The welding industry is now in the midst of an explosion of new welding technologies, many of which have made quick passage from the research lab to the production line. This kind of activity has not been seen for decades. Presentations on many of these technologies will form the body of this first-of-its-kind conference. Two of the main thrusts will explore interesting variations and improvements on laser technologies and on friction stir welding.

**FRICITION STIR WELDING AND PROCESSING—AN UPDATE OF RECENT DEVELOPMENTS**
9:30 am – 10:40 am
William J. Bieganek, NSF Center for Friction Stir Processing, and Advanced Materials Processing and Joining Center, South Dakota School of Mines and Technology, Rapid City, SD

Friction stir welding and processing have seen explosive growth over the last decade with several industrial implementations realized. The current state of the art in friction stir welding and processing is discussed with a focus on current industrial applications.

**THE DEFORMATION RESISTANCE WELDING PROCESS**
10:00 am – 10:40 am
Menachem Kimchi, Edison Welding Institute, Columbus, OH

Deformation resistance welding is starting to be used in industry. Tubular components in automobiles is one example of its use. Invented originally by Delphi Energy & Chassis Systems, the process is now undergoing considerable research at Edison Welding Institute. Development work on AHSS tubular structures and exhaust systems has recently been completed. Some of the results will be discussed.

**MORNING BREAK**
10:40 am – 11:00 am

**A NEW APPROACH TO HIGH-PRODUCTIVITY GMAW**
11:00 am – 11:40 am
Dr. Yu-Ming Zhang and James R. Boyd, University of Kentucky, Lexington, KY

A consumable double-electrode GMAW process is now available that increases weld deposition speed but does not increase the base metal heat input. A second electrode is introduced in order to divert any excess current away from the base metal and into the second electrode itself. In addition, a control system has been developed to maintain the effectiveness of the entire welding operation.

**MAGNETIC PULSE WELDING EXTENDS ITS LIST OF APPLICATIONS**
11:40 am – 12:20 pm
Michael Blackley, Hirtlec America Inc., Aubin Hills, MI

Magnetic pulse welding is enjoying success in the automotive industry, on air conditioning components, aluminum fuel filters, cables, and body parts. A very high-speed process, this relatively new method is capable of welding aluminum, copper, steel, and stainless steel, both to themselves and to each other. It can even be used to weld 7075 aluminum. No filler metal or shielding gas is needed. Through the Pulsar Research & Education Program, selected institutes like the University of Waterloo in Canada, RIST in South Korea, and MIRDC in Taiwan, to name a few, collaborate and conduct further research on this technology with the aim of making it an additional technology of choice for manufacturing industries worldwide.

**LUNCH (PROVIDED)**
12:20 pm – 1:30 pm

**THE FIBER LASER OPENS UP NEW OPPORTUNITIES FOR LASER WELDING**
1:30 pm – 2:10 pm
Bill Shiner, FG/Plascan Inc., Oxford, MA

In this presentation on high-power fiber laser technology, application results, current production applications, and the expansion of laser welding markets due to fiber technology will be discussed.

**ULTRASONIC JOINING OF METALS: ADVANCES IN WELDING, SOLDERING & BRAZING**
2:10 pm – 2:50 pm
Matt Short, Edison Welding Institute, Columbus, OH

While the use of ultrasonics for welding of copper electrical connections, thin foils, and microbonding is well known, advances in this technology are extending its uses to automotive and aerospace structural components involving a range of advanced materials, including high-strength aluminum alloys, steels, stainless steels, titaniums, and nickel-based alloys. Due to the solid-state nature of the ultrasonic bond, it is possible to join these materials with minimal impact on material properties. Similar advances are in progress in the field of ultrasonic soldering and brazing. The development of special solder alloys which, under the action of ultrasonic vibrations, permit coating of otherwise "unweldable" surfaces, has permitted fabrication of ceramic/titanium and other composite structures. These developments are now being transferred into the brazing temperature ranges, where unusual coating and joining results are being obtained. Other developments in both welding and soldering/brazing include higher-power transducers and new tooling designs and materials. These and other developments, such as process modeling, the complete new process strategies for additive manufacturing, and better understanding of material weldability, will be described.

