PM****F58: TUBE PRODUCING/JOINING B****Adding Process Control to the Tube Mill**

This session will discuss the limitations of the typical tube mill (what we think we can monitor and control), new developments to improve process monitoring and control, and the difference between process control and quality control.

Peter Meglin - Thermatool Corp.

**Optimizing Your HF Joining Process**

Introducing a new induction welding method on large diameter coil to coil pipe mills. The importance of power and frequency control when high frequency welding large diameter, heavy wall pipe. Increased throughput and reduced scrap using a new variable geometry HF induction welding coil.

Ted Linstrum - Thermatool Corp.

**F59: PRESS BRAKE SAFEGUARDING: CHANGES TO ANSI B11.3 I**

Understand the new ANSI B11.3 - 2012 Press Brake Safety Standard and its dynamic changes. Real world examples will outline an application appropriate approach to defining which type of safety device - light curtain, laser, or camera system - maximizes part flow through a particular machine.

Douglas Raff - Paragon Industrial Controls, Inc.

**1:30 PM – 3:30 PM****F68: ROLL FORMING BASICS AND JUSTIFICATION B****Basics of Roll Forming**

This session will focus on different roll forming systems and provide an explanation of different press systems. Different measuring systems (electric/manual) and the advantages of the roll forming process will be discussed.

Paul Williams - Hill Engineering/Formtek Inc. and Brian Rodgers - Formtek, Inc.

**Justification of Roll Forming**

This session will help you understand the opportunities of roll forming, value add possibilities, consistency of roll forming, and volume requirements.

Brian Rodgers and Jack Pennuto - Formtek, Inc.

**F69: PUNCHING I****Leverage Production on Your Punching Machine**

The combining of straight punching and forming operations allows integration of many processes into a single machine. This type of efficient control over part manufacturing allows the production cycle of a part to be more closely tracked for lean production. Software systems enhance the machine's production by reducing setup times, eliminate errors, and provide traceable feedback. The feedback can then be used to understand the production rate of a machine and provide goals for improvement.

Donald Angel and Rick Dorman - Murata Machinery USA, Inc.

**Advantages of Punch Laser Combination Processing**

This presentation will review the applications and benefits of consideration of this technology and how it offers the user the ability of an extremely flexible system able to produce diverse parts in a production environment.

Brian Welz - TRUMPF Inc.

**FRIDAY, NOVEMBER 18****8:00 AM – 10:00 AM****F78: PRESS BRAKE TOOLING I****Tooling Solutions for Bending Short Flanges and Bending Without Marking**

Using press brake tooling specifically designed to bend short flanges expands the achievable design envelope for sheet metal parts enabling the fabricator to do more for the customer. Tooling designed with rotating supports mimics a folding operation and thus has different flange length requirements to produce quality bends. This bending procedure or technique is gentle on polished materials, leaving them clean of marks. It can be used to bend across holes or bend to a diagonal sharp and is effective when bending uneven materials like tread plate. Attend this session to learn more about these tooling solutions.

Frank Baeumler and Larry Boden - Mate Precision Tooling

**Using Less to Do More: Optimizing Your Press Brake Tooling Mix for Maximum Productivity**

This session provides fabricators with information that will help them use less, more accurate, more flexible, and more durable press brake tooling to produce a wide range of parts in a wide range of materials and obtain optimum/near optimum results, emphasizing the need to get maximum value and productivity from their press brake tooling mix to reduce overall costs and set-up time. It will introduce new concepts designed to minimize/eliminate die changes when bending materials in the range of 20 ga. to .250" thick mild steel. Tools to measure the payback time on investment and the long term cost savings will be provided.

David Bishop - Wila USA



**F79: NEW! STEEL METAL 101: MILL TO FABRICATOR** **B**

Learn all facets of the steel making process including chemistry, the manufacturing process for flat rolled, bar, plate and specials, the steps to process steel before it reaches its end-user, and finally what the fabricator can expect forming the various grades specified by OEMs. Market drivers will also be covered.

John Eckstein and John Packard - Steel Market Update

**10:30 AM – 12:30 PM****F88: ADVANCED ROLL FORMING TOOLING AND LINE TROUBLESHOOTING** **A****Roll and Die Tooling Designs**

This session will help you to understand basic to intermediate tooling design principles, explore ideas to make designs more functional, design characteristics for easier set ups and repeatability, product designs and their effectiveness in roll forming, and roll form materials and coatings to aid the forming process.

John Kopsick - Formtek Inc.

**Punching and Cutoff Dies**

This session will cover in line punching concepts (stationary/flying), to help determine the best cutoff application for your cross section, and the best punching and cutoff press selection.

Paul Williams - Hill Engineering/Formtek Inc.

**Advanced Roll Forming Techniques**

This session will cover the differences between tube mills systems and welded roll forming systems, pros and cons of reshape vs. near net shape forming/welding, punching considerations, processing speeds, welding techniques and how to apply.

Paul Williams - Hill Engineering/Formtek Inc., Brian Rodgers and Brian Kopack - Formtek, Inc.

**F89: ADVANCED METALS & MATERIALS** **A****Advanced High-Strength Steel Growth in Automotive Applications and Associated Formability Challenges**

This presentation will review the growth of AHSS; grades, volume and applications. Additionally the Auto/Steel Partnership has developed a formability training course that will be introduced and reviewed in detail such that the audience can gain the knowledge necessary to work with these new grades of steel.

David Anderson - Steel Market Development Institute and George Coates - Phoenix Group

**How Different Steel Surfaces Affect Laser Cutting; Speed, and Quality: A Quantified Case Study**

This session will present quantified case study results from an identical part, laser burned, robotically welded, and press braked. Tests were conducted on 1/2" and 3/4" steel, keeping the same heat and mill when possible, similar chemistries and grade, with the variable being surface; Hot Roll Black, vs Hot Roll Blasted, vs Hot Roll Pickled and Oil. Laser burning speed,

burn quality, weld prep time (for HR Black), blasting time and costs, robotic welding times and press break die cleaning times were all measured and analyzed. We show the data and interpret what it may mean to your productivity and cost savings.

Danny Lerman and Steve Pugh - Steel Warehouse

**New Developments in Next-Generation Acrylic Adhesive Technology**

This presentation will showcase three applications where next-generation acrylics met fabrication demands and resulted in better, cost-efficient products. The first application, for the commercial vehicle market, will explain how the next-generation acrylic adhesive provided impact resistance needed for the demanding performance requirements of dump truck use. In the second application, the next-generation acrylic was used to build wind tower shrouds, due to its excellent failure mode on tough-to-bond substrates. In the third application, for industrial elevator doors, the next-generation acrylic offered 100% cohesive failure mode at 170iC.

John E. Hill - LORD Corp.

**STAMPING****WEDNESDAY, NOVEMBER 16****8:00 AM – 10:00 AM****S10: NEW! LUBRICANT APPLICATION AND CLEANING** **B****Improve Lubrication Application with Precision Spray Control**

Precision spray control has proven to be an effective way to ensure uniform application of coatings such as oils, lubricants and waxes. It is achieved by turning electrically actuated spray nozzles on and off quickly to control flow rate. With precision spray control, flow rate from a single nozzle can be varied without changing pressure. Spray angle and droplet size remain unchanged, and uniform application of coatings is ensured.

Dominic DeMaria - Spraying Systems Co.

**New, Safe, Vapor Degreasing Solvents for 2016 and Beyond!**

This presentation will provide a current comprehensive look at EPA/OSHA/NESHAP solvent regulations, emerging solvent-safety and performance information, market trends for solvent cleaning and state-of-the-art equipment. Environmental/Health/Safety concerns are paramount when selecting a solvent to meet the cleaning application.

Joe McChesney - KYZEN

**WEDNESDAY, NOVEMBER 16****8:00 AM – 10:00 AM****S11: IMPROVING FORMABILITY I****Closed-Loop Cushion Force Control in Stamping AHSS**

This presentation addresses the role, latest findings and applications that blankholder forces play in the formability of advanced high-strength steel. Attendees will learn the value of incorporating an oscillating blankholder force into their programmable profiles. The forming system enables the industry to tackle challenges such as friction/lubrication, wall thinning, wrinkling/cracking and improve their limit diagram. The theory of the technology, test data and case studies supporting the process of servo-controlled oscillating force will be covered.

Darrell Quander, Jr. - Hyson Metal Forming Solutions

**Separating Fact from Friction**

The IRMCO iTool is designed to perform stamping lubricant performance tests based on Dr. Taylan Altan's Cup Draw research at The Ohio State and Edison Welding Institute. With the IRMCO iTool housed in a 300-ton servo press, stamping companies and material suppliers can test and verify lubricant performance with statistical accuracy. With production press-time being so expensive and schedules so tight, it is hard to break in and test new technology. The IRMCO iTool allows for data-driven decisions in a controlled, real-world tool and press. Companies can actually separate fact from friction when selecting the best materials.

W. Jeff Jeffery and Mark Mrozik – IRMCO

**10:30 AM – 12:30 PM****S20: NEW! MATERIAL PROPERTIES B****Understanding Material Properties and Deformation Modes to Solve Metalforming Problems in the Press Shop**

Important relationships exist between material properties, basic forming modes and die operations. Understanding these relationships increases one's comprehension of the problem and the ability to identify the best solutions. This presentation offers a basic understanding of material properties and basic forming modes so that the user can identify and solve formability problems efficiently and effectively.

Peter Ulintz - Precision Metalforming Association

**S21: ERROR PROOFING B****Sensors for Error-Proofing Stamping, Metalforming & Assembly**

This session will cover basic and advanced applications of sensors for in-die protection and automatic in-die part quality measurement.

George Keremedjiev - Tecknow Education Services, Inc.

**1:30 PM – 3:30 PM****S30: NEW! TOOL STEEL AND HEAT TREATMENT B****Effective Utilization of Tool Steel: How to Meet the Challenge of Demanding Stamping Applications**

Tooling materials face an ever increasing challenge within the realm of stamping. This is due to many interrelated factors including more difficult part materials, the need for increased part quality, increasing die complexity, and the need to meet stringent cost expectations. At the same time, tool makers have many options concerning tool-steel products and related treatments. Attendees will receive practical advice how to make better informed choices and achieve a higher level of optimization of the tool material variables that come into play with demanding applications.

Gary R. Maddock - Tri-Star Metals

**Improving Die Life Using Failure Analysis and Proper Tool Steel Selection**

This presentation will show real-world examples of tooling issues and offer ways to address these issues by recognizing the root cause. The presentation also will discuss tooling alloys and their properties, highlighting how proper material selection can improve die life by addressing some of the failure mechanisms. This presentation will focus more on the education part of tooling evaluation and attendees will come away with information that will allow them to recognize and address ways to improve die life.

Ed Severson - Bohler-Uddeholm Corp.

