TOGETHER, WE GO HIGHER.

When we work together to create better opportunities for all, the possibilities soar. Boeing is proud to salute the people who open doors of success for themselves and others.

FINAL PROGRAM

27th AeroMat Conference and Exposition

AEROMAT 2016

MAY 23–25, 2016 | MEYDENBAUER CENTER | BELLEVUE, WASHINGTON, USA
Houghton is a proud sponsor of AeroMat 2016

OUR PORTFOLIO OF FLUID PRODUCTS AND SOLUTIONS
- Metal Removal Fluids and Metal Cleaners
- Metal Forming Fluids and Rust Preventives
- Specialty Hydraulic Fluids and Greases
- Metal and Surface Finishing Products
- Forging and Heat Treatment Fluids
- Steel and Non-Ferrous Products
- FLUIDCARE™ Services
- Engineering Services

The world’s top aerospace manufacturers rely on Houghton for high-tech fluid products and value-added service. For over 150 years, we’ve been helping clients improve productivity, reduce costs and improve quality.

BOOTH #410 at AeroMat 2016

Houghton is a world leader in metal removal, forging, and heat treatment fluids.

Helping your organization reach new heights.
A world leader in metal removal, forging, and heat treatment fluids.

Discover Our Analytical Tools Being Used in the Aerospace Industry

- Micro-XRF
- WDS
  Learn about the sensitivity of our XSense spectrometer
- EDS
  Find out what 1,000,000 cps looks like
- OPTIMUS™ TKD detector head
- Micro-CT

Stop by Bruker Booth # 200

www.bruker-com/nano-analysis

www.bruker-son1.com
2016 WELCOME LETTER

As chairman of the organizing committee, I am honored to welcome you to Bellevue, Washington, for the 27th annual AeroMat Conference and Exposition. For 27 years now, we have taken this opportunity to share and discuss recent developments in Aerospace Materials and Processes. No other conference has this specific focus. AeroMat is truly an event built for, and supported by, those in the Aerospace materials industry.

This year our theme is “Innovation Takes Flight.” If we look at recent developments in our field, it is obvious that we are now in an era of rapid technology changes. Advances in new materials and processes are now made at a faster pace than ever before. Innovations in light metal alloys and hybrid materials that save weight and improve performance are now quickly making their way onto aerostructures. Innovative processes such as additive manufacturing, friction joining, and surface modification are now showing the potential to reduce flow times and costs to build aircraft.

AeroMat is the premier venue for members of ASM International working in the various disciplines of aerospace materials and processes to come together to discuss the latest innovations in our industry. Whether we work in government, industrial or academia, commercial or military, OEM or supplier, airframes or engines, AeroMat provides something for everyone in the diverse aerospace materials and processes community. That community will offer more than 120 papers in Bellevue this year, covering innovations in aluminum, magnesium, titanium, composite and hybrid materials, high-strength steels, high-temperature alloys, joining, coatings, surface treatments, and thermomechanical processing. In addition, this year we will hold our largest session to date on additive manufacturing. Our plenary sessions will be equally diverse, with leaders in aerospace innovation from Planetary Resources, European Space Agency, Boeing, and the U.S. Air Force. The Exposition will offer exhibits from more than 30 companies highlighting the latest in cutting edge materials technologies. Clearly, AeroMat is a unique and diverse meeting that showcases both the progress, and the issues, that dominate our profession and ultimately guide the future of aerospace.

Whether you attend AeroMat as a speaker, to network and make new business and technical contacts, to promote a new technology, or to simply learn about the latest developments in aerospace materials and processes, ASM International welcomes you to the beautiful Pacific Northwest, and the 27th annual AeroMat Conference and Exposition.

Sincerely,

Michael P. Shemkunas

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REGISTRATION

Conference Registration Hours:
Sunday, May 22.................................5:00 – 8:00 p.m.
*Hyatt Regency Bellevue Lobby
Monday, May 23...............................6:45 a.m. – 6:00 p.m.
Tuesday, May 24..............................7:00 a.m. – 5:00 p.m.
Wednesday, May 25.........................7:00 – 11:30 a.m.

SESSION CHAIRS
REMINDER: Session Chair Packets will be available daily starting at 7:15 a.m. each morning of the conference in Room 401 of the Meydenbauer Center. Session Chairs are to pick up their session packet, which includes the session details, author biographies and pertinent session details and meet your presenting authors in the session room thirty minutes prior to the start of the session to upload presentations.

SPEAKERS
REMINDER: All speakers should plan to meet in the room of your presentation 30 minutes prior to the start of your session. This will allow all speakers the opportunity to meet their session chair, and go over any final conference details and audio visual concerns.

EXPOSITION DATES AND TIMES
Location: Meydenbauer Center, Exhibit Halls A & B

The Show Directory can be found on page 26

Monday, May 23
Exhibits Open........................................... 3:00 – 6:00 p.m.
Afternoon Refreshment Break............... 3:00 – 3:30 p.m.
Plenary Session on the Expo Floor.......... 3:30 – 4:30 p.m.
Expo Networking Reception .................. 4:30 – 6:00 p.m.

Tuesday, May 24
Exhibits Open........................................... 10:00 a.m. – 3:30 p.m.
Morning Refreshment Break................... 10:00 – 10:30 a.m.
Plenary Session on the Expo Floor.......... 10:30 a.m. – 12:00 p.m.
Lunch on the Exhibit Floor....................... 12:00 – 1:00 p.m.
Afternoon Refreshment Break................. 3:00 – 3:30 p.m.

Wednesday, May 25
Exhibits Open.......................................... 9:00 a.m. – 1:00 p.m.
Morning Refreshment Break.................... 10:30 – 11:00 a.m.
Plenary Session on the Expo Floor.......... 11:00 – 11:45 a.m.
Lunch on the Exhibit Floor....................... 11:45 a.m. – 1:00 p.m.

REFRESHMENT BREAKS AND LUNCHES
Morning and afternoon refreshment breaks will be provided. Lunch is provided on the expo floor Tuesday and Wednesday. Attendees are on their own for lunch Monday, May 23rd and the Meydenbauer Center has several dining options to choose from.

MOBILE APP
This year’s conference mobile app will provide key information regarding the AeroMat technical program, exposition and social events. Available for Apple and Android devices. Visit the Registration Desk to learn more about the app.
GENERAL INFORMATION

POLICY ON AUDIO AND VIDEO RECORDING OF TECHNICAL PAPER PRESENTATIONS/SESSIONS
ASM International® reserves the right to any audio and video reproduction of presentations at every technical session. Recording of sessions (audio, video, still photography, etc.) intended for personal use, distribution, publication or copyright without the express written consent of ASM and the individual is strictly prohibited.

AMERICANS WITH DISABILITIES
In accordance with the Americans with Disabilities Act (ADA) of 1990, ASM International and Meydenbauer Center are striving to accommodate all of our guests with special needs. If a disability requires that you have access to modified housing, transportation or other assistance, please inform the hotel and/or conference staff.

ASM ANTI-HARASSMENT POLICY
ASM International is dedicated to providing harassment-free events for everyone, regardless of age, race, religion, disability, gender, gender identity or sexual orientation. We do not tolerate harassment in any form from anyone attending an ASM event. Harassing behaviors include: offensive verbal comments related to age, race, religion, disability, gender, gender identity or sexual orientation; the use or display of sexual images, activities or commentary in public spaces; deliberate intimidation; stalking or following; harassing photography or recording; sustained disruption of events; or inappropriate physical contact. Participants asked to stop any harassing behavior are expected to comply immediately. Participants violating this policy may be sanctioned or expelled from the event or the membership at the discretion of ASM leadership.