**AFTERNOON BREAK**
2:50 pm – 3:10 pm

**GMAW PROCESSES FOR ROOT PASS WELDING**
3:40 pm – 4:20 pm
Dr. S. A. David and Dr. Zhi Feng, Oak Ridge National Laboratory, Oak Ridge, TN

The presentation will discuss recent progress made in friction stir welding of advanced materials such as high-strength aluminum, nickel-based superalloys, and metal matrix composite materials. It will also discuss challenges to advancing this new technology, and advanced neutron scattering experiments conducted at Oak Ridge National Laboratory to understand the fundamentals of the FSW process.

**WEDNESDAY, AUG. 15**

**CONTINENTAL BREAKFAST**
8:00 am – 9:00 am

**FRICITION STIR WELDING AND PROCESSING OF ADVANCED MATERIALS—ADVANCES AND CHALLENGES**
9:30 am – 10:20 am
Mike Skinner, MT Systems Corp., Eden Prairie, MN, and Bob Carter, NASA

Friction stir welding will play an extensive role in NASA’s ARES program. The process has already been selected to weld the 16.5-ft diam aluminum-lithium Orion capsule. This work will be performed at the Lockheed Martin Michoud Assembly Facility in New Orleans. Future applications for FSW in this program will also be discussed.

**SINGLE-SIDED PLASMA SPOT WELDING AND PLASMA BRAZING PROCESS—A REVIEW OF APPLICATIONS**
9:40 am – 10:20 am
R. V. Hughes, Camarc LLC, Westland, MI

A technical description of the working methodologies of these techniques will explain the basic workings of each. Illustration of many opportunities for novel and improved joining will be given through detailed reviews of current applications and ongoing research into these processes.

**MORNING BREAK**
10:20 am – 10:40 am

**LASER STIR WELDING OF ALUMINUM ALLOYS**
10:40 am – 11:20 am
R. P. Martukanitz, Pennsylvania State University, State College, PA, and Israel Stol, Alcoa Technical Center, Alcoa Center, PA

The presentation will include a brief description of a technique developed primarily for laser beam welding of aluminum alloys. The process, termed laser stir welding, involves manipulation of the laser beam to provide a stirring action within the molten pool. The result is improved weld soundness over conventional laser beam welding of aluminum alloys. Other benefits include the ability to accommodate larger gaps and mismatch, insensitivity to filler metal placement, and improved weld geometry. The presentation will also include quantitative evidence confirming the benefits of the process.

**NOVEL HEAT SOURCE ENABLES BRAZING AT ROOM TEMPERATURE**
11:20 am – 12:00 pm
Dr. Timothy P. Weihs, Reactive NanoTechnologies Inc., Hunt Valley, MD

Reactive NanoTechnologies has developed a novel local heat source (NanoFoil) that enables brazing of metals and ceramics at room temperature. The product consists of thousands of nanoscale layers that react to produce heat. By placing the foil between com-
CONFERENCE REGISTRATION FEES

CONFERENCE CODE: COENP

AWS members: $550
Nonmembers: $680

Each nonmember attendee will receive a two-year complimentary membership in AWS. Registration includes all conference sessions, two continental breakfasts, two lunches, and refreshment breaks. The registration fee does not include hotel accommodations. Hotel accommodations are subject to hotel regulations and are the responsibility of the attendee.

LOCATION AND ACCOMMODATIONS

Doubletree Golf Resort San Diego
14455 Penaquitos Dr.
San Diego, CA 92129-1603
Phone: 858-672-9100
Website: http://doubletree.hilton.com/en/dt/hotels/CA/sanmdt

Take advantage of the specially negotiated rate of $139 for single and double occupancy. This rate is also extended to you three days before the conference and three days after the conference (depending on hotel availability). Be sure to mention the American Welding Society. The deadline for reservations at this special price is July 14, 2007. Each reservation must be guaranteed with a major credit card. Any room reservations must be cancelled by five days in advance of the arrival date and must be done directly with the hotel.

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