NEW WELDING TECHNOLOGIES – THE KEY TO HIGHER PRODUCTIVITY

FORT LAUDERDALE, FL - JUNE 15 - 16, 2010

The prices for this conference are as follows;

Attendee Registration Rates
AWS members $550
Nonmembers $680

Original Conference Description

Many new welding processes and welding technologies are being introduced onto production lines and fabrication shops throughout numerous industries, including oil and gas, power, off-highway equipment, pipelines, automotive, and aerospace. Examples include hybrid welding, friction stir welding, fiber and disk welding, deformation resistance welding, ultrasonic stir welding, and the buried arc version of gas metal arc welding.

Join the AWS to see how these processes and others are improving productivity in the industry and see where you can find more solutions. Other processes of interest will include laser stir welding, the method for welding aluminum involving the shaping of the arc, laser assisted arc welding, controlled SST welding, magnetic pulse welding, and the revived hot wire welding method.
A conference on some of the most promising new technologies will be held on June 15-16 in Ft. Lauderdale, FL. Heading the list will be presentations on arc welding, laser beam welding, friction stir welding, resistance welding, and heat treating. All of these presentations are aimed at generous improvements in productivity and in quality. Many are already finding applications in various industries. Others are next in line for acceptance.

The keynote speaker will be Mike Russell from The Welding Institute in the UK. Dr. Russell will discuss many of the new developments in friction stir welding. Discussing the subject from another vantage point will be Jeff Ding from NASA, Huntsville, AL. He will be covering thermal stir processing, ultrasonic stir processing. Matt Short from the Edison Research Institute will describe EWI’s efforts in ultrasonic additive manufacture. Another speaker who will address additive manufacture (AM) will be Scott Poeppel from Joining Technologies. In this case the process involves the use of the laser to apply powder metal for AM or Cladding.

In arc welding, presentations will be made by Jim Cuhel of Miller Electric on short-circuiting transfer GMA welding, by Alain Piette of SpaceForm on the company’s SuperMig® process, and Bruce Horn of Concurrent Technologies Corp. (CTC) on hot wire/cold wire GTAW cladding. Horn will also discuss the new weld seam facing tool process. Both innovations were developed within CTC’s Navy Metalworking Center.

Eric Stiles from IPG Photonics will present information about the use of the fiber laser for welding, cutting, and cladding. The laser will also be discussed by Paul Blomquist of Applied Thermal Sciences in his presentation on the advances being made in hybrid welding.

In resistance welding, there will be two talks, one by Brian Finnigin of SpaceForm and the other by Stefan Mayr of Fronius. Finnagin’s presentation will be on deformation resistance welding, while Mayr will discuss his company’s new Delta Spot process.

The subject of heat treating will also be of interest to the audience. One presentation will address the monitoring that takes place in the surveillance of heat treating as seen in Superheat FGH’s unusual new process. Gary Lewis will be the speaker. Miller Electric also has an innovation in heat treating. Al Sherrill will discuss this development which involves induction heating.
NEW WELDING TECHNOLOGIES – THE KEY TO HIGHER PRODUCTIVITY

FORT LAUDERDALE, FL – JUNE 15-16, 2010

Conference Program

Tuesday, June 15, 2010

9:00 AM – 9:10 AM
Welcome Remarks Robert R. Irving, Conference Chairman,

9:10 AM – 9:45 AM
Keynote Address: Recent Developments and Novel Applications of Solid State Joining Techniques

PRESENTER: Mike Russell, Section Manager, Friction and Forge Process, TWI Ltd., Granta Park, Gt Abington, Cambridge UK CB21 6AL - mike.russell@twi.co.uk

DESCRIPTION: TWI is active in the development and application of solid state welding techniques for a variety of current and future applications. Recent developments include stationary shoulder friction stir welding for high temperature and thick section material joining, bobbin tool friction stir welding for thick section Al welding, linear friction welding for near net shape component manufacture and friction stir corner welding for a variety of joint geometries. The presentation will describe the current status of the new techniques and highlight the potential for new applications based on the techniques described.