**S31: IN-DIE TECHNOLOGIES I****Exploring the Benefits of In-Die Fastener Installation**

In-die fastener installation systems can improve productivity and quality while simultaneously increasing throughput and reducing WIP. A description of the individual elements of an in-die system and how they function together to form a complete system will be explained through graphics and animations. Also covered are typical and unique projects including the latest technologies associated with installation of micro-fasteners. Attendees will learn how these systems work as well as the ability to determine when an in-die assembly is appropriate and how to properly evaluate a project and mitigate risk.

Roger Patton – PennEngineering

**Automatic In-Die Part Quality Monitoring & Tool Adjustments**

Implementation of part measurement, die-adjustment and part tracking can result not only in 100% verification of critical part features, but also in significantly increased machine utilization, accurate production, reduced scrap rates and more reliable die protection. Learn the practical methods to select, apply and integrate sensors and control systems in order to fulfill accuracy and quality requirements.

James Barrett - Link Systems, Inc.

**THURSDAY, NOVEMBER 17****8:00 AM – 10:00 AM****S40: NEW! FORMABILITY ANALYSIS** **B****Sheetmetal Formability Analysis, Engineering, Simulation and Production**

This session introduces metal forming analysis, process engineering, and metal forming finite element analysis techniques and tools. Topics covered include sheetmetal stamping and die basics, sheet and tube mechanical properties, strain analysis for prediction of formability, common failure modes of sheetmetal parts, circle grid and thinning analysis and finite element analysis of sheetmetal stamping processes. Learn how to identify key mechanical properties for forming, recognize and read forming limit diagrams and identify common applications of forming analysis. See how common stamping die configurations, press types and other factors affect formability.

Eric Kam - AutoForm Engineering GmbH

**S41: SENSOR BASICS** **B****Die Protection and Sensor Basics**

This program covers everything from die protection strategy, control logic, sensor selection, installation and wiring. Learn the three most useful sensor types for in-die use, the five most common mistakes made by novice sensor users and the one specification that best relates to sensor longevity in a harsh environment. The photos, video and diagrams used in this program consist of running real-world applications of affordable and commonly available sensors and equipment. Attendees can immediately implement what they learn in this seminar in their own facilities.

Jim Finnerty – Wintriss

**10:30 AM – 12:30 PM****S50: NEW! SOLVING PROGRESSIVE DIE PROBLEMS** **A****Solving Progressive Die Problems - Challenges & Practical Solutions**

This presentation provides a methodical approach to solving complex problems associated with progressive dies. Several testing procedures - performed with the die in the press - are presented to assist in isolating and identifying the root cause of common problems. Additional techniques and other practical solutions are presented to assist in finding and identifying hidden problems.

Peter Ulintz - Precision Metalforming Association

**S51: PRESS MAINTENANCE** **I****21st Century Press Maintenance: A New Approach**

This presentation will discuss methods to make your press maintenance lean by reducing costs, while at the same time increasing overall effectiveness. We will examine how to use the existing press systems such as tonnage monitors, brake monitors, lubrication systems and die protection as effective tools to monitor overall press condition. We will look at how the electronic

monitoring provides markers that trigger further mechanical inspection. Also reviewed will be the details of the inspection process and methods of data tracking for each press and workcell.

Jeff Fredline - Industrial Maintenance Company, LLC

**1:30 PM – 3:30 PM****S60: LUBRICATION TECHNOLOGY** **I****LUBRINOMICS - The Science of Lubrication & Economics in Metal Stamping**

LUBRINOMICS is the science that studies the economic activity and strategies to gain an understanding of the processes that govern the production, distribution and consumption of metal stamping lubricants. Lubricants are required during the stamping process and can make a major impact on the success or failure of an operation. Learn how to develop processes for proper dilution and control of process lubricants, the different compositions available and how to best apply these to your specific operation. Determine how to evaluate different lubricants during a trial, learn industry best practices and important metrics for overall success and improving the bottom line.

Steve Lowery - Tower Oil &amp; Technology Co.

**Sheetmetal Lubrication: Reducing Costs and Maintenance While Improving Safety and the Environment**

Sheetmetal lubrication makes the forming process easier but also creates a lot of problems for stampers. The costs associated with lubricants are numerous, i.e. application equipment, the lubricant itself, plant maintenance, safety and environmental issues. After a brief overview of the issues and problems related to the lubrication process, a new spraying technology will be introduced in detail along with how it is being applied in production equipment. Case studies are presented that show the cost savings stampers are experiencing.

Ron R. Demonet - Atlas Technologies, Inc.

**S61: NEW! ANSI Z244.1** **I****Utilizing the Updated ANSI Z244.1 Control of Hazardous Energy Servicing Exceptions to Benefit Machine Productivity**

OSHA introduced 1910.147 regulations in the late 1980s, based on the document issued by ANSI/ASSE known as Z244.1. With the release of an updated Z244.1 in 2016, language for the control of hazardous energy has been updated to include the current technology of safety systems, and be forward thinking in terms of how to utilize this technology for enhanced operator and machine efficiencies. The presentation will review the updated language in Z244.1 and provide examples on how it can apply to various scenarios encountered in the current production environment.

Ted Sberna - White Horse Safety

## FRIDAY, NOVEMBER 18

8:00 AM – 10:00 AM

**S70: SPRINGBACK ANALYSIS** **A****Springback: Recognizing, Predicting and Responding to Variation in Sheetmetal Stamped Parts**

In this session, participants will apply knowledge of core mechanical principles of stress and strain and properties of sheetmetal to identify sources of variation in stamping processes; correlate mechanical properties such as yield stress and elastic modulus to springback; recognize characteristics of dies and stamping processes on springback effects; identify methods to predict and address sheetmetal springback during design and engineering; and define reasonable expectations of springback and stamping process repeatability. Springback and other process variations will be discussed in terms of early engineering and finite element analysis, as will production variation and controls.

Eric Kam - AutoForm Engineering GmbH

**S71: NEW! MODERN PRESS TECHNOLOGY** **I****Increase ROI with Turnkey Hot Stamping Solutions**

This presentation will cover simulation and method planning and the process steps to evaluate the feasibility of producing parts by hot stamping. Learn about modifying and optimizing the part based on simulation results. Also explained will be the common challenges to using the process, including part quality, output rate and process monitoring. Other topics to be discussed: Use of pre-developed blanks to reduce laser trimming after forming; die design and manufacture for hot stamping; and strategies for improving die tryout.

Paul Thom - Schuler Inc.

**Servo Press Technology and Return on Investment**

This presentation will cover servo-press technology and return on investment and an overview comparison of mechanical vs. servo press technology. You'll be shown the advantages of servo, and learn the benefits of using custom motion profiles including full stroke vs. pendulum stroke/with video.

Barry Lewalski - Schuler Inc.

10:30 AM – 12:30 PM

**S80: NEW! AHSS TOOLING TECHNOLOGY** **B****Latest Generation Hybrid Blanking Lines**

Learn about the latest tendencies and trends in blanking advanced high-strength steels and aluminum. The process to obtain blanks made of these materials requires new and advanced technology. New hybrid blanking installations have been created by adding new levelers, servo-blanking presses, stackers and automation which also are more efficient than conventional lines.

Victor Esteban - Fagor Arrasate USA, Inc.

**Cold-Work Die Steel: Development and Application**

Due to increased stress when stamping high-strength steels, proactive measures against tool failures such as chipping and cracking are required. Matrix-type cold-work die steel, DCMX, has been developed to tackle these problems. DCMX provides a much higher toughness than does D2. DCMX also has superb machining efficiency and easy dimension control in heat treatment. DCMX has been used in drawing, trimming and other applications of high-tensile-strength steels. Due to small and isotropic dimensional change, this steel is applicable to high-temperature coated dies in which close tolerance is required.

Kunio Namiki - Daido Steel Co., Ltd.

**S81: IN-DIE SENSING** **B****How In-Die Sensing and Press Setup Technologies Enable Quick Die Changes and Prevent Die Crashes**

For many in stamping operations, poor part quality and missed production quotas can be a daily source of frustration. Teams need to identify quality issues early and adjust quickly so they can have zero defects shipped to customer. This is readily accomplished through in-die process validation, electronic measurement and part traceability. Through real-world examples, this session will discuss how press shops are successfully implementing error-proofing, preventing die crashes and implementing quick die changes regardless of their experience with automation.

Will E. Healy, III and Dave Bird - Balluff Inc.

**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, international cuisine and regional favorites — 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](http://fabtechbistro.com).





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## WEDNESDAY, NOVEMBER 16

**8:30 AM - 4:30 PM**

### W10: D1.1 - CODE CLINIC

This seminar will provide a “road map” through the Code, emphasizing the ability to locate important paragraphs, charts and tables quickly, which is crucial to understanding the code when working under stressful deadlines. In addition to practice questions, a practice exam will be administered, and the instructor will illustrate the use of the Code under time constraints, creating deadline pressure similar to the test environment. If you’re taking the CWI exam, this clinic has proven to be valuable test preparation. As a leading construction code, D1.1 is the ideal tool to teach effective code use. NOTE: Clinic fee does not include a copy of the D1.1/D1.1M:2015 STRUCTURAL WELDING CODE-STEEL. D1.1 Code Book may be purchased from the AWS Technical Standards Sales Team at (800) 443-9353 ext. 280. Attendees will receive our study guide, AWS D1.1 Code Clinic Reference Manual.

**8:30 AM - 4:30 PM**

### W11: CRASH COURSE OF WELDING INSPECTION TECHNOLOGY SEMINAR (WIT)

This one day seminar is designed to combine the normal two day Welding Inspection Technology (WIT) portion of the CWI seminar into a one day crash course. The intent is to breakdown and cover the common knowledge aspects as opposed to covering all ten Chapters of the Welding Inspection Technology (WIT) textbook/workbook. NOTE: Attendees will receive the Welding Inspection Textbook and Welding Inspection Workbook

**8:30 AM - 4:30 PM**

### W12: D17.1 - CODE CLINIC

The one day seminar will go through the Code, emphasizing the ability to locate important paragraphs, charts and tables quickly, which is crucial to understanding the code when working under stressful deadlines. The instructor will illustrate the use of the Code under time constraints, creating deadline pressure similar to the test environment. If you’re taking the Certification Endorsement exam, this clinic will prove valuable test preparation. NOTE: Clinic fee does not include a copy of the D17.1/:2010 Specification for Fusion Welding Aerospace Applications may be purchased from the AWS Technical Standards Sales Team at (800) 443-9353 ext. 280.

## THE WHY AND HOW OF WELDING PROCEDURE SPECIFICATIONS

**W13: BEGINNER** — 8:00 AM - 12:00 PM

**W14: ADVANCED** — 1:00 PM - 5:00 PM

**W15: BEGINNER AND ADVANCED** —  
8:00 AM - 5:00 PM

### Welding Procedure Specifications — Ensuring Consistent, Predictable Welding Processes Performance

As a welding professional who is constantly responding to customer demands for increasing the performance and quality of weldments while controlling costs, optimizing your WELDING PROCEDURE SPECIFICATIONS (WPSs) for performance and profitability may be the key. A well written WPS Defines, Measures, Analyzes, Improves, & Controls (DMAIC) quality in the welding process. This two-part workshop revisits the fundamentals of WPSs for both the seasoned professional and for those individuals seeking to become more proficient in the authoring and application of a WPS in fabrication as well as hands on approach to advanced instruction in the formulation and writing of WPSs in the afternoon.