CONVENTION CENTER FLOORPLAN/LAYOUT MAP

4th Floor
## PROGRAM/SCHEDULE AT-A-GLANCE

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td><strong>Sunday, May 22, 2016</strong></td>
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<tr>
<td>1:00 – 5:00 p.m.</td>
<td>Exhibitor Move-In</td>
<td>Exhibit Halls A &amp; B</td>
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<tr>
<td>5:00 – 8:00 p.m.</td>
<td>Registration Open</td>
<td>Hyatt Regency Bellevue Lobby</td>
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<td></td>
<td><em>Pre-registered attendees only</em></td>
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<tr>
<td><strong>Monday, May 23, 2016</strong></td>
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<tr>
<td>6:45 a.m. – 6:00 p.m.</td>
<td>Registration Open</td>
<td>Meydenbauer Center Lobby</td>
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<tr>
<td>8:00 – 10:00 a.m.</td>
<td>Technical Programming</td>
<td>Meydenbauer Center, 4th Floor</td>
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<tr>
<td>8:00 a.m. – 12:00 p.m.</td>
<td>Exhibitor Move-In</td>
<td>Exhibit Halls A &amp; B</td>
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<tr>
<td>10:00 – 10:30 a.m.</td>
<td>Morning Refreshment Break</td>
<td>4th Floor, Meeting Space Foyer</td>
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<tr>
<td>10:30 a.m. – 12:00 p.m.</td>
<td>Technical Programming</td>
<td>Meydenbauer Center, 4th Floor</td>
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<tr>
<td>12:00 – 1:00 p.m.</td>
<td>Lunch (on own)</td>
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<tr>
<td>1:00 – 3:00 p.m.</td>
<td>Technical Programming</td>
<td>Meydenbauer Center, 4th Floor</td>
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<tr>
<td>3:00 – 3:30 p.m.</td>
<td>Afternoon Refreshment Break</td>
<td>Exhibit Halls A &amp; B</td>
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<tr>
<td>3:00 – 6:00 p.m.</td>
<td>Exhibits Open</td>
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<tr>
<td>3:30 – 4:30 p.m.</td>
<td>Plenary Speaker: Chris Lewicki</td>
<td>Exhibit Halls A &amp; B</td>
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<tr>
<td>4:30 – 6:00 p.m.</td>
<td>Expo Networking Reception</td>
<td>Exhibit Halls A &amp; B</td>
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<tr>
<td><strong>Tuesday, May 24, 2016</strong></td>
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<tr>
<td>7:00 a.m. – 5:00 p.m.</td>
<td>Registration Open</td>
<td>Meydenbauer Center Lobby</td>
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<tr>
<td>8:00 – 10:00 a.m.</td>
<td>Technical Programming</td>
<td>Meydenbauer Center, 4th Floor</td>
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<tr>
<td>10:00 – 10:30 a.m.</td>
<td>Morning Refreshment Break</td>
<td>Exhibit Halls A &amp; B</td>
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<tr>
<td>10:00 a.m. – 3:30 p.m.</td>
<td>Exhibits Open</td>
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<tr>
<td>10:30 a.m. – 12:00 p.m.</td>
<td>Plenary Speakers: Stefano Bianchi &amp; Mike Lombardi</td>
<td>Exhibit Halls A &amp; B</td>
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<tr>
<td>12:00 – 1:00 p.m.</td>
<td>Lunch on Exhibit Floor</td>
<td>Exhibit Halls A &amp; B</td>
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<tr>
<td>1:00 – 3:00 p.m.</td>
<td>Technical Programming</td>
<td>Meydenbauer Center, 4th Floor</td>
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<tr>
<td>3:00 – 3:30 p.m.</td>
<td>Afternoon Refreshment Break</td>
<td>Exhibit Halls A &amp; B</td>
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<tr>
<td>3:30 – 5:30 p.m.</td>
<td>Technical Programming</td>
<td>Meydenbauer Center, 4th Floor</td>
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<tr>
<td>7:00 – 9:30 p.m.</td>
<td>Off-Site Social Event - Seattle Space Needle (Transportation Included)</td>
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<tr>
<td><strong>Wednesday, May 25, 2016</strong></td>
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<tr>
<td>7:00 a.m. – 11:30 a.m.</td>
<td>Registration Open</td>
<td>Meydenbauer Center Lobby</td>
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<tr>
<td>8:00 – 10:30 a.m.</td>
<td>Technical Programming</td>
<td>Meydenbauer Center, 4th Floor</td>
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<tr>
<td>9:00 a.m. – 1:00 p.m.</td>
<td>Exhibits Open</td>
<td>Exhibit Halls A &amp; B</td>
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<tr>
<td>10:30 – 11:00 a.m.</td>
<td>Morning Refreshment Break</td>
<td>Exhibit Halls A &amp; B</td>
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</tr>
<tr>
<td>11:00 – 11:45 a.m.</td>
<td>Plenary Speaker: Dan Miracle</td>
<td>Exhibit Halls A &amp; B</td>
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<tr>
<td>11:45 a.m. – 1:00 p.m.</td>
<td>Lunch on Exhibit Floor</td>
<td>Exhibit Halls A &amp; B</td>
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<tr>
<td>1:00 – 10:00 p.m.</td>
<td>Exhibitor Move-Out</td>
<td>Exhibit Halls A &amp; B</td>
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<tr>
<td>1:00 – 5:00 p.m.</td>
<td>Optional VIP Tour of Boeing Everett Factory (Limited space and pre-registration required)</td>
<td>Exhibit Halls A &amp; B</td>
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*Programs are tentative: papers, authors and order of presentations are subject to change.*
REFRESHMENT BREAKS
Monday, May 23
  Morning Refreshment Break ................. 10:00 – 10:30 a.m.
  Afternoon Refreshment Break ............. 3:00 – 3:30 p.m.
Tuesday, May 24
  Morning Refreshment Break ................. 10:00 – 10:30 a.m.
  Afternoon Refreshment Break ............. 3:00 – 3:30 p.m.
Wednesday, May 25
  Morning Refreshment Break ................. 10:30 – 11:00 a.m.

LUNCH ON THE EXHIBIT FLOOR
Tuesday, May 24 ....................................................... 12:00 – 1:00 p.m.
Wednesday, May 25 .................................................. 11:45 a.m. – 1:00 p.m.

EXPO NETWORKING RECEPTION
Monday, May 23 ........................................................ 4:30 – 6:00 p.m.

AEROMAT 2016 SOCIAL EVENT
Tuesday, May 24 ........................................................ 7:00 – 9:30 p.m.
  Seattle Space Needle
  Tickets - $85 each (pre-registration required)
  Transportation Included – departing from the Hyatt Regency Bellevue at 6:30 p.m.

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# AEROMAT 2016 Organizing Committee

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**2016 Conference Chair**
The Boeing Company

## DR. GARY H. BRAY
**2016 Conference Vice-Chair**
Alcoa

## DR. RICHARD FREEMAN
**Technical Program Chair**
TWI Limited

## MR. MICHAEL M. NIEDZINSKI
**Immediate Past Chair**
Constellium

## Members

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization/Position</th>
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<tr>
<td>Dr. William E. Frazier, Board Liaison, FASM</td>
<td>Naval Air Systems Command</td>
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<tr>
<td>Dr. David U. Furrer, FASM</td>
<td>Pratt &amp; Whitney</td>
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<tr>
<td>Dr. Eli Ross</td>
<td>Pratt &amp; Whitney</td>
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<tr>
<td>Mr. Michael M. Antony</td>
<td>Allegheny Technologies Incorporated</td>
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<td>Dr. David U. Furrer, FASM</td>
<td>Pratt &amp; Whitney</td>
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<td>Dr. Eli Ross</td>
<td>Pratt &amp; Whitney</td>
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<td>Mr. Eric S. Bono</td>
<td>Summit Materials, LLC</td>
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<td>Mr. Robert A. Hafley</td>
<td>NASA</td>
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<td>Dr. Michael T. Hahn, FASM</td>
<td>Northrop Grumman Corporation</td>
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<td>Ms. Karen M. Tamingler</td>
<td>NASA</td>
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<td>Mr. Rodney R. Boyer, FASM</td>
<td>Constellium Aerospace &amp; Transportation</td>
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<td>Dr. Slyvain Henry</td>
<td>Constellium Aerospace &amp; Transportation</td>
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<td>Mr. Jeffrey Waldman, FASM</td>
<td>Navmar Applied Sciences Corporation</td>
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<td>Mr. Brian Boyette</td>
<td>NAVAIR – FRC EAST</td>
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<td>Pat Howell</td>
<td>ATI</td>
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<td>Mr. William L. Wentland</td>
<td>UTS Aerospace Systems</td>
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<td>Dr. Jim Cotton</td>
<td>Boeing</td>
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<td>Roy Nash</td>
<td>ATI</td>
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<tr>
<td>Mr. Kuang-o (Oscar) Yu, FASM</td>
<td>Alcoa Titanium &amp; Engineered Products</td>
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<tr>
<td>Mr. John Fanning</td>
<td>Timet</td>
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<tr>
<td>Mr. Venancio Neto</td>
<td>Embraer</td>
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<tr>
<td>Mr. Fernando F. Fernandez</td>
<td>Embraer</td>
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<tr>
<td>Hank Phelps</td>
<td>Lockheed Martin</td>
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</table>
**MONDAY, MAY 23, 2016**

Mr. Chris Lewicki  
*Planetary Resources, Inc.  
President & CEO*

**Redefining Natural Resources**

3:30 – 4:30 p.m.