BIOGRAPHY: Mike Russell obtained a Masters degree in Materials Engineering from Newcastle University in 1996 and a PhD on the Development and Modeling of Friction Stir Welding from Cambridge University in 2000. Mike joined TWI in 1999, and is currently Section Manager of the Friction and Forge Processes Group. Over the last 10 years Mike has worked on the development and implementation of Friction Stir Welding, Linear Friction Welding, and Rotary Friction Welding technology for a wide range of engineering materials, and for numerous organizations and applications throughout the World. Mike has authored over 50 technical papers and conference presentations on friction welding processes, and has filed two patent applications in the field. In 2008 Mike won The Welding Institute Lidstone Medal for significant contributions to the advancement of welding technology.
Presenters Title: Hybrid Laser Arc Welding Provides Numerous Advantages

PRESENTER: Paul Blomquist (207) 459-7777 - Principal Technologist, Laser Applications, Applied Thermal Sciences, Inc., P. O. Box C, 1861 Maine St., Sanford, ME 04073 pblomquist@appliedthermalsciences.com

DESCRIPTION: One of the major improvements in hybrid laser welding is the high degree of automation and computer control of the process. Also, the process provides a generous reduction in diffusible hydrogen and welding fume. Significantly less distortion was observed in a Navy research program when the process was used to weld HSLA-65 and HSLA-80 t-beams. The process has been implemented widely in Europe and, recently, in two locations in the U.S.

BIOGRAPHY: Mr. Blomquist brings a background of over 25 years’ experience in shipbuilding and heavy industry, and is the author of several novel concepts in this field. At present, he serves as Principal Technologist, Laser Applications, for Applied Thermal Sciences of Sanford, Maine.

Prior to joining ATS, Mr. Blomquist was Research Engineer and Manager of Maritime Technology Programs at the Applied Research Laboratory, Pennsylvania State University. He also served as senior welding engineer at Bath Iron Works for 16 years, where he directed the development and implementation of traditional and advanced welding technology regarding every aspect of the shipbuilding process. This included fabrication, overhaul and repair operations involving a wide variety of processes, alloys, products and equipment, as well as consulting for an extensive group of domestic industries and overseas projects. While at BIW he was awarded two National Shipbuilding Research Program grants for research in advanced methods of ship production, and received two AEGIS Excellence Awards in the areas of close-tolerance thin-gauge panel fabrication and cost-effective manufacturing of super-alloy gas turbine uptakes.

He also worked in the operations and welding engineering departments at the Electric Boat Corporation, as well as in the heavy mechanical construction industry. He is a member of the American Welding Society, chairman of the Society’s C7C Sub-Committee on Laser Beam Welding and Cutting, and has served as the US delegate to the ISO working group on Laser Hybrid Welding. He is also a member of the Laser Institute of America and the Welding Panel SP-7 of the National Shipbuilding Research Program.
**Presentation Title:** Computed Radiology – Innovations for Film Quality Results in Industrial Applications

**PRESENTER:** Terry Plasek (936) 441-2785 – Western Regional Manager, Fujifilm NDT Systems, 8 Claridge Court, Conroe, TX 77304 – terry.plasek@fujimed.com

**DESCRIPTION:** Discussion on the evolution of Computed Radiography dedicated to industrial use and applications. Discussion on the improvements in systems resulting in the ability to achieve results equal to or in some cases better than conventional wet film radiography using phosphor plate CR systems. Code updates for ASME and ASTM.

**BIOGRAPHY:** Terry has been involved with Industrial Imaging for 37 years. Starting in 1973, spent 13 years in the Piping Industry primarily in the Radiography Department of a major piping fabricator in Houston, Texas. This facility employed the use of Isotope and X-Ray capabilities on manufactured pipe and various fabricated sub assemblies including Code piping and Nuclear grade fabrication.

In 1986 Terry began with Fuji NDT Systems covering the Southwestern area and is currently Western Regional Manager.

Served as President of the Non-Destructive Management Association 1998. Member of NDTMA since 1986


Member of ASME and serves on ASME Working Group Radiography, Sub-Group Volumetrics, and Section V Committee on Non-Destructive Examination.

**Presentation Title:** The Application of Deformation Resistance Welding for Tubular Products

**PRESENTER:** Brian Finnigan (937) 369-8194 - Manager Advanced Welding Technologies, SpaceForm Welding Solutions, 1001 W. Thirteen Mile Road, Madison Heights, MI 48071 b.finnigan@spaceformtech.com

**DESCRIPTION:** Deformation resistance welding (DRW) is a revolutionary new metal-joining technology that delivers reliable, repeatable welds at significantly lower cost than conventional welding solutions for the welding of tubular components. The DRW process can be applied to the welding of similar and selected dissimilar materials.
The presentation will review the fundamentals of the DRW process as well as an example of a current commercial application for automotive airbag inflators. Current and past development projects including applications targeted for military, aerospace, automotive and consumer products will be discussed.