### WHO SHOULD ATTEND:

This session will benefit owners, managers, engineers, and CWIs who must qualify, write, or revise welding procedure specifications to satisfy codes and contract documents.

### WHAT WILL BE ADDRESSED?

This workshop is divided into two half day sessions. The morning session addresses the fundamentals of WPSs. Morning topics are focused on:

- Welding processes
- Filler metal
- Shielding gases
- Current and voltage range, travel speed and heat input
- Joint design tolerances
- Joint and surface preparation
- Preheat / interpass temperature and welding positions
- Standard WPSs

The afternoon session focuses on the mechanics of WPSs by different codes and standards. Afternoon topics include:

- Proper preparation and qualification of welding procedure specifications
- Documenting standard procedure qualification testing for commonly used processes for joining ferrous plate and pipe
- Selecting and documenting welding variables
- Specifying essential and nonessential variables commonly used in sample AWS, ASME, and API code formats
- Different techniques to author WPSs

## WEDNESDAY, NOVEMBER 16 - THURSDAY, NOVEMBER 17

### 8:30 AM - 4:30 PM

#### W16: ASME SECTION IX, B31.1 & B31.3 CODE CLINIC

This 16-hour seminar will help you prepare for the ASME Section IX, B31.1, and B31.3 examination for endorsement or Part C of the CWI. Note that endorsements are supplemental inspection credentials available to AWS Certified Welding Inspectors (CWIs) and Senior Certified Welding Inspectors (SCWIs), but non-CWI/SCWIs can also participate in the seminar and examination to enhance their educational background. Participants are expected to provide their own codebooks. Please note that there is a separate application and fee required to take the Certification Exam.

## THURSDAY, NOVEMBER 17

### 8:00 AM -12:00 PM

#### W17: D1.5: BRIDGE CODE CLINIC

This 4-hour seminar will help you prepare for the AWS D1.5, Bridge Welding Code exam by instructing in code navigation, structure, and design. The seminar will focus on areas of the code relevant to the welding inspector, specifically clauses and sections concerning materials and design, fabrication, inspection, and qualification. Note that endorsements are supplemental inspection credentials available to AWS Certified Welding Inspectors (CWIs) and Senior Certified Welding Inspectors (SCWIs), but non-CWI/SCWIs can also participate in the seminar and examination to expand their professional credentials. Please note that there is a separate application and fee required to take the Certification Exam. NOTE: Clinic fee does not include a copy of AWS D1.5M/D1.5:2015 Bridge Welding Code. AWS D1.5M/D1.5:2015 Bridge Welding Code book can be purchased from WEX at (888) 935-3464.

### 8:00 AM - 12:00 PM

#### W18: ETHICS SEMINAR FOR CERTIFIED WELDING INSPECTORS - PART A

Working In the field as a Certified Welding Inspector is a very rewarding undertaking. However, it is wrought with perils relating not only to personal safety but also professionally, involving ethical decisions which could potentially (bite you in the ass) injure or even destroy your professional reputation. The AWS QC-1 code of ethics will be reviewed and then a panel will discuss scenarios and answer questions regarding ethical situations relating to the Certified Welding Inspector.

### 1:00 PM - 5:00 PM

#### W19: WHAT TO EXPECT AS A NEW CERTIFIED WELDING INSPECTORS - PART B

This seminar will supply insights, directions and recommendations for the Fledgling Certified Welding Inspector. If you have just accomplished your AWS QC-1 Certified Welding Inspector Goal this seminar is for you. After long hours of studying, a week long refresher course and a rigorous 6 hour exam. You were then awaiting your outcome for 8 long stress filled days you finally receive word; YOU PASSED! You spend a week or so basking in the warm comfort of success as the thought slowly creeps in on you. "Now that I have the CWI, what should I do with it and how do I do it? This seminar will supply strategies, information and recommendations on how to proceed with your new credential.

#### WHAT WE WILL DISCUSS:

- Welder Qualifications/Certifications
- Writing Welding Procedures
- Pricing services
- Visual inspection Techniques
- Insurance
- Adding credentials to enhance your CWI
- Advertising
- And More...

### 8:30 AM - 4:30 PM

#### W21: BETTER UNDERSTANDING OF WELDING SYMBOLS (A2.4 AND A3.0)

Welding symbols are a great communication tool — but are quite often misunderstood. While a designer typically knows what weld joint or weld they want, the welding symbol they place on a drawing is often either drawn incorrectly or is misinterpreted by the welder making the weld. Furthermore, many welding inspectors do not fully understand welding symbols and may be misinspecting welds. The goal of this seminar is to provide a good understanding of AWS welding symbols, with explanations of their proper and improper use. This seminar is geared for all involved with welding symbols—from designers who place them on drawings, to the welders who know what the designer wants (regardless of what the symbol says), to the welding inspector who has to verify that the final weld meets the welding symbol requirements. It will also be great for new engineers who do not have the experience with symbols, shop and field supervisors, and anyone else involved in manufacturing and welding. Examples of welding symbols which frequently trip up users and of real-life samples are provided. NOTE: Attendees will receive the following books: AWS A2.4:2012 Standard Symbols for Welding, Brazing, and Nondestructive Examination and AWS A3.0M/A3.0:2010 Standard Welding Terms and Definitions.

## SEMINARS

**8:00 AM - 5:00 PM****W22: THE NEW VISUAL INSPECTION WORKSHOP**

An 8-hour course for CWI exam candidates to review the basic concepts and applications of visual inspection. After a discussion of the limitations and advantages of visual inspection, types of weld data that may be obtained by visual inspection are presented and discussed. Includes the many types of discontinuities encountered during the visual inspection of welds. Common tools used for visual inspection are presented and discussed (a machinist's scale, dial calipers, micrometers, fillet weld gages, the Palmgren gage, and the V-WAC). Participants will use these gages to make measurements on weld replicas. This will prepare candidates for Part "B" of the exam. A sample weld specification containing acceptance criteria is presented and discussed, after which students use the specification and visual inspection tools to evaluate the weld replicas using a series of specific questions and scenarios.

**8:30 AM - 4:30 PM****W23: FUNDAMENTALS OF LIQUID PENETRANT TESTING FOR CWI'S AND QUALITY ASSURANCE PERSONNEL**

The purpose of this seminar is to provide the fundamental knowledge of penetrant testing required by Certified Welding Inspectors and quality assurance and test personnel to enable them to: ascertain that the proper test technique, or combination of techniques, is being used to assure the quality of the finished product; interpret, evaluate, and make a sound decision as to the results of any liquid penetrant test; and recognize those areas of doubtful test results that require either retest or assistance in interpretation and evaluation.

**TOPICS COVERED INCLUDE:**

- Introduction and testing philosophy

- Liquid penetrant testing principles with description of procedures, applications, and capabilities
- Equipment and materials
- Testing techniques including selection of penetrant materials and processes
- Interpretation of test results with description of indications and their characteristics
- Quality control of penetrant materials

**FRIDAY, NOVEMBER 18****8:30 AM - 4:30 PM****W24: FUNDAMENTALS OF RADIOGRAPHIC INSPECTION FOR CWI'S AND QUALITY ASSURANCE PERSONNEL**

The purpose of this workshop is to provide the fundamental knowledge of radiography required by Certified Welding Inspectors and quality assurance and test personnel to enable them to: ascertain that the proper test technique, or combination of techniques, is being used to assure the quality of the finished product; interpret, evaluate, and make a sound decision as to the results of any radiographic test; and recognize those areas of doubtful test results that require either retest or assistance in interpretation and evaluation.

**TOPICS COVERED INCLUDE:**

- Introduction and testing philosophy
- Radiographic principles, description of X-rays and gamma rays
- Radiographic equipment, industrial X-ray and gamma ray equipment, gamma-ray sources, and equipment description
- Radiographic film, characteristics of film, film processing, and required equipment
- Safety considerations, X-ray, gamma ray, and electrical

## CONFERENCES

**WEDNESDAY, NOVEMBER 16****8:00 AM - 5:00 PM****W25: DESTRUCTIVE AND NON-DESTRUCTIVE TESTING CONFERENCE**

A full day conference about testing at this year's FABTECH will feature destructive testing in the morning and nondestructive testing in the afternoon. A number of destructive testing methods will be covered, including the Charpy test. Featured in the afternoon session will be a presentation on phased array NDT.

**1:00 PM - 5:00 PM****W26: THERMAL SPRAY COATINGS - FREE**

**What Is It? Where Is It Used?  
How Does It Work?**

James Weber, Sulzer Chemtech USA

This group will discuss most aspects of thermal spray coatings including thermal spray processes, equipment, pre and post treatment, applications, and industry usage. Processes covered will include flame spray (powder, wire, and rod), detonation spray, high velocity oxy/fuel spray (HVOF), cold spray, plasma spray, and twin wire electric arc spray. Several thermal spray guns will be available for attendees to handle and discuss throughout the class. Complex automated thermal spray systems and spray booths will be illustrated and discussed. Application examples will be presented for a variety of requirements from several different industries. Industry usage charts will be reviewed listing several processes and coating applications used by various industries.

Open and lively discussion is welcomed and encouraged by the presenter who has nearly 30 years experience in the thermal spray industry.

## CONFERENCES

**WEDNESDAY, NOVEMBER 16  
- THURSDAY, NOVEMBER 17****W27: SO YOU'RE THE NEW WELDING  
ENGINEER**

Get "up to speed" quickly, ask the right questions and get the results needed to save money and stay out of trouble! Two-day conference for Managers/Engineers/Designers, and others with welding responsibility but limited exposure/background in welding. The session is based on arc welding applications but the principles have universal applicability. Presentations and discussion are based on the "Application Analysis Worksheet," which was developed to teach a senior college course to engineers about to enter industry, with the objective of helping them develop a path to understand and deal with the challenges they were about to face.

**DAY 1 — WEDNESDAY****8:00 AM – 8:30 AM****Welcome and Introductions**

Team

**8:15 AM – 8:45 AM****Keynote Speaker**

David Landon - Vermeer

**8:45 AM – 9:45 AM****Application Analysis**

Fritz Saenger - Consultant

**10:00 AM – 11:00 AM****Key Background Information**

Walter Sperko - Sperko Engineering Services, Inc.

**11:00 AM – 12:00 PM****"Matching" the Base Materials and the Weld**

David Meyer - ESAB Welding &amp; Cutting

**12:00 PM – 1:00 PM - Lunch****1:00 PM – 2:00 PM****Pre and Post Weld Operations**

Mike Rice - Nooter Corp.