Mr. Chris Lewicki has been intimately involved with the lifecycle of NASA’s Mars Exploration Rovers and the Phoenix Mars Lander. Mr. Lewicki performed system engineering development and participated in assembly, test and launch operations for both Mars missions. He was Flight Director for the rovers Spirit and Opportunity, and the Surface Mission Manager for Phoenix. The recipient of two NASA Exceptional Achievement Medals, Mr. Lewicki has an asteroid named in his honor: 13609 Lewicki. Chris holds bachelor’s and master’s degrees in Aerospace Engineering from the University of Arizona. At Planetary Resources, Mr. Lewicki is responsible for the strategic development of the company’s mission and vision, engagement with customers and the scientific community, serves as technical compass, and leads day to day operations.

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**TUESDAY, MAY 24, 2016**

Mr. Stefano Bianchi  
*European Space Agency  
Head of ESA Launchers Department*

**European Launchers Developments and Technologies—Perspectives and Challenges**

10:30 – 11:15 a.m.

Stefano Bianchi, born in Milan (Italy) in 1959, holds a MSc degree in Nuclear Engineering from the “Politecnico di Milano”. In 1987, joined the European Space Agency (ESA) to work first on the Ariane 5 Launcher development programme and then on the Vega launcher development programme.

From 2008 as Programme Director, he has been responsible for managing the development of the Vega launcher and Ground Segment infrastructure in French Guyane. He finally led the programme to the five first successful flights of Vega, starting with the maiden flight on 13 February 2012.

Since early 2013 he is responsible at ESA of the European launchers development programs, including Ariane 6, Vega C, Pride re-entry demonstrator and of the Future Launcher Technology Programme.

Since 2007 he is visiting professor at the University of Rome for the master in space transportation.

In 2013 the President of the Italian Republic awarded him the title of officer of the order of merit, the highest ranking honour of the Republic.

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Mr. Mike Lombardi  
*The Boeing Company  
Corporate Historian*

**Making Dreams Into Reality—the Epochal Stories That Define The Boeing Company**

11:15 a.m. – 12:00 p.m.

Mr. Michael Lombardi has a Bachelor of Arts degree in History from City University. He started at Boeing in 1979 and has been the Senior Corporate Historian for the Boeing Company for the last 20 years. He is also the corporate historian for North American Aviation and manager of Boeing Historical Services which includes the company’s historical archives.

Mr. Lombardi is a regular contributor to the Boeing Frontiers magazine and has one book published on the history of Strategic Airpower. He is currently working on a history of Boeing Plant 2 in Seattle.

As a spokesperson for Boeing Mr. Lombardi has appeared in documentaries for the Discovery Channel, PBS, Smithsonian Channel, and BBC as well as in Germany, Russia, Japan and China.

He is also currently on the board of trustees for Seattle’s Museum of History and Industry.
Dr. Daniel Miracle is a Senior Scientist in the Materials and Manufacturing Directorate of the Air Force Research Laboratory (AFRL), where he shares responsibility for the quality, balance and focus of the technical program and the quality and balance of the technical workforce. He represents technologies of interest to the US Air Force and leads formation of technical partnerships through interactions with universities, industry and the international scientific community. As a senior technical leader, Dr. Miracle represents the Department of Defense in the formation of major technical alliances with other Governments. Dr. Miracle is an ex officio member of the AFRL Research Council, which is responsible for defining strategies, policies and workforce development for a staff of over 3400 scientists and engineers. He has conducted research in the areas of nickel-based superalloys and intermetallic compounds for high temperature structures; metal matrix composites for structural and thermal applications; advanced aluminum alloys for cryogenic components; and boron-modified titanium alloys for improved processibility. Current research interests include basic studies of amorphous metals and development of multi-principal element alloys for structural applications. Dr. Miracle received a B.S. degree in Materials Science and Engineering from Wright State University, M.S. and Ph.D. degrees in Metallurgical Engineering from The Ohio State University, and an Honorary Doctor of Science from the Institute of Metal Physics, Ukrainian Academy of Sciences, Ukraine. Dr. Miracle is a Fellow of ASM, International and a Fellow of the Air Force Research Laboratory. Dr. Miracle has received the AF Basic Research Award and was co-recipient of the DoE Outstanding Scientific Accomplishment award. He is author or co-author of over 190 peer-reviewed scientific articles and 6 book chapters, and is co-editor of 6 books, including *Composites*, Volume 21 of the ASM Handbook series. Dr. Miracle is co-inventor on 8 patents and has given over 130 plenary, keynote and invited talks at national and international scientific venues in 18 countries.
Additive Manufacturing

The Additive Manufacturing (AM) sessions will include presentations on recent advances in metallic AM processes and technologies in the aerospace, medical and transportation industries. Presentations will cover AM methods, applications, materials & processes, mechanical properties as well as design practices. Presentations on AM methods will cover the various deposition processes used to produce metallic components. Applications will include both prototype and production implementation and examples of associated lessons learned. Secondary processing required, including heat treatment, surface finishing, repair & non-destructive inspection (NDI) will be covered in the Materials & Processes session. AM design practice topics will include design criteria, modeling and simulation techniques, analysis methods, certification requirements and the use of reverse engineering.

Advanced Aluminum Alloys—Light High Performance Alloys and Structures

The “Advanced Aluminum Alloys—Light High Performance Alloys and Structures” sessions cover research, development and applications of aluminum alloys and aluminum alloy-based MMC materials. The technical presentations cover subjects ranging from alloy development, processes involved in the manufacture of aluminum products and structures, and evaluations of the performance of structural subcomponents and components. Focus areas include the development, processing, manufacture and application of recently commercialized aluminum alloys including Al-Li alloys; the corrosion and durability properties of new aluminum alloys; and new design and manufacturing technologies aimed at reducing cost of aluminum structures.

Composite Materials, Processes and Structures

Research and development of composite materials, processes and structures have continued their high rate of growth and application for advanced aerospace designs. While the vast majority of composite materials systems are fiber-reinforced polymer-matrix, there is also continued expansion into fiber metal laminates for targeted applications (e.g. lightweight, improved fatigue and damage tolerance, etc.) Many of the implementation challenges have a common thread originating in either unknown material behavior or in the transition to manufacturing where large-scale, high-rate processes are employed. Concurrently, new composite and FML materials are continually evolving, holding promise for even better performance and more challenges. This session will cover current work that ranges from fundamental science and technology to process development and fabrication, including: matrix and reinforcement materials development, processing and process modeling, dimensional control, applications, defect management and detection, tooling methods, surface preparation, material characterization, additive fabrication methods and cross-sector (commercial, defense, consumer and space) market transitions.

Emerging Materials and Processes

New materials and process technologies allow the aerospace industry to improve performance and affordability in all life-cycle phases of aerospace systems. These sessions will highlight recent work in novel materials and process technology with a focus on potential new applications for the aerospace industry.

Failure Analysis of Aerospace Components

Failure analysis has been used as a tool to enhance aviation safety throughout the decades. It draws on a variety of science and engineering disciplines in order to identify root causes and make recommendations to avoid repeat offenses. As materials, processes, and aircraft designs evolve, new methods combined with traditional practices are required to provide solutions to the aviation industry. This session will bring together failure analysis practitioners to exchange ideas, share best practices and lessons learned, and make new connections.

High Temperature and Turbine Materials

High temperature materials and their advancement are often on the critical path for development of propulsion systems, aerospace vehicles, and gas turbines for power generation. While meeting performance and structural integrity requirements is essential, accelerating development of high-temperature materials has meant an increased reliance on emerging Integrated Computational Materials Engineering (ICME) methods. Advances in alloys, ceramics, intermetallics and coatings for high-temperature applications will be presented, with emphasis on how ICME has become enabling to cost-effective, rapid development and implementation.

Integrated Computational Materials Engineering

Integrated Computational Materials Engineering (ICME) methods, as enabled by industry and government efforts such as the Materials Genome Initiative (MGI), have garnered increased attention over the past several years. The ICME session covers research related to the computational modeling and
accelerated development of new aerospace materials and advanced processing methods such as additive manufacturing. Particular areas of interest include: (1) the development of process-structure and structure-property computational models and their integration into materials design practice; (2) the optimization of a material’s production or processing path; (3) the rapid development and qualification of new aerospace materials; and (4) the use of modeling to optimize designs employing advanced materials and processing methods.