**BIOGRAPHY:** Brian is the Advanced Welding Technologies Manager at SpaceForm Welding Solutions. He has over 22 years of industrial experience with 18 of those years with General Motors and Delphi Automotive Systems. While with GM and Delphi, Brian worked in roles from manufacturing to development for steering wheel and airbag safety systems and was awarded several patents for steering wheel and airbag applications. Brian earned his Bachelor of Science in Welding Engineering from The Ohio State University and a Master of Science in Engineering Science from Rensselaer Polytechnic Institute. Brian recently joined Spaceform Welding Solutions where he is responsible for the research and development of the DRW and SuperMig technologies.

**LUNCH & EXHIBIT DISPLAY – 11:45 PM – 1:45 PM**

1:45 PM – 2:20 PM  
**Presentation Title:** Thermal Stir Welding (TSW) and Ultrasonic Stir Welding (USW) Processes for Solid State Welding Applications  
**PRESENTER:** Jeff Ding (256) 544-2700 - Aerospace Welding Engineer, NASA Marshall Space Flight Center, EM30, Huntsville, AL 35812  
robert.j.ding@nasa.gov  
**DESCRIPTION:** Two new solid state weld processes are being developed at NASA’S Marshall Space Flight Center in Huntsville, Alabama. Both processes separate the heating, stirring and forging elements of the friction stir welding (FSW) process and allow for independent control of each of the three process elements. There is no frictional energy associated with the two processes other than the adiabatic heating generated from the stir rod. TSW uses a specially designed induction coil to heat weld material into a plastic state before a stir rod “stirs” the plasticized abutting surfaces of the weld joint. In the USW process, high powered ultrasonic energy heats the weld material into a plastic state before being stirred. The TSW has been successfully demonstrated by welding 0.500-in thick titanium alloys. The USW process lends itself to the joining of thinner materials. The two weld processes are being developed for NASA and DOD welding applications.

**BIOGRAPHY:** Jeff Ding is an aerospace welding engineer specializing in weld process development at NASA’s Marshall Space Flight Center in Huntsville, AL. He has been employed at NASA for 24 years. He is a graduate from the Ohio State Welding Engineering program. He is noted for bringing the friction stir welding process to the NASA agency in 1995. His most recent contributions to welding technology development pertain to solid state welding processes. Mr. Ding holds seven U.S. Patents including his most
recent entitled, “Ultrasonic Stir Welding Process”. His Thermal Stir Welding process (patent pending) was recently used to complete an eight foot long weld joining .500-in thick commercially pure titanium.

2:20 PM – 2:55 PM  
Presentation Title: Cladding and Additive Manufacture Using Laser Applied Powder (LAP™) Processes

PRESENTER: Scott Poeppel (860) 653-0111 - Manager of Additive Processes, Joining Technologies, Inc., Newgate International Business Center, 17 Connecticut South Dr., East Granby, CT 06026  
spoeppel@joiningtech.com

DESCRIPTION: A brief overview and lessons learned from the LAP™ processes including hard facing, corrosion-resistant coatings, worn surface restoration to Laser Applied Manufacturing (LAM) of components. Discussion will also include focus on equipment capabilities as related to various industries such as aerospace, medical, oil & gas exploration, mining, power generation and industrial equipment repair.

BIOGRAPHY: Scott has been involved in industrial repair technologies for 28 years. Beginning in 1980 in submarine nuclear operations for the Navy and continuing this interest in commercial reactor operations for Houston Lighting and Power until 1995. During this time frame he was actively involved in numerous repair activities of both primary and secondary systems for nuclear power generation and nuclear waste management. In 1995 he began working for Trumpf, Inc. in Farmington, CT. As a Laser Application Engineer for Trumpf, Inc. he was tasked with solving materials processing problems using high power lasers for the metal fabrication industries. Scott teamed up with Joining Technologies, Inc. as the Laser Process Development Manager 4 ½ years ago. Joining Technologies is a welding service provider and laser systems integrator for numerous industries including medical, aerospace, power generation, oil & gas exploration and DOD. Currently Scott is now the Additive Processes Manager for Joining Technologies as they focus on industrial OEM applications and high value component repair processes.