**2:00 PM – 3:15 PM****Arc Welding Process Modes — What Are You Using? What Are "Advanced" Modes? Would You Benefit from "Advanced" Equipment and Techniques?**

Nino Mascalco - ESAB Welding &amp; Cutting

**3:15 PM – 3:30 PM - Break****3:30 PM – 4:30 PM****The Welding Procedure**

Lee Kvidahl - Ingalls Shipbuilding

**4:30 PM – 5:00 PM****Making Your PROCEDURE Robust: Controlling the Critical Parameters**

Randy Dull - EWI

**DAY 2 — THURSDAY****8:00 AM – 8:20 AM****Automotive Welding – Some of the Most Sophisticated Welding Done Today**

Jerry Uttrachi - AWS President 2014

**8:20 AM – 9:15 AM****Weld Quality — Requirements of Different Types of Applications: Commercial, Military, Industry, etc.**

Dick Holdren - Arc Specialties

**9:15 AM – 10:00 AM****Welding Costs**

Pete Ullman - Techniweld

**10:00 AM – 10:15 AM – Break****10:15 AM – 11:15 AM****The Automation Decision**

Jeff Noruk - Sevo Robot Corp.

**11:15 AM – 12:15 PM****Aluminum**

Tony Anderson - Miller Electric

**12:15 PM – 1:00 PM – Lunch****1:00 PM – 2:00 PM****Welding Safety**

Susan Fiore - Hobart Brothers Co.

**2:00 PM – 2:50 PM****What is "Productivity"?**

Fritz Saenger - Consultant

**2:50 PM – 3:00 PM – Break****3:00 PM – 4:00 PM****Stainless and Heat Resisting Steels**

William Newell - W.F. Newell &amp; Associates, Inc.

**4:00 PM – 4:30 PM****Review of the Applications Analysis — and a "To Do" List**

Team

**4:30PM – 5:00PM****Adjourn and Individual Discussions****THURSDAY, NOVEMBER 17****9:00 AM – 5:00 PM****W28: DISTORTION CONTROL  
CONFERENCE**

Among the subjects for this important conference will be arc straightening and thermal forming. Also, attention will be paid to some of the welding processes that reduce the existence of distortion. The ICE process is one of them.

## RWMA RESISTANCE WELDING SCHOOL

## THURSDAY, NOVEMBER 17

7:45 AM – 5:00 PM

W29: RWMA SCHOOL – DAY 1

**Welcome and Introduction to Resistance Welding**

Mark Siehling - RoMan Manufacturing Inc.

**Welding Processes & Machines**

This session will reinforce the very essence of how the resistance welding process works and how the process relates to each of the four resistance welding processes. This session will be full of application examples from each process, and will show how machinery utilizes the individual components and elements illustrated in the other sessions.

Tim Foley - Automation International, Inc.

**Materials**

Not all materials are created equal, especially from the perspective of resistance welding. This session will present a brief overview of the most common materials joined by the resistive processes. Don will also highlight specific methodologies for joining them that have proven successful over his 20 years in the resistance welding industry.

Donald Maatz - RE Automated

**Electrodes and Tooling**

This session will focus on the classification, selection and maintenance of electrodes and fixtures as they pertain to numerous applications. Discover powerful problem/evaluation/solution techniques that will keep a production process running longer and an operation more efficient.

Bill Brafford - Tuffaloy Products, Inc.

**Electrical Power Systems**

This session reviews the descriptions and maintenance of electrical power components and conductors from the weld control to the electrode. This lively presentation has something for everybody. Utilizing several small demonstrations, Mark Siehling will keep attendees on the edge of their seats as he highlights the important part of the resistance welding process.

Mark Siehling - RoMan Manufacturing Inc.

**Question and Answer Session**

## FRIDAY, NOVEMBER 18

8:00 AM – 4:30 PM

W29: RWMA SCHOOL – DAY 2

**Welding Controls**

This discussion focuses on the selection, descriptions, and applications of welding timers, contractors, and accessories. Packed with a punch, Don Sorenson drives home understanding energy that creates a weld,  $H=I^2rt$ , that is unforgettable. Learn how this invaluable formula is used in every resistance welding application—every day—every cycle—all the time!

Don Sorenson - ENTRON Controls, LLC.

**Resistance Spot and Projection Weld Standards and Quality**

A unique session designed to make you think about the quality standards associated with two common forms of resistance welding, spot and projection. After hearing Don's presentation, it is very possible that you will never look or think about a weld the same way again.

Donald Maatz - RE Automated

**Initial Machine Set-Up**

Mike takes the mystery out of weld program setup by guiding attendees through the steps required to select proper welding schedules. He will also introduce preventive maintenance programs designed to make resistance welding operations more profitable. Hands-on demonstrations peak this presentation.

Mike Prokop - Taylor-Winfield Technologies, Inc.

**Troubleshooting and Maintenance**

We have been using this Weld Schedule for two years! Why are my welds failing? If your weld schedule hasn't changed, maybe it's not the problem. Mike Prokop will guide you through the process of determining where the problem may be and how to correct it.

Mike Prokop - Taylor-Winfield Technologies, Inc.

**Panel Discussion and Welder Demonstration**

## WORKSHOP

## THURSDAY, NOVEMBER 17

8:00 AM - 12:30 PM

AWF100: LASER WELDING FOR TODAY'S FABRICATOR WORKSHOP

This very extensive workshop will cover everything from basic understanding of laser welding to laser sources, systems overview, product design, implementation, material selections, hybrid welding, standards and new additive technologies. Come hear these experts share their combined experience for everything you need to know about laser welding for today's fabricator.

**Introduction to Industrial Laser Welding**

Mark Taggart - Laser Mechanisms, Inc.

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

Jean-Philippe Lavoie - Coherent

**System Overview for Laser Welding**

Mark Rodighiero - Amada Miyachi America

**Product Design Principles & Implementation Considerations**

David Havrilla - TRUMPF Inc.

**Material Selection for Laser Welding**

Geoff Shannon - Amada Miyachi America

**Hybrid Laser Welding**

Paul Denney - Lincoln Electric

**Standards for Laser Welding**

Todd Palmer - Penn State University

**Laser Welding and Additive Technologies**

Scott Poeppel - Joining Technologies, Inc.



## PROFESSIONAL PROGRAM

Pick and choose between concurrent sessions for the latest in welding research and commercial developments. Pay by the day or attend the entire three-day program, with special discounts for students and members of AWS, FMA, SME, PMA, or CCAI.

**1-Day Professional Program: Wednesday: W31, Thursday: W32, Friday: W33**

**3-Day Professional Program: W34**

**3-Day Student Professional Program: W35**

### WEDNESDAY, NOVEMBER 16

#### SESSION 1: WELDING METALLURGY & WELDABILITY SESSION A

Chairs: Z. Xu (Harbin Institute of Technology) and Z. Yu (Colorado School of Mines)

##### 1A. 2:00 PM Phase Transformations and Mechanical Properties of Fusion Welds in 10 wt% Nickel Steel

Erin Barrick and John DuPont, Lehigh University, Bethlehem, PA

##### 1B. 2:20 PM Development of a CCT Diagram for the Intercritical Heat Affected Zone in Grade 91 Welds

Kyle Stritch, The Ohio State University, Columbus, OH

##### 1C. 2:40 PM Quantification of the Effect of Misalignment on Hydrogen-Assisted Cracking of SMAW Pipeline Welds

Mitchell Grams and Patricio Mendez, University of Alberta, Edmonton, Canada, Denys Vodyk and John Goldak, Carleton University, Canada

##### 1D. 3:00 PM Defect Formation in Welds of Higher Melting Temperature Consumable on Lower Melting Temperature Substrate: Low Alloy Steel Welded over Nickel-Based Alloy

Evan O'Brien and Boian Alexandrov, The Ohio State University, Columbus, OH

##### 1E. 3:20 PM Gleeble Multipass Welding Simulations Of Precipitation Hardened Stainless Steels 17-4 And 13-8+Mo

Robert Hamlin, Lehigh University, Bethlehem, PA

##### 1F. 3:40 PM Effect of Composition on Grain Boundary Wetting Characteristics in Ni-30Cr Weld Metal

Rebecca Wheeling and John Lippold, The Ohio State University, Columbus, OH

##### 1G. 4:00 PM Stress Relief Cracking of High Temperature Alloys

Rishi Kant and John DuPont, Lehigh University, Bethlehem, PA

##### 1H. 4:20 PM Ferritic and Austenitic Welds in High Strength Steels: Metallurgical Characterization and Weldability Evaluation

Matthew Duffey, The Ohio State University, Columbus, OH

##### 1I. 4:40 PM Dynamic Behaviors of Solder Filling in Ultrasonic Soldering

Zhiwu Xu, Lin Ma, Ziwei Cao and Jiuchun Yan, State Key Laboratory of Welding and Joining, Harbin Institute of Technology, Harbin, China

#### SESSION 2: MODELING

Chairs: C.S. Wu (Shandong University), Y.P. Yang (EWI)

##### 2A. 2:00 PM Toward Physics-based Predictive Modeling of Inertia Friction Welding

Daniel Tung and Wei Zhang, The Ohio State University, Columbus, OH, David Mahaffey, Oleg Senkov and S. Lee Semiatin, Air Force Research Laboratory

##### 2B. 2:20 PM Exploring Methods for Producing Standard Reference Data for Calibration of Numerical Welding Simulations

Jeffrey Sowards, Erik Pfeif, Boris Wilthan, Kenneth Kroenlein and Brian Simonds, NIST, Boulder, CO

##### 2C. 2:40 PM Computational Simulation and Validation of Various Synergic Welding Machines

Charles Fisher, Caroline Scheck, Kim Tran and Gary Margelowsky, Naveal Surface Warfare Center – Carderock Division (NSWCCD), West Bethesda, MD

##### 2D. 3:00 PM Study of Medium Influence on the Cooling Conditions of an API 5L X80 Pipe In-Service Welding Through the Finite Element Method

Antonio Alves, Dario Magno Ferreira Batista, Rubelmar Maia de Azevedo Cruz Neto and Sergio Duarte Brandi, University of São Paulo, São Paulo, Brazil

##### 2E. 3:20 PM External Electromagnetic Force Assisted Suppression of Humping Bead in High-Speed GMAW

Chuan Song Wu, Lin Wang, Ji Chen and JinQiang Gao, Institute of Materials Joining, Shandong University, Jinan, China

##### 2F. 3:40 PM Study on Dynamic Development of Three-Dimensional Weld Pool Surface in GTAW

Jiankang Huang, Xiaoying He, Yu Shi and Ding Fan, School of Materials Science and Engineering, Lanzhou University of Technology, Lanzhou, China

##### 2G. 4:00 PM Study of Thermal-Mechanical Coupled Model of Plasma Arc Keyhole Welding

Shujun Chen, Bin Xu and Fan Jiang, Beijing University of Technology Beijing, China, Qingxian Hu, Jiangsu University of Science and Technology, Zhenjiang, China

##### 2H. 4:20 PM Keyhole Growth Rates During Laser Welding of Several Alloys

Jared Blecher, 3D Systems, State College, PA and Todd Palmer, Applied Research Lab, University Park, PA, Tarasankar DebRoy, Penn State University, University Park, PA