Surface Modification for Aerospace
Innovations in surface modification of materials have been increasing in frequency in recent years. Aerospace Engineers are continually looking for novel methods to improve tribological properties and enhanced fatigue life of materials. Performance improvements have been traditionally accomplished by the use of surface treatments that can be classified as either applied coatings, such as thermal spray or plating, or media impingement, such as grit blasting or shot peening. Now, advances in plasma, laser and ultrasonic technologies are pushing the envelope of surface modification for enhanced material performance. Advanced surface treatments can be automated to replace costly and often hazardous manual operations, creating safer, more efficient high-rate production processes. Implementation of new surface processing techniques presents many challenges, whether in unexpected material behavior, or in transitioning to production, where large-scale, high-rate processes are employed. This session will cover current work in surface modification ranging from fundamental science and technology, to process development for production.

Sustainability of Aerospace Materials and Processes
These sessions aim to highlight and report on challenges in environmental sustainability particular to the aerospace industry, elucidate leading sustainable approaches and recommend best practices. Experts will share their knowledge and discuss design of materials and processes for improved recyclability, design for environment (DfE) and processing to recover manufacturing scrap and end of life (EoL) parts for new resources. Challenges in maintaining premium chemistry control and preventing impurity pickup and concentration are of special interest for high-performance aerospace alloys (magnesium, aluminum, titanium, ferrous alloys and superalloys). Similarly, methods of addressing fiber recovery from reinforced thermoplastics and thermoset polymer composites are highly desirable topics. Cost modeling and life cycle assessment likewise appropriate. The evolution and future of recycling methods, inline scrap characterization and control, and modern melting methods also fit well in this program. Other topics of interest include: renewable materials sources, biomaterials, EoL dismantling, aircraft DfE, and environmental legislation and controls.

Thermomechanical Processing
This session will cover topics involving all manner of thermomechanical processing of aerospace materials, including forging, extrusion, rolling, drawing, swaging, etc. Materials systems of interest include magnesium, aluminum, titanium, nickel- and cobalt-base superalloys and ferrous alloys. Modeling of thermomechanical processes and papers on developing processes are also welcome.

Titanium Alloy Technology
New novel Ti powder metallurgy approaches (not 3D printing) are discussed which claim to reduce cost and improve properties. These presentations will discuss things such as sintering and extrusion, use of hydride powder, sintering plus forging, and a spark plasma sintering process, which, in conjunction with applied compaction pressure which results in rapid densification. Another process discusses a novel Ti extraction process and low cost powder spheroidization process to reduce the cost of a powder metallurgy approach. Another interesting technology to be discussed is laser assisted machining where a laser is utilized to heat the metal ahead of the cutting or milling tool. One would not intuitively add here, the titanium’s low thermal conductivity can be a problem, reducing tool life. They claim improved tool life and surface finish along with reduced machining costs. Friction stir welding of three alpha-beta titanium alloys and the results compared. Good quality welds with a significantly refined weld nugget were observed for each alloy. Property comparisons will be discussed.

Welding and Joining
Welding technologies have been used in aircraft engine component manufacture for decades, but in more recent years there has been an increase in laser welding, friction welding and adhesive hybrid bonding for airframe manufacture in addition to the more conventional riveting technology. These technologies are continuing to develop and improve, and are being used for higher load applications, and in areas where dissimilar material joints are beneficial to the design for weight saving and performance requirements. The Welding sessions cover many areas of friction, power beam and fusion welding technologies, and adhesive hybrid bonding for a variety of aircraft and space applications.
REGISTRATION NOW OPEN!

The ASM Heat Treating Society will present a new and exciting global event, Heat Treat Mexico, which will showcase the heating/heat treating resources and technology available to the important automotive manufacturing market in Mexico. When registration opens, attendees will get the following for the low price of $250 USD (member)/$265 USD (non-member):

- Education Short Course, “Metallurgy for the Non-Metallurgist”, including class materials
- 3-Day Heat Treating Symposium
- Daily Lunch (4 total) and Refreshments Breaks
- Welcome Reception with exhibitors
- Special Networking Event, with open bar
- Dedicated networking times with exhibitors
- Courses/Symposium + written materials. Offered in English and Spanish
- Free membership in ASM/HTS for non-members
- Free parking
- Single day rates available

ONLINE REGISTRATION IS NOW OPEN.

Visit asminternational.org/htmexico to view the entire agenda.

Organized By:
Monday, May 23, 2016

Additive Manufacturing I
8:00 – 11:30 a.m.
Meeting Room: 404

Session Chair
Mr. William Wentland
United Technologies Aerospace Systems
Rockford, IL, USA

8:00 a.m.
Optimization of Selective Laser Melting Parameters for the Ni-Based Superalloy IN-738 LC Using Doehler’s Design: Dr. Nataliya Perevoshchikova1, Jordan Rigaud1, Y. Sha2, Martin Heilmaier3, Barrie Finnin4, Elena Labelle4,5, Xinhua Wu4,5 and Dr. Dacian Tomus6; 1Monash University, Clayton, Australia; 2Ecole National Superieure des Ingenieurs en Arts Chimiques et Technologiques, Labege, France; 3Department of Material Science and Engineering, Monash University, Clayton, Australia; 4Karlsruhe Institute of Technology (KIT), Institute for Applied Materials (IAM), Karlsruhe, Germany; 5Monash Centre for Additive Manufacturing, Notting Hill, Australia; 6School of Physics, Monash University, Melbourne, Australia

8:30 a.m.
A Statistical Method for Predicting the Compressive Strength of Geometrically-Imperfect Metal Microlattices Produced by Selective Laser Melting: Mr. Tyler London1, Mr. Damaso De Bono2 and Ms. Amanda Allison2; 1Numerical Modelling and Optimization, TWI Technology Centre (North East), Middlesbrough, United Kingdom; 2Laser Additive Manufacturing, TWI Technology Centre (Yorkshire), Rotherham, United Kingdom

9:00 a.m.
Use of Additive Friction Stir in Al Alloys (Powder and Solid): Ms. Nanci Hardwick, Aeroprobe Corporation, Christiansburg, VA, USA

9:30 a.m.
Topology Optimization for Structural Integrity—Improving Part Quality and Performance within the Design-for-Additive-Manufacture Workflow: Mr. Tyler London, Numerical Modelling and Optimization, TWI Technology Centre (North East), Middlesbrough, United Kingdom

10:30 a.m.
Microstructure Impact on Ultrasonic Nondestructive Inspection of Ti-6Al-4V Produced Using Electron Beam Directed Energy Deposition: Mr. Bryant Foster1, Dr. Shawn M. Kelly1, Mr. Roger Spencer1,2 and Mr. Hank Phelps3; 1Additive Manufacturing, EWI, Columbus, OH, USA; 2Non Destructive Evaluation, EWI, Columbus, OH, USA; 3Lockheed-Martin, Marietta, GA

11:00 a.m.
Use of Additive Friction Stir in Mg Alloys (Powder and Solid): Ms. Nanci Hardwick, Aeroprobe Corporation, Christiansburg, VA, USA

Composite Materials and Structures I
8:00 a.m. – 12:00 p.m.
Meeting Room: 407

Session Chair
Mark Rogalski
Boeing Commercial Airplanes
Everett, WA, USA

8:00 a.m.
New Discrete Silicon Carbide Fibers for Composites: Dr. Tom Quantrille, Advanced Composite Materials, LLC, Greer, SC, USA

8:30 a.m.
Preliminary Study on the Effect of Drill Geometry on the Surface Quality of CFRP Holes: Dr. Dave Kim, Washington State University Vancouver, Vancouver, WA, USA

9:00 a.m.
Fiber Metal Laminates—Its History and Perspective: Prof. L. B. Vogelesang1, Prof. Jan Willem Gunnink2 and Prof. R. Benedictus3; 1Aerospace Department, Delft University of Technology, Delft, Netherlands; 2GTM Advanced Structures, The Hague, Netherlands; 3Structural Integrity & Composites, Delft University of Technology, Delft, Netherlands

9:30 a.m.
Recent Developments in FML/Aluminum Bonded Structures: Dr. R.C. Alderliesten and Prof. R. Benedictus, Structural Integrity & Composites, Delft University of Technology, Delft, Netherlands

10:00 a.m. Morning Refreshment Break

10:30 a.m.
Design for Value of FML Components—Example Fuselage Panels: Mr. Cees van Hengel, Technology, Fokker Aerostructures, Papendrecht, Netherlands
11:00 a.m.
Design Optimization Methodology for Future Hybrid Wing Structures: Dr. R. C. Alderliesten\(^1\), Dr. Ilhan Sen\(^1\), Frederic Bron\(^2\), Mr. Guillaume Delgrange\(^2\), Dr. Jean-Christophe Ehstrøm\(^2\) and Prof. R. Benedictus\(^1\); \(^1\)Structural Integrity & Composites, Delft University of Technology, Delft, Netherlands; \(^2\)Constellium Technology Center, Voreppe, France