AFTERNOON BREAK – 2:55PM – 3:10PM

3:10 PM – 3:45 PM  
Presentation Title: Automated Weld Seam Facing Tools Modified to also Perform Back Gouging

PRESENTER: Bruce Horn 814-262-2351 - Principal Technical Staff Member, Navy Metalworking Center/Concurrent Technologies Corporation, 100 CTC Drive, Johnstown, PA 15904-1961 - hornb@ctc.com. Co-author is T.
DESCRIPTION: Two prototype (preproduction) weld seam facing (WSF) tools, which were developed under a Navy Metalworking Center (NMC) project, were delivered in June 2009 to Bath Iron Works (BIW) and Northrop Grumman Shipbuilding-Gulf Coast (NGSB-GC). The tools have been implemented and BIW is actively using the tool on both DDG 51 and DDG 1000 applications. These tools will greatly reduce or eliminate the need for manual grinding of certain weld reinforcements. The potential capability of the WSF tool has been expanded to also perform back gouging of both square butt and double-V bevel joints. A back gouge capability demonstration was held in December 2009 at both BIW and NGSB-GC.

BIOGRAPHY: Mr. Horn is the Navy Metalworking Center's Technical Project Manager for the Automated Weld Seam Facing and Back Gouging project. He has 40 years of industry experience with the last five years affiliated with CTC. He earned a B.S. degree in Metallurgical Engineering from Drexel Institute of Technology and a MBA degree from Case Western Reserve University. He has extensive background in production welding and machining. He served as Chair of the AWS D14H sub-committee for "the Surfacing of Industrial Rolls and Equipment". At the Navy Metalworking Center, Mr. Horn has managed projects associated with; Automated Thermal Plate Forming, Arc Cladding of Submarine Components with Nickel-Base Alloys and most recently Plate Distortion Mitigation during Plasma Cutting.

3:45 PM – 4:20 PM
Presentation Title: Dual Hot Wire/Cold Wire Gas Tungsten Arc Cladding Procedure Developed to Significantly Improve Deposition Rate

PRESENTER: Bruce Horn 814-262-2351 - Principal Technical Staff Member, Navy Metalworking Center/Concurrent Technologies Corporation, 100 CTC Drive, Johnstown, PA 15904-1961
hornb@ctc.com

DESCRIPTION: The current cladding process utilized by General Dynamics Electric Boat (GDEB) in ship production is hot wire gas tungsten arc welding (GTAW-HW). The cladding rate of nickel-based materials, such as Inconel® 625 and Hastelloy® C-276 onto HY-80 and HY-100 components, is restricted by heat input, dilution rate, number of layers and interpass temperature limits. A Navy Metalworking Center (NMC) project was developed to evaluate arc cladding processes, down select a candidate process and demonstrate the ability to qualify the cladding procedure based on NAVSEA Tech Pub 248 and additional GDEB requirements.
**BIOGRAPHY:** Mr. Horn is the Navy Metalworking Center's Technical Project Manager for the Improved Arc Cladding Techniques project. He has 40 years of industry experience with the last five years affiliated with CTC. He earned a B.S. degree in Metallurgical Engineering from Drexel Institute of Technology and a MBA degree from Case Western Reserve University. He has extensive background in arc cladding with both publications and patents in that field. He served as Chair of the AWS D14H sub-committee for "the Surfacing of Industrial Rolls and Equipment". At the Navy Metalworking Center, Mr. Horn has managed projects associated with; Automated Thermal Plate Forming, Arc Cladding of Submarine Components with Nickel-Base Alloys and most recently Plate Distortion Mitigation during Plasma Cutting.

**Wednesday, June 16, 2010**

**9:00 AM – 9:35 AM**  
**Presentation Title:** Fiber Lasers: The Flexible Tool for High Power Laser Welding  
**PRESENTER:** Eric Stiles (248) 207-1251 – Applications Manager, IPG Photonics, Midwest, 46695 Megallan Drive, Novi, MI 48377  
estiles@ipgphotonics.com  
**DESCRIPTION:** The use of fiber lasers for high power welding processes is expanding rapidly, due both to advantages in operating costs and process performance vs other established laser technologies. This presentation describes the wide range of welding processes possible with fiber lasers, ranging from high speed welding of thin materials to heavy section welding, with an emphasis on application examples.  

**BIOGRAPHY:** Speaker Bio not available at this time.

**9:35 AM – 10:10 AM**  
**Presentation Title:** Monitoring the New High Tech Version of Heat Treatment  
**PRESENTER:** Gary Lewis (704) 799-2248 - Director of Business Development, Superheat FGH, Graduate of Georgia Tech 1982, 111 Bonner Lane, Mooresville, NC 28117 - - cell: (704) 905-5957  
glewis@superheatfg.com  
**DESCRIPTION:** Owners and contractors in Power Generation and refining are benefitting from Quality advancements in heat treatment. Advanced communication technologies, project management software and worldwide access to the internet enable greater oversight and data management, in-real time to improve jobsite Quality Assurance, Productivity, Safety and Cost Control.
**BIOGRAPHY:**

Gary is a 1982 Industrial Engineering Graduate of Georgia Tech in Atlanta, GA.