##### 2I. 4:40 PM Computational Study of Thermal-Buckling in Mechanically Fastened Aluminum Steel Bi-Metal Structure

Alisha Cardanini, The Ohio State University, Columbus, OH, Zhili Feng, ORNL and Eric Boettcher, HRA

**WEDNESDAY, NOVEMBER 16****SESSION 3: ARC WELDING**

Chairs: P.W. Fuerschbach (SmartWeld Solutions), F. Jiang (Beijing University of Technology)

**3A. 2:00 PM Metallurgical Advantage of Spin-Arc Welding on HSLA Steels**

Wesley Wang, Marc Purslow and Steve Manning, EWI, Columbus, OH

**3B. 2:20 PM Droplet Temperature and Fall Voltages in GMAW utilizing CO<sub>2</sub> Shielding Gases**

Cory McIntosh and Patricio Mendez, University of Alberta, Edmonton, Canada

**3C. 2:40 PM Comparison of Energy Act on Workpiece among Non-Transferred Plasma Arc Welding, Plasma Arc Welding and Twin-Body Plasma Arc Welding**

Shujun Chen, Ruiying Zhang and Fan Jiang, Beijing University of Technology, Beijing, China

**3D. 3:00 PM Pulsed Gas Metal Arc Welding of Aluminum Using SpinArc**

Andrew Deceuster, Weber State University, Ogden, UT

**3E. 3:20 PM The Role of Oxygen in Arc Stabilization for Aluminum GMAW**

Paul Burgardt, Carl Cross, Jesse Martinez and Andy Duffield, Los Alamos National Laboratory, Los Alamos, NM

**3F. 3:40 PM Arcing-wire PAW—Coupled Arc Welding Process in High-speed**

Shujun Chen, Liang Zhag, Guangqiang Men and Yaxiu Song, Beijing University of Technology, Beijing, China

**3G. 4:00 PM Characterization of Modified Hot-Wire Gas Tungsten Arc Process Parameters of Welded HSLA Steel**

Drew White and Stephen Liu, Colorado School of Mines, Golden, CO

**3H. 4:20 PM Measurement and Analysis of Hollow Cathode Centered Negative Pressure Arc**

Jiang Fan, Shujun Chen, Zhaoyang Yan and Bin Xu, Beijing University of Technology, Beijing, China, YuMing Zhang, University of Kentucky, Lexington, KY

**3I. 4:40 PM Effect of Welding Fluxes on Metal Transfer in SAW**

Vivek Sengupta and Patricio Mendez, CCWJ, University of Alberta, Edmonton, Canada

**THURSDAY, NOVEMBER 17****SESSION 4: PLENARY SESSION**

Chairs: T.J. Lienert (LANL) and Y.M. Zhang (University of Kentucky)

**4A. 8:00 AM The Evolution of the American Welding Society - The Past 50 Years and the Next 50 Years**

Thomas Eager, Massachusetts Institute of Technology, Cambridge, MA

**4B. 9:00 AM Micromechanism of Cleavage Fracture in Welding Metals**

Jianhong Chen and Rui Cao, Lanzhou University of Technology, Lanzhou, China

**SESSION 5: BATTERY WELDING**

Chairs: W. Cai (GM Research) and L.G. E (Bosch Battery Systems)

**5A. 10:00 AM Lithium-Ion Battery Joining For Electric Vehicles: A Contemporary Overview**

Wayne Cai, GM, Warren, MI

**5B. 10:20 AM Bond Formation and Parameter Effects in Al/Cu Ultrasonic Welding Process**

Ying Luo, University of Michigan, Ann Arbor, MI

**5C. 10:40 AM Multi-Layer Foil-to-Tab Joining for the Lithium-Ion Battery Industry**

Mitch Matheny, EWI, Columbus, OH

**5D. 11:00 AM Heavy Al & Cu Wire Bonding for Battery Applications**

Mike McKeown, Hesse Mechatronics, Mineola, NY

**5E. 11:20 AM Laser Welding Simulation of Thin Al/Cu Metals**

Wayne Cai, GM, Warren, MI

**5F. 11:40 AM Laser Welding for Automotive Prismatic Lithium-ion Batteries in Mass Production**

Pierson Cheng, TRUMPF Inc., Plymouth Township, MI

**SESSION 6: HONORARY SYMPOSIUM FOR PROF. T. EAGAR - SESSION A**

Chairs: J. DuPont (Lehigh U)

**6A. 10:00 AM Modeling of Welding Phenomena with an Eye on the Practitioners**

Patricio Mendez, University of Alberta, Edmonton, Canada

**6B. 10:40 AM Professor Tom Eagar: A Scientist and an Engineer**

Stan David and Zhili Feng, Oak Ridge National Laboratories, Oak Ridge, TN

**6C. 11:20 AM Heat Transfer, Fluid Flow and Solidification in Additive Manufacturing**

T. DebRoy, Penn State University

**SESSION 7: MECHANICAL PROPERTIES**

Chairs: P. Hohanadel (LANL), X. Yu (ORNL)

**7A. 2:00 PM New Flux-Cored Arc Welding Electrode Design for Producing Ultra-Clean Weld Deposits with Extreme Toughness**

Susan Fiore, Hobart Brothers, Troy, OH

**7B. 2:20 PM Effect of Microstructure on Deformation Behaviors of Ultra-high Strength Steel Resistance Spot Welds**

Andrea Peer, Ying Lu and Wei Zhang, The Ohio State University, Columbus, OH

**7C. 2:40 PM Wide Gap Braze Repairs of Nickel Superalloys: Bend Properties and Crack Behavior Characterization**

Cheryl Hawk, Colorado School of Mines, Golden, CO

**7D. 3:00 PM Multi-Scale Modeling and Fracture Mechanics of Nickel-based Superalloy Brazed Joints**

Bryan Riggs, Avraham Benatar, Boian Alexandrov and Ray Xu, The Ohio State University, Columbus, OH

## PROFESSIONAL PROGRAM

**7E. 3:20 PM Yield, Tensile Strength and Fracture Toughness Evolution Across Welded Joints**

Simon Bellemare, Michael Tarkanian, Steven Palkovic, Kotaro Taniguchi and Phillip Soucy, Massachusetts Materials Technologies LLC, Cambridge, MA

**7F. 3:40 PM Residual Stress Quantification of Non-Pressure Retaining External Attachment Weld Applications to Evaluate the Need of PWHT**

Rashed Alhajri and Stephen Liu, Colorado Schools of Mines, Golden, CO

**7G. 4:00 PM Effect of Low Heat Input on Creep Strength of 9Cr-1MoV Weldments**

Tyler Payton, Harrison Whitt, Mike Mills, Wei Zhang and Yanli Wang, The Ohio State University, Columbus, OH

**7H. 4:00 PM Erosive Wear Resistance of Laser Cladding CoCrMo Coatings Over Mild Steel**

Alejandro Vargas-Uscategui, Jose Aguilar-Hurtado, Nazmul Alam and Stefan Gulizia, Universidad de Chile, Santiago, Chile

**7I. 4:00 PM Effect of Welding Fabrication Method on the Mechanical Properties and Pitting Corrosion Resistance of GTAW Welds for Super Duplex Stainless Steel**

Gi Deok Park, Hyun Rae Park, Jong Min Park and Ki Hyung Han, Daewoo Shipbuilding & Marine Engineering Co., Ltd, Geoje-daero, South Korea

**SESSION 8: HONORARY SYMPOSIUM FOR PROF. T. EAGAR - SESSION B**

Chairs: Dr. YuKang Liu (MathWorks) and Professor John Steele (Colorado School of Mines)

**8A. 2:00 PM Is Metal Additive Manufacturing Really Different Than Welding?**

John Elmer, LLNL, Livermore, CA

**8B. 2:30 PM Understanding the Link Between Microstructural Evolution And Weld Strength Reduction Factors In New Superalloys Designed For Advanced Power Plants**

John DuPont and Daniel Bechetti, Lehigh University, Bethlehem, PA

**8C. 3:00 PM Nanoscale Size Effect on Thermodynamic Stability of Hexavalent Chromium in Welding Fume**

Neil Jenkins, Richard Taylor and Thomas Eagar, Harvard School of Public Health, Cambridge, MA

**8D. 3:20 PM A Tribute to Tom Eagar: Computational Modeling of Transient Liquid Phase Bonding and its Application to Microelectronics Packaging**

Raymundo Arroyave, Texas A&M University, College Station, TX

**8E. 3:40 PM Computational Modeling of Heat Transfer and Fluid Flow during Laser-Powder Bed Fusion Additive Manufacturing and Experimental Validation**

Yi Li and Wei Zhang, The Ohio State University, Columbus, OH, Yousub Lee, Oak Ridge National Laboratory, Oak Ridge, TN, Jacob Marchal, EWI, Columbus, OH

**8F. 4:00 PM Selection and Properties of Shielding Gases Used for Welding**

Mikal C. Balmforth and Thomas Eagar, Materials and Engineering Group LLC, Cambridge, MA

**8G. 4:20 PM The Influence of Tom Eagar on MMT Technology Development**

Michael Tarkanian, Steven Palkovic and Simon Bellemare, Massachusetts Materials Technologies LLC, Cambridge, MA

**8G. 4:40 PM Influence of Reheating Conditions and Cooling Rates Through  $\Delta T_{8/5}$  On the Formation of Crn, Cr2N and Austenite in a Simulated Welding Cycle of a Lean Duplex Steel**

Vit Janik, Ivani Bott, Sam Clark and Sridhar Seetharaman, WMG University of Warwick, Coventry, United Kingdom

**SESSION 9: SENSING AND ANALYSIS**

Chairs: J. Chen (ORNL) and N. Barnes (U of Alberta)

**9A. 2:00 PM Real-time Strain and Stress Monitoring During Welding**

Jian Chen, Roger Miller and Zhili Feng, Oak Ridge National Laboratory, Oak Ridge, TN, Zongyan Chen, University of Tennessee, Knoxville, TN

**9B. 2:20 PM Laser Vision Based Defect Detection of the Weld Bead in GTAW**

Gang Zhang, Yu Shi, Yufen Gu and Ding Fan, Lanzhou University of Technology, Lanzhou, China, YuMing Zhang, University of Kentucky, Lexington, KY

**9C. 2:40 PM Measurement and Analysis of Arc Length and Droplet Size in AC Twin-Wire Indirect Arc**

Shujun Chen and Liwei Wang, Beijing University of Technology, Beijing, China

**9D. 3:00 PM Gas Tungsten Arc Welding Monitoring Using Multiple Optical Sensing System**

Zongyao Chen, Jian Chen and Zhili Feng, University of Tennessee, Knoxville, TN

**9E. 3:20 PM Weld Pool Surface Dynamic Behavior for Penetration Monitoring and Control**

Jinsong Chen, University of Kentucky, Lexington, KY, Jian Chen and Zhili Feng, Oak Ridge National Lab, Oak Ridge, TN, YuMing Zhang, University of Kentucky, Lexington, KY