11:30 a.m.
Fiber Metal Laminate Lower Wing Cover Structures: Mr. Tim Axford\(^1\) and Mr. Christian Rueckert\(^2\); \(^1\)Wing Structures R&T, Airbus Operations Limited, Bristol, United Kingdom; \(^2\)Engineering Structure, R&T for Materials & Processes, Airbus Operations GmbH, Bremen, Germany

Emerging Materials and Processes I
8:00 – 11:30 a.m.
Meeting Room: 406

Session Chair
Mr. Brian Boyette
NAVAIR
Cherry Point, NC, USA

8:00 a.m.
Electroforming of High-Strength Lightweight Nanostructured Aluminum Alloys with Complex Geometries: Dr. Shiyun Ruan\(^1\), Dr. Robert Hilty\(^1\), Dr. Alan Lund\(^1\) and Prof. Christopher A. Schuh\(^2\); \(^1\)Xtalic Corporation, Marlborough, MA; \(^2\)Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, MA

8:30 a.m.
Fatigue Properties of 300M in Relation with Material Cleanliness: Dr. Nicolas Biot\(^1\), Mrs. Valentine Deneux\(^1\), Mr. Andrew Harris\(^2\) and Mr. Peter Taylor\(^2\); \(^1\)Materials & Process Department, Messier Bugatti Dowty, Oloron Sainte Marie, France; \(^2\)Materials & Process Department, Messier Bugatti Dowty, Gloucester, United Kingdom

9:00 a.m.
Architected High-Temperature Alloy Truss Cores: Dr. Hunter Martin, Eric Clough, David Page, David Ashby and Tobias Schaedler, HRL Laboratories, Malibu, CA, USA

9:30 a.m.
High Hardness and Low Friction of Ti-6Al-4V and Inconel 718 Alloy at High Temperatures: Mr. Jun-Hyong Kim\(^1\), Dr. Auezhan Amanov\(^1\), Prof. Jarryung Koo\(^2\) and Prof. Young-Sik Pyun\(^2\); \(^1\)Mechanical Engineering, Sun Moon University, Asan, South Korea; \(^2\)Advanced Materials Engineering, Kongju National University, Cheonan, South Korea

10:00 a.m. Morning Refreshment Break

10:30 a.m.
Material Development Tendencies at Airbus: Mr. Christian Rueckert, Engineering Structure, R&T for Materials & Processes, Airbus Operations GmbH, Bremen, Germany

11:00 a.m.
Novel High Specific Stiffness Materials for Space Applications: Mr. A. Norman\(^1\), Mrs. G. Mozdzen\(^2\), Mr. M. Scheerer\(^3\), Mr. A. Merstallinger\(^3\), Mr. E. Neubauer\(^3\) and Mr. H. Wulz\(^4\); \(^1\)European Space Agency (ESA), Noordwijk, Netherlands; \(^2\)Aerospace & Advanced Composites GmbH, Wiener Neustadt, Austria; \(^3\)RHP-Technology GmbH, Seibersdorf, Austria; \(^4\)RTBV GmbH, Vienna, Austria

High Temperature and Turbine Materials I
8:00 a.m. – 12:00 p.m.
Meeting Room: 402

Session Chair
Mr. Eli Ross
UTC Pratt & Whitney
East Hartford, CT, USA

8:00 a.m.
Foam-Reinforced Thermal Insulation for High-Temperature and Cryogenic-Temperature Applications: Dr. Jacob J. Stiglich, Mr. Brian Williams and Mr. Victor Arrieta, Ultramet, Pacoima, CA, USA

8:30 a.m.
Accelerated Material Testing of Aero Engine Parts in a High-Temperature Test Rig at Elevated Pressures: Mr. Thomas Jackowski\(^1\), Mr. Achmed Schulz\(^1\), Prof. Hans-Jörg Bauer\(^1\) and Mr. Miklós Gerendás\(^2\); \(^1\)Institut für Thermische Strömungsmaschinen, Karlsruhe Institute of Technology, Karlsruhe, Germany; \(^2\)Combustor Aerothermal and Cooling, Rolls-Royce Deutschland Ltd. & Co KG, Blankenfelde-Mahlow, Germany

9:00 a.m.
Thermomechanical Model for Life Prediction of a Turbine Engine Blade to Disk Attachment: Dr. Sam Naboulsi, AFRL DSRC, Wright-Patterson Dayton, OH, USA; High Performance Technologies Innovations LLC., Reston, VA, USA

9:30 a.m.
A Simplified Solution Heat Treatment Protocol for Nickel-Based Single Crystal Superalloys: Dr. Lin Liu, Department of Materials Science and Engineering, Northwestern Polytechnical Univesity, Xi’an, China

10:00 a.m. Morning Refreshment Break
10:30 a.m.
Development of Niobium Based Intermetallic Alloys Doped with Silicon for Low Pressure Turbine Applications: Ms. Laurence Sikorav¹, Dr. Anne Denquin¹, Dr. Zhao Huvelin¹ and Prof. Philippe Vermaut²; ¹Département of Metallic Materials and Structures, ONERA—The French Aerospace Lab, Palaiseau, France; ²PSL Research University, Chimie ParisTech—CNRS, Institut de Recherche de Chimie Paris, Paris, France; ³UFR926, Sorbonne Universités, UPMC Univ Paris 06, Paris, France

11:00 a.m.
Investigation of the Chemical Behavior between Platinum Rhodium and the Rocket Engine Propellants Monomethylhydrazine and Dinitrogen Tetroxide: Ms. Loreen Wermuth¹, Dr. Steffen Beyer¹, Prof. Michael Schütze², Mr. Joel Deck², Mr. Georg Schulte³ and Mr. Max Kolb⁴; ¹Space Systems, Airbus DS GmbH, Munich, Germany; ²DECHEMA-Forschungsinstitut, Frankfurt am Main, Germany; ³System and Product Engineering, Airbus DS GmbH, Hardthausen-Lampoldshausen, Germany; ⁴Airbus Group Innovations, Munich, Germany

11:30 a.m.
Processing and Testing of Ultra High-Temperature Fiber-Reinforced Ceramic and Metal Matrix Composites: Dr. Jacob J. Stiglich, Mr. Brian Williams, Mr. Jerry Brockmeyer and Mr. Victor Arrieta, Ultramet, Pacoima, CA, USA

Integrated Computational Materials Engineering
8:00 a.m. – 12:00 p.m.
Meeting Room: 405

Session Chair
Dr. Jason Sebastian
Questek Innovations, LLC
Evanston, IL, USA

8:00 a.m.
Development of an Integrated Computational Materials Engineering-Based Property Model Library (Application Example of Single Crystal Nickel Superalloy Design): Dr. Jason Sebastian¹ and Mr. Paul Mason²; ¹Questek Innovations, LLC, Evanston, IL; ²Thermo-Calc Software Inc., McMurray, PA, USA

8:30 a.m.
A Predictive Strength Model with Experimental Characterization for Gas-Atomized Aluminum Powder: Ms. Baillie McNally¹, Dr. Danielle Cote¹, Mr. Victor K. Champagne² and Prof. Richard D Sisson¹; ¹Materials Science and Engineering, Worcester Polytechnic Institute, Worcester, MA, USA; ²ARL Center for Cold Spray, US Army Research Laboratory, Aberdeen, MD, USA

9:00 a.m.
Integrated Materials Modeling of Laser Additive Manufacturing Processes: Prof. Yung Shin, Mr. Neil Bailey and Mr. Chris Katinas; Mechanical Engineering, Purdue University, W. Lafayette, IN, USA

9:30 a.m.
The Influence of “Lightweighting” on Induction Heat Treatment Processes: Mr. Collin A Russell, Research & Development, Inductoheat Inc., Madison Heights, MI, USA

10:00 a.m. Morning Refreshment Break

10:30 a.m.
Defining Materials in the Digital Age (or, Reinventing the Lowly Materials Specification): Dr. James D. Cotton, Materials and Manufacturing Technology, Boeing Research and Technology, Seattle, WA, USA

11:00 a.m.
Numerical Simulation for Composite Wing Structure Design of an Unmanned Aerial Vehicle: Mr. Arturo Paz and Dr. Martin Castillo, Universidad Autonoma de Nuevo Leon, San Nicolas de Los Garza, Mexico

11:30 a.m.
Buckling and Vibration Analysis of Curvilinearly Stiffened Plates with Holes: Mr. Wei Zhao¹ and Prof. Rakesh K. Kapania²; ¹Virginia Tech, Blacksburg, VA, USA; ²Aerospace and Ocean Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA

Welding and Joining I
8:00 a.m. – 12:00 p.m.
Meeting Room: 403

Session Chair
Mr. Fernando Fernandez
Embraer
São José dos Campos, Brazil

8:00 a.m.
Development of Aluminum-Titanium Tube Joints for Space Propulsion Systems: Mr. A. Norman¹, Mr. A. Bernad² and Mr. S. Resch³; ¹European Space Agency (ESA), Noordwijk, Netherlands; ²Omnidea-RTG, Stuhr, Germany; ³IWS-Service, Hamburg, Germany

8:30 a.m.
Development of Friction Stir Welding of Titanium Alloys for Spacecraft Propellant Tanks: Dr. Richard Freeman¹ and Mr. A. Norman²; ¹TWI Ltd, Cambridge, United Kingdom; ²European Space Agency (ESA), Noordwijk, Netherlands
9:00 a.m.
Phase Field Modelling of Microstructural Evolution in Titanium Alloy Welds: Dr. Nathaniel Ng, Dr. Adele Lim, Dr. Mark Wong, Dr. Jerry Quek, Dr. David Wu and Dr. Rajeev Ahluwalia, Institute of High Performance Computing, Singapore, Singapore

9:30 a.m.
Novel Approach to Keyhole Closure in Aluminum Alloys Using Friction Spot Welding: Mr. Martin Remann, Dr. Uceu Suhuddin and Dr. Jorge F. dos Santos, Institute of Materials Research, Materials Mechanics, Solid-State Joining Processes, Helmholtz-Zentrum Geesthacht GmbH, Geesthacht, Germany

10:00 a.m. Morning Refreshment Break

10:30 a.m.
Friction Stir Welding and EB Welding of Al-Li Alloys for Demisable Spacecraft Propellant Tanks: Dr. Richard Freeman1, Mr. A. Norman 2 and Dr. M. J. Russell3, 1TWI Ltd, Cambridge, United Kingdom; 2European Space Agency (ESA), Noordwijk, Netherlands; 3Friction & Forge Processes Group, TWI Ltd, Cambridge, United Kingdom

11:00 a.m.
Structural Behavior of AA2024-T3 Weld Produced by Friction Spot Welding for Aircraft Application during Loading: Mr. Robson Cristiano Brzostek, Dr. Uceu Suhuddin3 and Dr. Jorge F. dos Santos; Institute of Materials Research, Materials Mechanics, Solid-State Joining Processes, Helmholtz-Zentrum Geesthacht GmbH, Geesthacht, Germany

11:30 a.m.
Automatic Defect Recognition Using Full Matrix Capture Data: Mr. Ian Cooper1, Dr. Mark Sutcliffe1 and Dr. Richard Freeman2; 1VAL, TWI Technology Centre Wales, Port Talbot, United Kingdom, 2TWI Ltd, Cambridge, United Kingdom

1:00 p.m.
Wear Behavior and Microstructure of Selective Laser Melting Additively Manufactured Hypereutectic Al-Si Alloys: Mr. Nan KANG, Dr. Pierre Coddet, Prof. Hanlin Liao, Prof. Christian Coddet and Mrs. Tiphaine Baur, Irtes-Lermps, Université de Technologie de Belfort-Montbéliard, Belfort, France

1:30 p.m.
Additive Manufacturing of Magnesium Based Alloys—a Status Update: Dr. Rajiv Tandon, Magnesium Elektron Powders, Manchester, NJ, USA

2:00 p.m.
Analysis of High-Cycle Fatigue Behavior of Metallic Materials Fabricated by Additive Manufacturing: Dr. David Witkin, Dhruv Patel and Thomas Albright, Materials Science Department, The Aerospace Corporation, Los Angeles, CA, USA

2:30 p.m.
Processing Superalloy Materials in Additive Manufacturing Using Electron Beam Melting Technology: Dr. Francisco Medina1, Michael Kirka2, Dr. Ulf Ackelid3 and Dr. Ryan Dehoff2; 1Arcam, Naperville, IL, 2Manufacturing Demonstration Facility, Oak Ridge National Laboratory, Knoxville, TN, USA; 3Manufacturing Demonstration Facility, Oak Ridge National Lab, Oak Ridge, TN, USA

3:00 p.m. Afternoon Refreshment Break

Advanced Aluminum Alloys I
1:00 – 3:00 p.m.
Meeting Room: 406

Session Chair
Mr. Roy Nash
Kaiser Aluminum
Spokane, WA, USA

1:00 p.m.
Carbon Nano-Rods Reinforced Powder Metallurgy Aluminum Composites: Prof. Katsuyoshi Kondoh, Dr. Biao Chen, Dr. Junko Umeda, and Dr. Hisashi Imai, Joining and Welding Research Institute, Osaka University, Ibaragi, Japan
1:30 p.m.
Aluminium Matrix Composites for Aerospace Applications: Dr. David Tricker¹, Mr. Andrew Tarrant¹ and Mr. Don Hashiguchi²; ¹Materion Aerospace Metal Composites Ltd, Farnborough, Hampshire, England; ²Materion Corporation, Elmore, OH, USA

2:00 p.m.
Commercial Processing of Aluminum Composites with Nano Alumina Reinforcement: Dr. William C. Harrigan, Gamma Technology, Valencia, CA, USA

2:30 p.m.
Fabrication of High-Strength, High-Toughness Nanostructured Al Alloys: Ms. Rose Roy¹, Dr. Shiyun Ruan¹, Dr. Robert Hilty¹, Dr. Alan Lund¹ and Prof. Christopher A. Schuh¹, Xtallic Corporation, Marlborough, MA, USA; ¹Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, MA, USA

Advances in Aerospace Coatings I
1:00 – 2:30 p.m.
Meeting Room: 405

Session Chair
Heidi Nesgoda
Boeing Research & Technology
Seattle, WA, USA

1:00 p.m.
Seal-Friendly Wear- and Corrosion-Resistant CVD-Coating for Complex Shaped Aircraft Parts: Dr. Yury Zhuk, Technical, Hardide Coatings Ltd, Bicester, Oxfordshire, United Kingdom

1:30 p.m.
Alternative Metallic Binders for High-Performance Cermet: Dr. Kevin Plucknett, Materials Engineering, Dalhousie University, Department of Process Engineering and Applied Science, Halifax, NS, Canada

2:00 p.m.
Analysis of the TEM Specimen Prepared by FIB of Copper Deposited on Aluminum: Prof. Tianying Xiong, Division of Surface Engineering, Institute of Metal Research, CAS, Shenyang, China

Composite Materials and Structures II
1:00 – 3:00 p.m.
Meeting Room: 407

Session Chair
Mark Rogalski
Boeing Commercial Airplanes
Everett, WA, USA

1:00 p.m.
Space FML, a New Family of Space Materials Properties and Performances of GLARE 1: Mr. Johannes Homan¹, Mr. Paul Brand¹, Mr. Jochem Frudiger¹, Prof. Jan Willem Gunnick¹, Dr. Andreas Tesch¹ and Dr. Tommaso Ghidini²; ¹GTM Advanced Structures, The Hague, Netherlands; ²Materials Technology Section at European Space Agency, Noordwijk, Netherlands

1:30 p.m.
Automated FML Manufacturing for High-Production Rates: Dr. Hilmar Apmann, Technology Development, Premium Aerotec GmbH, Varel, Germany

2:00 p.m.
For the LOV of Advanced Materials—Developing a Multiple-Site Damage Analysis Approach for Fibre Metal Laminates: Dr. Calvin Rans¹, Mr. Wandong Wang¹ and Mr. Zhinan Zhang²; ¹Delft University of Technology, Delft, Netherlands; ²The first aircraft design and research institute of AVIC, Xi’an, China

2:30 p.m.
Investigation of GLARE 2 as Titanium Replacement for Fuselage Crack Stoppers: Dr. Thomas Beumler¹, Mr. A. Schmidt² and Prof. Jan Willem Gunnick³; ¹Airbus Germany, Hamburg, Germany; ²CE, Airbus, Toulouse, France; ³GTM Advanced Structures, The Hague, Netherlands