He worked for 20 years, in a variety of roles within the Air Compressor Group of Ingersoll-Rand Company.

He joined Miller Electric in 2000 as the Director of Business Development to establish a new, Direct end-user channel focusing on Specialty Piping and industrial construction applications.

In 2006 Gary joined Superheat FGH, as a principal of the company; to work with Power Companies, Refiners and leading Contractors to advance Value Creation improvements in advanced Heat Treatment including, improved Quality Control, increased Productivity and more effective Project Management, on a global scale..

**MORNING BREAK – 10:10 AM – 10:25 AM**

10:25 AM – 11:00 AM

Presentation Title: **Controlled Short Circuit GMAW Process Surpasses SMAW, GTAW for Productivity, Ease-of-Use, Cost Effectiveness on Root Pass Pipe Welding**

**PRESENTER:** Jim Cuhel, Welding Engineer, Pipe Welding Products, Miller Electric An ITW Company 1635 W. Spencer St. Appleton, WI 54914, W: (920) 735-4597, C: (920) 202-4275
Jim.Cuhel@millerwelds.com

**DESCRIPTION:** A modified short circuit welding process, known as Regulated Metal Deposition (RMD™), has the potential to greatly increase productivity in the fabrication of power plants by eliminating the need for a backing gas when welding chrome-moly and stainless steels. In addition, the process provides a smooth, stable metal transfer that reduces training time and is exceptionally tolerant of high-low misalignments. The process also mitigates differences in operator technique, since it maintains a consistent arc length regardless of stickout.

RMD combines the increased travel speeds and high-deposition benefits of GMAW with the quality associated with the GTAW process for root pass welding on the stainless steel and high chrome (e.g., P91) steel piping used in power plant construction.

**BIOGRAPHY:** Author of several technical welding articles, appearing in the AWS Welding Journal and the Tube and Pipe Journal. Graduate from Ferris State University: Welding Engineering Technology program as well as a Masters Degree in Business and Administration from Cardinal Stritch University.
Currently, at Miller Electric in the Pipe Welding Products division for 4 years.

11:00 AM – 11:35 AM  
Presentation Title: **DeltaSpot - A perfect solution to weld aluminum: Resistance spot welding with process tape**

**PRESENTER:** Stefan Mayr, Key Account Manager - Robotic/Integration National Process Expert DeltaSpot Fronius USA LLC 10421 Citation Drive, Suite 1100 Brighton - MI 48116 Phone: 810-220-4414 ext. 2776 Cell: 810-299-1970
mayr.stefan@fronius.com

**DESCRIPTION:** After a five-year development period, Fronius is now in a position to present a solution to the problems in resistance welding. Its name is DeltaSpot. DeltaSpot features:
- 10,000 spots non stop welding on aluminum
- Two or more sheet combinations
- No impact on the surface
- Welding of all aluminum alloys
- Welding from soft- to ultra-hard-coated steel
- Coatings and materials which present problems in conventional spot welding (like Boron steel)

**BIOGRAPHY:** Stefan Mayr is the National Process Expert for the product line DeltaSpot and Key Account Manager for Robotic/Integration at Fronius USA, LLC in Brighton MI. He is working with Fronius since 1997; was promoted from R&D to sales as the International Process Expert on DeltaSpot in 2005; and moved to Fronius USA in 2006. He holds a Master Workman in Electrical Engineering and Business.

**LUNCH & EXHIBIT DISPLAY – 11:35 PM – 1:00 PM**

1:00 PM – 1:35 PM  
Presentation Title: **A New Hybrid Plasma-GMA Welding Process Features Many Advantages Over GMAW**

**PRESENTER:** Brian Finnigan (937) 369-8194 - Manager Advanced Welding Technologies, Space Form Welding Solutions, 1001 W. Thirteen Mile Road, Madison Heights, MI 48071 b.finnigan@spaceformtech.com