**9F. 3:40 PM Visual Sensing Of the Physical Process During Underwater Wet FCAW**

Chuanbao Jia, Yong Zhang and Chuansong Wu, Shandong University, Jinan, China

**9G. 4:00 PM Assessment of Wireless Guided System for Supervised Mechanized Welding With Near-Infrared Illumination**

Carolina Mota, Federal Institute of Triangulo Mineiro, Ituiutaba, Brazil, Louriel Vilarinho and Roberto Finzi Neto, Federal University of Uberlandia, Uberlandia, Brazil

**9H. 4:20 PM Wavelet Package Based Denoising Technique for Defect Detection in Austenitic Stainless Steel Weldment Using Ultrasonic Method**

Dazhao Chi, Harbin Institute of Technology, Harbin, China

**9I. 4:40 PM In-Situ Visualization of Solidification in Chromium Carbide Weld Overlays**

Narin Barnes and Patricio Mendez, University of Alberta, Edmonton, Canada, Sridhar Seetharaman and Samuel Clark, University of Warwick, Canada

## FRIDAY, NOVEMBER 18

## SESSION 10: DISSIMILAR JOINING APPLICATIONS

Chairs: B. Alexandrov (OSU) and M. Tumuluru (USS)

**10A. 8:00 AM Characterization of Weld Fusion Boundary between Steel and Carbide Dissimilar Materials**

Leijun Li, University of Alberta, Edmonton, Canada

**10B. 8:20 AM Dissimilar Metal Welding of X65 Steel Pipes with Super Duplex Stainless Steel Filler Metal**

Emeric Suma, The Ohio State University, Columbus, OH

**10C. 8:40 AM Minimization of Carbon Diffusion and Thermal Stresses in Dissimilar Metal Welds in Nuclear Applications by the Development of Novel Functionally Graded Transition Joints**

Jonathan Galler and John DuPont, Lehigh University, Bethlehem, PA

**10D. 9:00 AM Metallurgical Characterization of Induction Bent Dissimilar Metal Welds**

Rex Alexandre and Boian Alexandrov, The Ohio State University, Columbus, OH

**10E. 9:20 AM Laser Welding Dissimilar Materials for Tab to Terminal Joining**

Geoff Shannon, Amada Miyachi America, Monrovia, CA

**10F. 9:40 AM Metallurgical Characterization of Dissimilar Metal Welds in Grade F65 Steel to Grade F22 Steel Overlaid with Low Alloy Steel Filler Metal**

Ryan Buntain and Boian Alexandrov, The Ohio State University, Columbus, OH

**10G. 10:00 AM Microstructural and Mechanical Evaluation of Stainless Steel to Fe-Co-V Soft Magnetic Alloy Friction Welds**

Jeffrey Rodelas, Don Susan, Michael Maguire and Jay Carroll, Sandia National Laboratories, Albuquerque, NM

**10H. 10:20 AM Hydrogen Embrittlement in Dissimilar Metal Welds for Subsea Service: Associated Transition Zone Microstructures and Fracture Modes**

Carolin Fink and Boian Alexandrov, The Ohio State University, Columbus, OH, Desmond Bourgeois and Jamie Fenske, ExxonMobil Development Company

**10I. 10:40 AM Laser Welding of Dissimilar Precious Metal Electrical Contact Alloys**

Donald Susan, Jeff Rodelas and Pierrette Gorman, Sandia National Laboratories, Albuquerque, NM

**10J. 11:00 AM Characterization Near the Dissimilar Weld Interface Location in Grade 91 DMWs**

Michael Kuper and Boian Alexandrov, The Ohio State University, Columbus, OH, Joshua Burgess, GE Power, Chattanooga, TN

**10K. 11:20 AM Dissimilar Metals Joining with 2507 Super-Duplex Stainless Steel to Carbon Steel, Stainless Steel and Nickel Alloys**

Mikael Johansson, Sandvik Materials Technology

**10L. 11:40 AM Welding of Internally Clad X65 Pipes with Filler Metals of Precipitation Strengthened Ni-base Alloys**

Graciela Penso and Boian Alexandrov, The Ohio State University, Columbus, OH

## SESSION 11: SOLID-STATE PROCESSES

Chairs: W. Tang (ORNL), T. Lienert (LANL)

**11A. 8:00 AM Friction Stir Welding of Helium Content 304 Stainless Steel**

Wei Tang and Zhili Feng, Oak Ridge National Laboratory, Oak Ridge, TN, Artie Peterson and Greg Frederick, Electric Power Research Institute, Charlotte, NC

**11B. 8:20 AM Fabrication of Nuclear Fuel Plates Using Friction Stir Welding - First Approach**

Karem Tello and Diego Mena, Universidad Técnica Federico Santa María, Valparaíso, Chile, Luis Olivares, Carlos Gutierrez and Jaime Lisboa, Comisión Chilena de Energía Nuclear, Santiago, Chile

**11C. 8:40 AM Effect of Welding Parameters on Mechanical Properties of Friction Stir Welded 5A06 Al Alloy**

Shujun Chen, Xiaoxu Li, Xiaoqing Jiang and Fan Jiang, Beijing University of Technology, Beijing, China

**11D. 9:00 AM Characterization of Residual Stress As a Function of Friction Stir Welding Parameters in Oxide Dispersion Strengthened (ODS) Steel MA956**

Luke Brewer, The University of Alabama, Tuscaloosa, AL, E. Andrew Payzant and Lindsay Sochalski-Kolbus, Oak Ridge National Laboratory, Oak Ridge, TN, Brad Baker, United States Naval Academy, Annapolis, MD

**11E. 9:20 AM Microstructures Evolutions in Underwater Friction Stitch Welding Of DH36 Steel**

Zhijiang Wang, Dongpo Wang, Jinhua Teng, and Lei Cui, Tianjin University, Jun Cao, Offshore Oil Engineering, Co., Ltd

**11F. 9:40 AM Friction Bit Joining Of Polymer Composites to Advanced High Strength Steel for Lightweight Vehicle Application**

Hoonmo Park and Junho Jang, Hyundai Motor Company, Yong Chae Lim, Jong Khak Keum, Zhili Feng, Oak Ridge National Laboratory, Oak Ridge, TN

**11G. 10:00 AM Friction Plug Welding Process of Al-Cu Alloy for Rocket Tank**

Lei Cui, Xinqi Yang, and Dongpo Wang, Tianjin University, Tianjin, China

**11H. 10:20 AM Formation Mechanism of Wavy Interface by Stud-Typed Spin Impact Bonding Of Copper to Low Carbon Steel**

Jianping He, Donald Sirois, Howard Wickle and Bryan Chin, Auburn University, Auburn, AL

**11I. 10:40 AM Explosion Welding As a Method for Highly Dissimilar Metal Joining To Facilitate Lighter Weight Welded Designs**

Michael Blakely and Tom Morey, NobelClad, Boulder, CO

**11J. 11:00 AM Fundamental Understanding of the Mechanism of Solid State Weld Formation in Dissimilar Metal Welds**

Niyanth Sridaran, Marcelo Dapino, David Seidman and S.S. Babu, University of Tennessee, Knoxville, TN, Dieter Isheim, North Western University

**11K. 11:20 AM Bonding Mechanism of Magnetic Pulse Welded Dissimilar Materials**

Shujun Chen and Shan Su, Beijing University of Technology, Beijing, China

## PROFESSIONAL PROGRAM

**11L. 11:40 AM Exploring Interface Character and Bond Quality in Explosive Bonds of Stainless Steel via Three-Dimensional Reconstruction**

Olivia Underwood, Sandia National Laboratories

**SESSION 12: OVERLAY AND ADDITIVE MANUFACTURING**

Chairs: W. Zhang (OSU), T. Palmer (Penn State Univ)

**12A. 8:00 AM A New Approach to Determining Bead Width and Height in Coaxial Laser Cladding**

Gentry Wood and Patricio Mendez, University of Alberta, Edmonton, Canada

**12B. 8:20 AM Ni-WC Hardfacing by Gas-Metal Arc Welding**

Ping Yu and Sindo Kou, University of Wisconsin, Madison, WI, Xiao Chai, Novelis Global Research &amp; Technology Center, Kennesaw, GA, Derek Landwehr, Fisher Barton Technology Center, Watertown, WI

**12C. 8:40 AM Effect of Postweld Heat Treatment on the Properties of Steel Clad with Alloy 625 for Petrochemical Applications**

Tao Dai and John Lippold, The Ohio State University, Columbus, OH

**12D. 9:00 AM Corrosion of Weld versus Wrought Austenitic Stainless Steel for Cladding**

Nathan Switzner, Zhenzhen Yu and Stephen Liu, Colorado School of Mines, Golden, CO, Thomas Lienert, LLNL, Los Alamos, NM

**12E. 9:20 AM High Quality Electroslag Strip Cladding Of Alloy 625 with Controlled Dilution and Composition**

Russell Fuchs, Mathieu Decherf and Ronny Demuzere, Voestalpine Bohler Welding USA, Inc., Sugarland, TX

**12F. 9:40 AM Development of a Numerical Modeling Tool to Predict Microstructure, Residual Stress, and Deformation in Laser Powder Bed Fusion Process**

Yu-Ping Yang, Mahdi Jamshidinia, Paul Boulware and Shawn Kelly, EWI, Columbus, OH

**12G. 10:00 AM Development of a Weldability Testing Protocol for the Powder-Feed Additive Manufacturing Process**

Brandon Kemerling and John Lippold, The Ohio State University, Columbus, OH

**12H. 10:20 AM Novel Dissimilar Joints between 2.25Cr-1Mo Steel and Alloy 800H**

James Zuback, Tuhin Mukherjee, Todd Palmer and T. DeBro, Penn State University, University Park, PA

**12I. 10:40 AM Weld & Additive Manufactured Microstructural Predictions Using Kinetic Monte-Carlo Simulation**

Jonathan Madison, Theron Rodgers and Veena Tikare, Sandia National Laboratories, Albuquerque, NM

**12J. 11:00 AM Friction Stir Welding of Additively Manufactured Aluminum Alloys**

William Todd Evans, Alvin Strauss, George Cook and Jay Reynolds, Vanderbilt University, Nashville, TN, Tracie Prater, NASA Marshall Space Flight Center

**12K. 11:20 AM A Quantitative Approach to Fabricate Distortion Free Additively Manufactured Parts**

Tuhin Mukherjee and T. DeBro, Penn State University, University Park, PA, Wei Zhang, The Ohio State University, Columbus, OH

**12L. 11:40 AM The Effect of PWHT on Intergranular Corrosion in SS347 and SS308**

Byungchul Kim, Bumchan Bae, Jinseung Kim and Daesoon Kim, Hyundai Heavy Industries, Ulsan, South Korea

**SESSION 13: WELDING METALLURGY & WELDABILITY SESSION B**

Chairs: J. Perdomo (ExxonMobil) and L. Li (U of Alberta)