Welding and Joining II
1:00 – 3:00 p.m.
Meeting Room: 403

Session Chair
Gary Coleman
Boeing Research & Technology
Seattle, WA, USA

1:00 p.m.
Dissimilar Alloy Aluminum Tailor Welded Blanks: Dr. Yuri Hovanski¹, Dr. Piyush Upadhyay¹, Ayoub Soullami¹, Dr. John Carsley², Blair Carlson², Susan Hartfield-Wunsch³, Mr. Mark Eisenmenger³, Tom Luzanski³, Dustin Marshall³, Mr. Brandon Landino³, and Glenn Jarvis⁴; ¹Applied Material Processing, Pacific Northwest National Laboratory, Richland, WA, USA; ²GM Global R&D, Warren, MI, USA; ³TWB Company LLC., Monroe, MI, USA; ⁴Global Aerospace, Transportation, & Industrial Rolled Products, Alcoa Inc., Farmington Hills, MI, USA
1:30 p.m.
Analysis of Fiber-Laser Welding of Ti6Al4V via Experiments and Predictive Modeling: Prof. Yung Shin and Mr. Kyung-Min Hong, Purdue University, West Lafayette, IN, USA

2:00 p.m.
The Effect of Post-Weld Heat Treatment on the Corrosion Performance of Friction Stir Welded High-Strength Aluminum Alloys: Dr. Karsa Sotoudeh1, Dr. Hua Zhang2, Dr. Richard Freeman2, Mr. Dave Harvey2 and Dr. M. J. Russell2; 1Materials Group, TWI Ltd, Cambridge, United Kingdom; 2TWI Ltd, Cambridge, United Kingdom; 3Friction & Forge Processes Group, TWI Ltd, Cambridge, United Kingdom

3:00 p.m. Afternoon Refreshment Break

Plenary Session I
3:30 – 4:30 p.m.
Meeting Room: Exhibit Halls A&B

3:30 p.m.
Redefining Natural Resources: Mr. Chris Lewicki, President and CEO, Planetary Resources Inc., NE Redmond, WA, USA

Tuesday, May 24, 2016

Additive Manufacturing III
8:00 – 10:00 a.m.
Meeting Room: 404

Session Chair
Brian T. Rosenberger
Lockheed Martin Aeronautics Company
Fort Worth, TX, USA

8:00 a.m.
The Influence of Post-Build Microstructure on the Electrochemical Behavior of Additively Manufactured 17-4PH Stainless Steel: Dr. Mark Stoudt1, Dr. Sudha Cheruvathur1, Dr. Eric Lass2, Dr. Yaakov Idell3, Dr. Carelyn Campbell4, Dr. Richard Rickers; and Dr. Lyle Levine1, 1Materials Science & Engineering Division, National Institute of Standards & Technology, Gaithersburg, MD, USA 2Material Measurement Laboratory, National Institute of Standards and Technology, Gaithersburg, MD, USA

8:30 a.m.
Effects of Post-Processing Heat Treatment on the Microstructure of Additively Manufactured 17-4 PH Stainless Steel: Dr. Eric Lass and Dr. Sudha Cheruvathur, Materials Science & Engineering Division, National Institute of Standards & Technology, Gaithersburg, MD, USA

9:00 a.m.
Surface Roughness in Selective Laser Melting Ti-6Al-4V Alloy: Mr. Zhuoer Chen1, Prof. Chris Davies1,2, Prof. Xinhua Wu1,2 and Dr. Dacian Tomas1,2; 1Mechanical and Aerospace Engineering, Monash University, Clayton, Australia; 2Monash Centre for Additive Manufacturing, Notting Hill, Australia; 3Materials Science and Engineering, Monash University, Clayton, Australia

9:30 a.m.
Control of Residual Stress, Distortion and Mechanical Properties in Wire + Arc Additive Layer Manufactured Ti-6Al-4V Parts: Mr. Jan Hönigse, Welding Engineering and Laser Processing Centre (WELPC), Cranfield University, Cranfield, United Kingdom

Advanced Forming and Thermomechanical Processing
8:00 – 9:00 a.m.
Meeting Room: 402

Session Chair
Dr. Daniel G. Sanders
University of Washington
Seattle, WA, USA

8:00 a.m.
Relationship Macro and Micro Plasticity of Titanium Alloys: Mr. A. V. Volkov, R&D Center, VSMPO, Sverdlovsk Region, Russia

8:30 a.m.
The Technology-Driven Growth of Induction Heating in the Aerospace Industry: Mr. Collin A Russell, Research & Development, Inductoheat Inc., Madison Heights, MI, USA

Emerging Materials and Processes II
8:00 – 9:30 a.m.
Meeting Room: 405

Session Chair
Devon Beckett
NAVAIR
Cherry Point, NC, USA

8:00 a.m.
Novel Surface Preparation Process for Aluminum, Copper and Brass: Dr. Marvin Hawkins, Sentecor Consulting, Tremonton, UT, USA
AEROMAT 2016 TECHNICAL PROGRAM

8:30 a.m. Intellectual Property—Protecting Innovation Across The Technology Life Cycle: Mr. Sunil Moo- tien-Pillay1 and Kevin Jablonski2; 1The Boeing Company, Seattle, WA, USA, 2Lane Powers PC, Seattle, WA, USA

9:00 a.m. A Peek into Next-Generation Magnesium Alloys: Prof. Nick Birbilis, Department of Materials Engineering, Monash University, Clayton, Australia

Welding and Joining III
8:00 – 10:00 a.m.
Meeting Room: 403

Session Chair
Dr. Richard Freeman
TWI Ltd
Cambridge, United Kingdom

8:00 a.m. Friction Stir Welding—The Next Decade: Dr. Richard Freeman1 and Dr. M. J. Russell2; 1TWI Ltd, Cambridge, United Kingdom; 2Friction & Forge Processes Group, TWI Ltd, Cambridge, United Kingdom

8:30 a.m. Solid-State Joining of Dissimilar Materials with Friction Stir Scribe Technology: Dr. Yuri Hovanski, Dr. Piyush Upadhyay, Dr. Saumyadeep Jana, and Dr. Leo Fifield; Applied Material Processing, Pacific Northwest National Laboratory, Richland, WA, USA

9:00 a.m. Friction Stir Welding Characterization of 2050 and 2219 Plate: Dr. Michael Eller1, Mr. Matthew Champagne2, Mr. Rob Marrero2 and Mr. Michael Niedzinski3; 1Lockheed Martin, New Orleans, LA, USA; 2University of New Orleans, New Orleans, LA, USA; 3Constellium, South Barrington, IL, USA

9:30 a.m. Development of a Refill Friction Stir Spot Welding System Using Opposed Robots: Mr. Hideki Oka- da1, Dr. Kenichi Kamimuki1, Mr. Yoshikawa Shuhei1, and Mr. Shintaro Fukada2; 1Aerospace Company, Kawasaki Heavy Industries, Ltd., Kakamigahara, Japan; 2Kawasaki Heavy Industries,Ltd., Hyogo, Japan

10:00 a.m. Morning Refreshment Break

Plenary Session II
10:30 a.m. – 12:00 p.m.
Meeting Room: Exhibit Halls A&B

10:30 a.m. European Launchers Developments and Technologies—Perspectives and Challenges: Mr. Stefano Bianchi, European Space Agency (ESA), Frascati, Italy

11:15 a.m. Making Dreams into Reality—The Epochal Stories That Define The Boeing Company: Mr. Michael J. Lombardi, Boeing, Seattle, WA, USA

Additive Manufacturing IV
1:00 – 5:30 p.m.
Meeting Room: 404

Session Chair
Frank Medina
EWI
Columbus, OH, USA

1:00 p.m. Microstructural Refinement of Additive Manufactured Ti-6Al-4V By Thermohydrogen Processing: Dr. Hao Zhang and Mr. Ryan Quarberg, Boeing Research & Technology, Boeing, Portland, OR, USA

1:30 p.m. Application of High-Strength, High-Ductility Titanium Alloys for Additive Manufacturing (AM) Processing: Mr. Clay Houser1 and Brian T. Rosenberger2; 1QuesTek Innovations, LLC, Evanston, IL, USA; 2Lock-heed Martin Aeronautics Company, Fort Worth, TX, USA

2:00 p.m. Microstructure and Properties of Ti-6Al-4V and Ti-6Al-2Sn-4Zr-2Mo after Electron Beam Melting Additive Manufacture: Dr. John Porter1, Mr. Mike Velez2, Dr. Patrick Martin3, and Mr. John Wooten4; 1UES Inc., Dayton, OH, USA; 2Structural Materials, UES Inc. AFRL/RXCM, Wright-Patterson AFB, OH, USA; 3CalRAM Inc, Camarillo, CA, USA

2:30 p.m. Evaluation of Free Form Laser Additive Ti 6Al-4V Forms Produced from PREP Powder: Mr. Tim Bar- stow1 and Nick Wald2; 1TIMET–Henderson Technical Laboratory, Henderson, NV, USA; 2RPM Innovations, Rapid City, SD, USA