**DESCRIPTION:** SuperMig® is the trade name for a hybrid plasma-gas metal arc welding process. When compared to conventional GMAW, SuperMig® demonstrates an increase in welding speed by a factor of two, has better weld penetration, a narrower heat-affected zone resulting in increased productivity, reduced capital investment, and reduced manpower.
Brian is the Advanced Welding Technologies Manager at SpaceForm Welding Solutions. He has over 22 years of industrial experience with 18 of those years with General Motors and Delphi Automotive Systems. While with GM and Delphi, Brian worked in roles from manufacturing to development for steering wheel and airbag safety systems and was awarded several patents for steering wheel and airbag applications. Brian earned his Bachelor of Science in Welding Engineering from The Ohio State University and a Master of Science in Engineering Science from Rensselaer Polytechnic Institute. Brian recently joined Spaceform Welding Solutions where he is responsible for the research and development of the DRW and SuperMig technologies.

1:35 PM – 2:10 PM
Presentation Title: Induction Heating Provides Improved Productivity, Ease of Use and Lower Costs Compared to Conventional Heating In Welding Projects

PRESENTER: Al Sherrill, Regional Induction Sales Specialist, Pipe Welding Products, Miller Electric Mfg. Co. An ITW Company 1635 West Spencer St. Appleton, WI 54912-1113 Tel. 920-735-4069, Mobile 920-740-6364 Al.Sherrill@Millerwelds.com

DESCRIPTION: Managers of welding projects face common challenges such as a shrinking supply of skilled welders, compliance to welding codes and demands for faster cycle times. Induction heating systems are now available that can help contractors and project managers meet these challenges by providing fast and consistent heat for pre-heating weld joints with a portable simple system. The system can also be used for post-weld heat treating of code quality welds.

An induction heating system uses high-frequency magnetic fields to induce electrical current flow (called eddy currents) into a target work piece such as a pipe or a flat plate of steel. Productivity increases when using induction for several reasons. The newer induction systems ease-of-use and quick training time can allow other workers or the welders to pre-heat the joints. Consumables costs are greatly reduced compared to the traditional pipe heating methods. Inductance heating uses low amounts of electrical energy and eliminates the fuel costs used in flame heating. These savings in material, time and manpower offer immediate benefits to the power plant construction industry—an industry facing higher demand, tighter deadlines and a less-skilled workforce.

BIOGRAPHY: Al has been with Miller for 9 years and has 21 years of experience in the induction heating industry. He has a Bachelors degree in Electrical Engineering from DeVry and a Masters in Business Administration from University of Wisconsin, Oshkosh. Al is a past chair and remains an officer
of the AWS Fox Valley Section, and has presented papers with EPRI, the ASME and other heat treating organizations for applications using induction heating and data acquisition systems.

2:10 PM – 2:45 PM
Presentation Title: **Recent Developments in Ultrasonic Additive Manufacturing (UAM)**

**PRESENTER:** Matt Short, Engineering Team Leader - Ultrasonics Edison Welding Institute, ph. 614.688.5137 matt_short@ewi.org email.

**DESCRIPTION:** Ongoing work at EWI has continued to expand the field of UAM by developing a large scale, very high power ultrasonic welding system. These recent developments have proven to be successful in joining advanced materials including higher strength aluminums, copper, stainless steel, and titanium. Emphasis will be placed on potential applications for these materials which will prove beneficial to the aerospace, energy, and automotive markets.

**BIOGRAPHY:** Matt Short joined EWI in 2004, bringing a diverse background in ultrasonic joining systems, custom system design, and automation. In his current role as Engineering Team Leader, he continues to focus on the expanded uses of high-power ultrasonics in additive manufacturing, welding and machining, as well as having responsibility for building EWI’s technical expertise in the technology and applications of ultrasonics.

**ADJOURNMENT**

**TABLETOP EXHIBIT SCHEDULE**

**Tabletop Rental Rates**
**AWS Member $750**
**Nonmember $880**
Exhibit space rental includes:

- 2’ x 6’ draped table (All display items must be small enough and light enough to fit on the table)
- (1) Chair and (1) 7” x 10” easel-back sign with company name.
- (1) Conference registration and all related benefits (Hotel and travel costs are not included in conference fees.).
  (Additional staff will need to register for the conference at the regular attendee price.)

**Exhibit Dates and Times**
Tuesday – June 15, 2010, 11:45 AM - 1:45 PM
Wednesday – June 16, 2010, 11:35 AM - 1:00 PM
Exhibit Move-In
Tuesday – June 15, 2010, 9:00 AM - 11:30 AM
Exhibit Tear-Down
Wednesday – June 16, 2010, 1:00 PM – 4:00 PM