**13A. 1:00 PM Evolution of Grain Boundary Coarsened Zones in INCONEL® Alloy 740H® Fusion Welds**

Daniel Bechetti and John DuPont, Lehigh University, Bethlehem, PA

**13B. 1:20 PM Investigation on the Formation of Untempered Martensite in 410 Steel**

David Stone and Boian Alexandrov, The Ohio State University, Columbus, OH

**13C. 1:40 PM Cracking in Hot-dip Galvanized Welded Joints in Steel Platform Structures**

Christopher DiGiovanni, Leijun Li and Robert Driver, University of Alberta, Edmonton, Canada

**13D. 2:00 PM Mitigation of Hydrogen Induced Cracking Using Low Temperature Phase Transformation Welding Filler Wire**

Demetrios Tzelepis, and Xinghua Yu, The United States Army Tank Automotive Research, Warren, MI

**13E. 2:20 PM Laser Weldability Testing of Austenitic Nickel Alloys**

Jonathan Watson and Stephen Liu, Colorado School of Mines, Golden, CO, Paul Williams and Jeffrey Sowards, NIST, Boulder, CO, Jeremy Caron, Haynes International, Inc., Kokomo, IN

**13F. 2:40 PM Formation of Soft Microstructure in Intercritical Heat-Affected Zone of As-Welded Grade 91 Pipe Steel Weldments**

Yiyu Wang and Leijun Li, University of Alberta, Edmonton, Canada

**13G. 3:00 PM Weldability of High Entropy FeNiCoCrMn Alloy**

By Zhenggan Wu, Hongbin Bei and Stan David, Oak Ridge National Laboratory

**13H. 3:20 PM Development of a High Chromium Ni-Base Filler Metal Resistant to Ductility Dip Cracking and Solidification Cracking**

Adam Hope and John Lippold, The Ohio State University, Columbus, OH

**13I. 3:40 PM Microstructure Evolution of Uranium-6 Wt. Pct. Niobium Alloy Upon Laser Melting and Rapid Resolidification**

Amanda Seet Hwa Wu and John Elmer, Livermore National Lab

**13J. 4:00 PM Infiltration on Weld of Stainless Steel 304L**

Heejae Kang, Beomchan Bae, Chunho Jee and Juntae Choi, Hyundai Heavy Industries, Ulsan, South Korea



## FRIDAY, NOVEMBER 18

### SESSION 14: APPLIED TECHNOLOGIES

Chairs: J. Jones (Energy Tech) and M. Sinfield (NSWCC)

#### 14A. 1:00 PM Control of Weld Metal Diffusible Hydrogen by Seamless Cored Wire Technology

Gerhard Kosic, Voestalpine Bohler Welding USA, Inc., Sugarland, TX

#### 14B. 1:20 PM The Development of a Welding R&D Hot Cell Facility for Enabling Repair of Irradiated Reactor Components

Brian Gibson, Zhili Feng and Wei Tang, Oak Ridge National Laboratory, Oak Ridge, TN, Greg Frederick and Jonathan Tatman, Electric Power Research Institute, Charlotte, NC

#### 14C. 1:40 PM The Effect of Prior Austenite Grain Size and Low Temperature Toughness for FCAW Welding of Low Temperature Steels by The Welding Position Change

KumGi Pak, Daewoo Shipbuilding & Marine Engineering Co., Ltd., South Korea

#### 14D. 2:00 PM The Study of Application Skills for Low Temperature Steel's FCAW Welds

KumGi Pak, Daewoo Shipbuilding & Marine Engineering Co., Ltd., South Korea

#### 14E. 2:20 PM Hybrid Induction-Plasma Oxygen Cutting - HI-PO - Nuclear Submarine Hull Steel

Jerry Jones, EnergyTech, Inc., Lakewood, CO

#### 14F. 2:40 PM The Development of Automation Welding System Using Tandem MIG Process of Aluminum Plate

Sang-Gu Choi, Sang-Hyun Ryu and Jong-Jun Kim, South Korea

#### 14G. 3:00 PM Wiki-SCORE Tool Allows for the Grading of Welders & Welding Robots

Joseph Bertoni, and Jeffrey Noruk, SevoRobot Corporation, Milwaukee, WI

#### 14H. 3:20 PM Application of Artificial Intelligence to Real-Time Weld Quality Control and Quality Monitoring

Jerald Jones, EnergyTech, Inc., Lakewood, CO

#### 14I. 3:40 PM Reduction of Overwelding and Distortion by Optimizing Weld Sizing

Jonathan Roberts, Ingalls Shipbuilding

#### 14J. 4:00 PM Welding Material for Low Temperature Applications

William Layo, Midalloy

### SESSION 15: ADVANCED CONTROLS AND SYSTEMS

Chairs: Y. Shi (Lanzhou University of Technology) and J. Steele (Colorado School of Mines)

#### 15A. 1:00 PM An Investigation of Pulse Shaping for GMAW Control

Adewole Ayoade and John Steele, Colorado School of Mines, Golden, CO

#### 15B. 1:20 PM Evolution in Laser Enhanced GMAW: Laser Controlled Short-circuited Transfer

Jun Xiao and Shujun Chen, Welding Research Institute at Beijing University of Technology, Beijing, China, YuMing Zhang, University of Kentucky, Lexington, KY

#### 15C. 1:40 PM In-situ Penetration Depth Estimation Using a Calibrated Analytic Model

Shaojie Wu and YuMing Zhang, University of Kentucky, Lexington, KY, Gao Hongming, Harbin Institute of Technology, Harbin, China, Zhang Wei, The Ohio State University, Columbus, OH

#### 15D. 2:00 PM A Study of Characteristic Oscillation Frequency of Weld Pool in Continuous P-GTAW Process based on Laser-vision

Yu Shi, Chunkai Li, Yufen Gu, Gang Zhang and Ding Fan, Lanzhou University of Technology, Lanzhou, China

#### 15E. 2:20 PM Using Ultrasonic Impact Technology to Reduce Residual Stresses around Gas Metal Arc Welds in Aluminum-Magnesium Alloys

Luke Brewer, The University of Alabama, Tuscaloosa, AL, Kim Tran, Naval Surface Warfare Center Carderock Division, West Bethesda, MD

#### 15F. 2:40 PM Improving Technical Welding Training Using Real-Time Sensory Feedback

Daniel Foster, Old Dominion University, Norfolk VA

#### 15G. 3:00 PM Utilize Low-cost VR Technology for Welder Training

Shunnan Chen, Chao Du, YuMing Zhang and Ruigang Yang, University of Kentucky, Lexington, KY

#### 15H. 3:20 PM Development of Pipe Internal Welding Machine

Jong-Cheol Kim, Jong-Jun Kim and Yong-Seop Kwon, Hyundai Heavy Industries Co., Ltd, South Korea

#### 15I. 3:40 PM Fusing Machine Algorithm with Welder Intelligence for Adaptive Welding Robots

YuKang Liu and YuMing Zhang, University of Kentucky, Lexington, KY

#### 15J. 4:00 PM Adaptive Control of Laser Welding with Filler for Tight Butt Joints

Ke Zhang, XiaoPeng Zhu and XinHua Tang, School of Material Science & Engineering, Shanghai Jiaotong University, China

### AWS POSTER SESSION

#### NOVEMBER 16-18 - DURING SHOW HOURS

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. Posters are presented in five categories: Students in High School Welding Program, Students in a Two-Year College or Certificate Program, Undergraduate Students, Graduate Students, and Professionals. Be sure to stop by and observe this year's entries.

**WEDNESDAY, NOVEMBER 16**

**W36: NATIONAL CENTER FOR WELDING EDUCATION AND TRAINING AND WELD-ED**

**9:00 AM – 9:30 AM**  
**Welcome / Introductions**

Duncan Estep

**9:30 AM – 10:00 AM**  
**Weld-Ed Overview**

Discussion is centered on the National Center for Welding Education and Training (Weld-Ed) and its contributions to the field of welding education. Changes in the focus of the NSF grant.

Monica Pfarr

**10:00 AM – 12:00 PM**  
**Cutting and Welding Processes**

Joining and Cutting Processes course covers the basics and principles of major joining and cutting processes. Advantages, disadvantages, equipment, consumables, techniques and variables for each process are discussed. Applications, criteria for consumable selection and how to establish process parameters are emphasized. Laboratory work involves equipment set up and operating of the welding and cutting equipment for specific applications. The presentation will cover part of the week-long professional development course. In addition to topics in welding process, laboratory assignments, and teaching strategies for presenting topics in welding metallurgy will be provided.

Dan Turner - Yuba College

**12:10 PM – 1:00 PM**  
**Lunch and Speaker from Hypertherm**

**1:10 PM – 3:10 PM**  
**Weld Quality, Inspection and Codes**

Weld Quality and Inspection, Welding Codes, Specifications and Safety” course covers the concepts and fundamentals, of the weld quality and inspection methods, welding codes, specifications and safety. Laboratory work consists of setting up and operating the instruments and equipment for identification and characterization of weld discontinuities and defects. The presentation will cover part of the week-long professional development course. In addition to topics in code interpretation, changes to the AWS Structural Steel Code, laboratory assignments, and teaching strategies for teaching codes and standards will be provided.

Joel Johnson - North Dakota State College of Science

**3:15 PM – 3:30 PM**  
**Affiliate Network / Wrap up and Evaluations**

Join Weld-Ed in our quest to build a solid foundation of highly trained technicians to fulfill the demand of industry.

Duncan Estep

**THURSDAY, NOVEMBER 17**

**W37: AWS EDUCATION PROGRAM**

**8:30 AM – 9:00 AM**  
**Howard E. Adkins Memorial Membership Award Lecture**

The Howard E. Adkins Instructor Membership Award is sponsored by Mrs. Wilma Adkins and family, and is given as a means of recognizing high school, trade school, technical institute or junior college instructors whose teaching activities are considered to have advanced the knowledge of welding to students in their respective schools. Each awardee receives a certificate, two-year membership in the American Welding Society and free registration to attend FABTECH and all technical sessions in the year that the award is presented.

Scottie C. Smith - Northwest Florida State College

**9:00 AM – 9:45 AM**  
**The ABC's of Starting and Running a Private Welding School**

Dave Lynnes - Lynnes Welding Training, Inc.

**9:45 AM – 10:00 AM**  
**Break and Networking**

**10:00AM – 11:00AM**  
**Adams Memorial Membership Award Lecture**

This award, established by the American Welding Society, is given as a means of recognizing educators whose teaching activities are considered to have advanced the knowledge of welding of the undergraduate or postgraduate students in their respective engineering institutions.

Professor Wei Zhang - The Ohio State University



**THURSDAY, NOVEMBER 17****W37: AWS EDUCATION PROGRAM****11:00 AM - 12:00 PM****Plummer Memorial Lecture**

This award has been established by the American Welding Society to recognize an outstanding individual who has made significant contributions to welding education and training, and to recognize Fred L. Plummer's service to the Society as President from 1952 to 1954 and Executive Director from 1957 to 1969. A certificate and bronze medal are presented at the annual Awards Luncheon held during AWS show week. Professor Richard T. Stone is the 2015 Plummer Memorial Award recipient. Professor Stone conducted a comprehensive study to evaluate the cognitive and physical impact of virtual reality (VR) integrated training vs. traditional welder training methods. Participants in this study were randomly assigned to one of two separate two-week training courses taught by sanctioned AWS CWIs. Upon completion of training the participants were given the opportunity to test for certification. This study demonstrated that participants in the virtual reality integrated training group performed as well as, and in some cases significantly better, than the traditional welding training group. Dr. Stone will discuss the benefits of virtual reality technology as a training aid to reduce training time and improve skill levels, compared to traditional welder training methods alone.

Scott L. Burdge, RD Dradge Career Technical Center

**12:00 PM - 1:30 PM**

**Lunch & Presentation Sponsored by Hypertherm, Inc.**

**12:30 PM - 1:15 PM****Cutting Technologies**

Jim Colt - Hypertherm, Inc.

**1:30 PM - 2:30 PM****Reasons Why Welds Crack, But Were Afraid to Ask**

Larry R. Zirker - Zirker Technology and Consulting

**2:30 PM - 3:00 PM****Safety & Liability: Risk Management for Welding Educators**

Robert Udy - Salt Lake Community College

**3:00 PM - 3:15 PM****Break and Networking****3:15 PM - 3:45 PM****Beginner's Guide to Design of Experiments - Application to Paint Adhesion and Weld Settings**

Christopher Bertoni - 4Front Engineered Solutions

**3:15 PM - 3:45 PM****Robotic Arc Welding Interfacing**

Joshua Williamson - Fronius



## SPECIAL PROGRAMS

**WEDNESDAY, NOVEMBER 16****7:00 AM - 8:30 AM****W38: AWS PRAYER BREAKFAST****Prayer Breakfast Speaker**

Duane K. Miller, Sc.D., P.E., is a recognized authority on the design and performance of welded connections. He is a popular speaker on the subject and has lectured around the world. Dr. Miller publishes frequently and on three occasions, has been awarded the Silver Quill Award of the American Welding Society (AWS) for the excellence of his published work. In 2001, he received the American Institute of Steel Construction's T. R. Higgins Lectureship Award, in 2005, the AISC Lifetime Achievement Award, and in 2015 was named an AWS Fellow. He became the 8th recipient of the AISC Robert P. Stupp Award for Leadership Excellence in 2015. He has authored and co-authored texts and chapters of many handbooks, including the AISC Design Guide on Welding and the Mark's Handbook of Engineering, 11th Edition. He has appeared as a subject expert on the History Channel and Discovery Channel.

Dr. Miller earned a B.S. degree in Welding Engineering from LeTourneau University in Longview, Texas, an M.S. in Materials Engineering from the University of Wisconsin - Milwaukee, and was awarded an honorary Doctor of Science degree from LeTourneau University in 1997. He is the immediate past Chair of the AWS D1 Structural Welding Code Committee. He was the first Chair of the Seismic Welding Subcommittee and is a former co-chair of the AASHTO-AWS D1.5 Bridge Welding Code Committee. His current technical involvement includes membership on the AWS D1 committee, the AWS Technical Activities Committee, and the AISC Specification Committee. He is a Professional Engineer, Certified Welding Inspector and Qualified Welder.

Duane has been married to his wife Susan for 38 years and has six children, three children-in-laws, and six grandchildren. He is a dedicated man of faith as a member of the Parkside Church in Cleveland where he has led the Sunday evening children's program called Kids of the Kingdom for 28 of his 30 years there. He is also the founding member and first president of Christian Communicators of America, which is a multi-state speech and debate program for home educated high school students.

**7:00 AM - 7:40 AM****Attendees Eat Breakfast****7:40 AM - 7:50 AM****Welcome and Opening Prayer****7:50 AM - 8:30 AM****Duane K. Miller, Sc.D., P.E.****8:00 AM - 5:00 PM****W39: 40TH INTERNATIONAL BRAZING AND SOLDERING SYMPOSIUM - FREE**

At this Symposium authors will be presenting original and unpublished research, applications and new developments in a broad spectrum of technical areas within the brazing and soldering fields. The symposium will also have an "Expert Panel" Discussion where you are encouraged to bring any current Braze issues or challenges that you may have. This panel will also have a few short presentations covering new technical issues that are facing brazing operations and discuss how these challenges are being resolved. Finally, Dr. Anatol Rabinkin will give a brief presentation on the history of brazing dating back to Egyptian times. The technical and tutorial sessions will present some of the latest developments and provide valuable information to anyone in the brazing or soldering community.

**WEDNESDAY, NOVEMBER 16  
- THURSDAY, NOVEMBER 17****WELDERS WITHOUT BORDERS:  
WELDING THUNDER 2016****Location:** Silver Lot

Welders Without Borders: Welding Thunder 2016 is an event coordinated by AWS Section 21 where welding students compete to weld and cook off of their fabrication project for the judges as required in the contest guidelines. The event hosts teams from various registered welding programs, with a limited number of students allowed in the action arena at a time; no limit on team members attending and supporting. All teams will be limited to the same start and stop time, finished or not. Teams will fabricate their project on day one, with the secret component being welded on the morning of day two. At noon on the second day, each team will demonstrate the functionality of their project and cook lunch for both their team and the judges. Awards will be given to the teams with the most accurate fabrication project as determined by the judges. Other award categories include: Best red, yellow, blue or other welding equipment manufacture themed "Welding Thunder" road rig, trailer or contest work site. Best of event welding PPE equipment and uniform themed team. Best of event team spirit. People's choice award; there can be only one. Best tasting "Grill and Griddle" meal winner.

**FRIDAY, NOVEMBER 16****7:00 AM - 6:00 PM****AWS CERTIFICATION EXAM**

Advance application required. Take your exam to certify as a CWI, CWE, SCWI, CWEng, or test for endorsements. Call 1-800-443-9353 ext. 273, or go to [www.aws.org/certification](http://www.aws.org/certification) for details on the certification and registration requirements for each of these programs.

**WEDNESDAY, NOVEMBER 16****9:00 AM - 12:00 PM****AWS OPENING SESSION & ANNUAL BUSINESS MEETING**

During the AWS Opening Session and the 97th Annual Business Meeting, 2016 AWS President Dave McQuaid will give the Presidential Report and John Bray will be inducted as the AWS President for 2017. Following the induction, the 2016 Class of AWS Counselors and Fellows will also 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 "Understanding the Reliability of Solder Joints Used in Advanced Structural and Electronics Applications" by Paul T. Vianco. An AWS Fellow, Paul received a Ph.D. degree in Materials Science from the University of Rochester (New York) in 1986. He joined Sandia National Laboratories, Albuquerque, New Mexico in 1987 and is currently a Distinguished Member of Technical Staff. He has been involved in all aspects of soldering technology, including alloy and process development of Sn-Pb and Pb-free solders as well as the modeling of thermal mechanical fatigue and solid-state intermetallic compound layer growth in both electronic packaging interconnections and structural solder joints.

His technical work has also included several investigations into the physical and mechanical metallurgy of active braze joints. Vianco has authored over one hundred peer-reviewed journal articles; eight book chapters and two books: Soldering Handbook - Third Edition and Guideline for Hand Soldering Practices - First Edition, both of which are published by AWS. He is a past, co-recipient of the Robert L. Peaslee Award as well as several Best Paper awards presented at the International Brazing and Soldering Conference and Surface Mount Technology Association International Conference. Vianco is a co-author of the TurboSiP<sup>®</sup> v2.0 solder fatigue software (©Sandia National Laboratories) and holds five US patents.

**6:30 PM - The Westgate Las Vegas Resort and Casino****AWS OFFICERS/PRESIDENTS/ COUNTERPARTS RECEPTION**

Held at the AWS Headquarters Hotel, this reception is held annually during the show and is open to all registrants. Take advantage of this opportunity to meet the AWS Officers, network with members and prospects. A complimentary hors d'oeuvres buffet is included, along with a cash bar. Evening business attire, please.

**12:00 PM - 2:00 PM****AWS EXCELLENCE IN WELDING AWARDS CEREMONY AND LUNCHEON**

The best and brightest stars in the welding industry will be honored for their outstanding industry achievements at the 14th Annual Excellence in Welding Awards (formerly Image of Welding Awards). Presented by the AWS and WEMCO, a standing committee of AWS, the Excellence in Welding Awards is the industry's top honors saluting the year's most outstanding public initiatives and programs that promote the image of welding. By invitation only.

**THURSDAY, NOVEMBER 17****12:00 PM - 2:00 PM****W40: 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 an assembly of distinguished award presenters, recipients, and guests for a well-paced ceremony and a delicious lunch. 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 2018. Nominations must be accompanied by 16 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.

**FRIDAY, NOVEMBER 18****10:00 AM - 10:30 AM****R.D. THOMAS, JR. INTERNATIONAL LECTURE**

The recipient of this year's R.D. Thomas, Jr. Award is Mr. Robert E. Shaw, Jr., PE. Mr. Shaw is President of the Steel Structures Technology Center, Inc., an engineering firm he founded in 1990 to provide consulting services and technical education related to the design, fabrication, erection and inspection of steel-framed structures. He is a civil engineer graduate from Rose-Hulman Institute of Technology, and began his career in the steel construction industry in 1973.

Mr. Shaw is past Chair of IIW Commission XV on Design, Analysis and Fabrication of Welded Structures, and chairs the IIW Select Committee on Quality Management in Welding and Allied Processes. He has also been involved in IIW's Working Group on Standardization, Working Group on Regional Activities, and the Technical Management Board.



He is a long-standing member of the American Welding Society (AWS) D1 Structural Welding Committee, and serves on Subcommittees on Steel (D1.1), Seismic Welding Issues (D1.8), Strengthening and Repairing Existing Structures (D1.7), the Executive Committee, and Task Groups on Design and on Prequalification. He serves on the American Institute of Steel Construction (AISC) Specifications Committee, TC6 on Connections, TC12 on Quality Control and Quality Assurance, and the Connections Prequalification Review Panel for seismic connections. Mr. Shaw serves on ISO TC167/WG3 working toward the development of a new ISO standard on the execution of steel structures.

To facilitate the exchange of global best practices in steel construction, welding and related standards, Mr. Shaw has presented numerous lectures, seminars and workshops around the world. He has consulted for US and international clients on design, fabrication, erection and quality issues on numerous building and bridge projects.

His work has been recognized by the AISC with two Special Achievement Awards, by the Iranian Society of Steel Structures with the Arek Meker-tichian Lectureship Award, and by the AWS with the R. D. Thomas Memorial Award and the George E. Willis Award.

**10:30 AM (immediately following the R.D. Thomas, Jr. International Lecture)**

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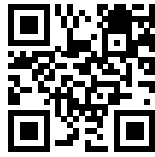


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