3:00 p.m. Afternoon Refreshment Break

3:30 p.m. Additive Friction Stir for Additive Manufacturing: Ms. Nanci Hardwick, Aeroprobe Corporation, Christiansburg, VA
4:00 p.m.
Preliminary Study on Inkjet-Based High-Speed Sintering 3D Printing for a Polymeric Material: Dr. Dave Kim and Dr. Hua Tan, Washington State University Vancouver, Vancouver, WA, USA

4:30 p.m.
Electrochemical Surface Finishing of Additively Manufactured Parts: Dr. Timothy Hall, Mr. Stephen Snyder, Dr. Maria Inman and Dr. EJ Taylor, Faraday Technology, Inc., Englewood, OH, USA

5:00 p.m.
Metallic Materials by Additive Manufacturing for Surface Cooling of Combustion Chambers: Ms. Océane Lambert¹, Cécile Davoine¹, Daniel Gaffié¹ and Rémy Dendievel¹; ¹DMSM, ONERA, Châtillon, France; ²DEFA, ONERA, Châtillon, France; ³GPM2, Grenoble University & CNRS, SIMaP, Saint Martin d’Hères, France

1:00 p.m.
Three Years of Industrial Production of Airware® Plates, Sheets and Extrusions—A Solid Platform for Future Developments: Mr. Michael Niedzinski¹, Dr. Frank Eberl¹, Mr. Tristan Crawford¹, Mr. Sylvain Henry¹, Dr. Jean-Christophe Ehrstrom¹, and Dr. Timothy Warner¹; ¹Constellium, South Barrington, IL, USA; ²Constellium LLC, Issoire Cedex, France; ³CRV, Constellium LLC, Voreppe, France; ⁴Constellium Global Aerospace Transportation and Industry, Voreppe, France; ⁵Constellium Technology Center, Voreppe, France

1:30 p.m.
Assessment of Emerging Metallic Structures Technologies Through Full-Scale Test and Analysis of Fuselage Panels: Mr. Michael Kulak¹, John Bakuckas¹, Markus B. Heininner¹, Po Yu Chang¹, Ian Won¹, and Mark Freisthler¹; ¹Aerospace Group, Alcoa Technical Center, Alcoa Center, PA, USA; ²FAA William J Hughes Technical Center, Atlantic City Int Airport, NJ, USA; ³Alcoa Technical Center, Alcoa Center, PA, USA; ⁴FAA Transport Airplane Directorate, Renton, WA, USA

2:00 p.m.
Universal Alloy Corporation—Overview of Recent Alloy Developments for Aerospace Applications: Mr. Vic Dangerfield¹, Ms. Hailey Jesequel¹, Dr. Justin Lamb¹, and Dr. Thomas Dorin²; ¹Universal Alloy Corporation, Canton, GA, USA; ²Deakin University, Geelong, Australia

2:30 p.m.
Advanced Material Development for Aircraft Fuselage Applications: Mr. K. Paul Smith¹, Dr. Frank Eberl¹, Mr. Sylvain Henry¹, Mr. Scott Buchwald¹, P Lorenzo¹, Dr. J. Chevy¹, and M. Bouet-Griffont¹; ¹Constellium Aerospace Transportation, Ravenswood, WV, USA; ²Constellium LLC, Issoire Cedex, France; ³Constellium Global Aerospace Transportation and Industry, Voreppe, France; ⁴Constellium Technology Center, Voreppe, France

3:00 p.m. Afternoon Refreshment Break

3:30 p.m.
Monolithic Aero Aluminum Structures—The Incorporation of Bulk Residual Stress Models and Measurements into Design and Manufacture: Dr. John D. Watton¹, Dr. Mark A. James¹ and Dr. Adrian T. Dewald¹; ¹Aerospace, Alcoa, Inc., Alcoa Center, PA, USA; ²Hill Engineering, LLC, Rancho Cordova, CA, USA

4:00 p.m.
KaiserSelect® Aerospace Product Update Focusing on Thick Plate Product AA7097: Mr. Jason Scheuring¹, Mrs. Jane Buehler¹, Mr. Philippe Lassince², Ms. Maneet Kamboj¹, Dr. Zhengdong (Steven) Long¹, and Mr. Roy Nash¹; ¹Research and Development, Kaiser Aluminum, Spokane, WA, USA; ²Research and Development, Kaiser Aluminum, Paris, France

4:30 p.m.
Effect of Thermal Exposure on the Performance of Airframe Aluminum Alloy AA7050-T7451: Dr. Alexandra Shekhter, Defence Science and Technology Group, Melbourne, Australia
Advances in Aerospace Coatings II
1:00 – 5:00 p.m.
Meeting Room: 405

Session Chair
Arash Ghabchi
The Boeing Company
Seattle, WA, USA

1:00 p.m.
Development of a Chromate-Free, Corrosion Resistant, Eurethane Compatible Epoxy Primer for Cadmium and Zn-Ni Plated Steels: Dr. Roque Panza-Giosa1, Dr. Marilea Manzini1, Dr. Mark Jaworowski2, and Dr. George Zafiris2; 1Materials and Processes, United Technology Aerospace Systems, Oakville, ON, Canada; 2United Technologies Research Center, Hartford, CT, USA

1:30 p.m.
REACH Compliant Functional Trivalent Chromium Electroplating and Stripping: Dr. Timothy Hall, Mrs. Heather McCrabb, Mr. Stephen Snyder, Dr. Maria Inman, and Dr. EJ Taylor, Faraday Technology, Inc., Englewood, OH, USA

2:00 p.m.
Technical Challenges on Coatings for European Space Missions: Dr. Christopher Semprimoschnig1, Dr. Thomas Rohr2, and Dr. Tommaso Ghidini2; 1Head of Materials Space Evaluation and Radiation Effects Section, ESA, Noordwijk, Netherlands; 2ESA, Noordwijk, Netherlands

2:30 p.m.
Platinum Effect on Durability of Aluminide Coatings—Mechanics-Based and Density Functional Theory Investigation—Dr. Kuiying Chen1, Dr. Prakash Patnaik2, and Mr. John R. Rodgers3; 1Structures, Materials and Manufacturing Laboratory, National Research Council Canada, Ottawa, ON, Canada; 2Gas Turbine Laboratory, National Research Council Canada, Ottawa, ON, Canada; 3Innovative Materials Technologies Inc., Ottawa, ON, Canada

3:00 p.m. Afternoon Refreshment Break

3:30 p.m.
A New Process to Produce Local Chromium Diffusion Coating: Dr. Zhihong Tang1, Mr. Jeff McConnell1, Dr. Kevin Garing1, and Mr. Sean Sweeney2; 1Praxair Surface Technologies Inc, Indianapolis, IN, USA; 2Praxair Surface Technologies Inc, Biddeford, ME, USA

4:00 p.m.
Failure Analysis and Life Prediction of Eb-Pvd and APS Thermal Barrier Coatings: Dr. Kuiying Chen1, Dr. Prakash Patnaik2 and Vladimir Pankov3; 1Structures, Materials and Manufacturing Laboratory, National Research Council Canada, Ottawa, ON, Canada; 2Gas Turbine Laboratory, National Research Council Canada, Ottawa, ON, Canada

4:30 p.m.
Vacuum Plasma Processing for Aerospace Engine Applications: Mr. Ralph Herber1 and Dr. Robert Gansert2; 1AMT AG, Dottingen, Switzerland; 2Advanced Materials & Technology Services, Inc, Simi Valley, CA, USA

5:00 p.m.
Implications of Zircon Formation on Thermal Barrier Coatings Exposed to Siliceous Deposits: Dr. Jason Van Sluytman1,2, R. Wesley Jackson2, Vladimir K. Tolpygo1, and Carlos G. Levi3; 1Materials & Corrosion Engineering Practice, Exponent, Menlo Park, CA, USA; 2Materials Department, University of California, Santa Barbara, CA, USA; 3Honeywell Aerospace, Phoenix, AZ, USA

Failure Analysis of Aerospace Components
1:00 – 3:00 p.m.
Meeting Room: 407

Session Chair
Rachael Ambrosi
Boeing
Everett, WA, USA

1:00 p.m.
Quantitative Fractography for Evaluating Fatigue Crack Growth Behavior of Aerospace Aluminum and Titanium Alloys: Mrs. Jessica Childs, The Boeing Company, Oklahoma City, OK, USA

1:30 p.m.
Materials Characterization of a Payload Bay Latch Roller and x0582 Ring Frame Bulkhead Recovered From Space Shuttle Columbia: Mrs. Ngozi Ubani Ochoa1, Dr. Stephen W. Stafford2, Darren Cone2, and Dr. John Olivas3; 1Materials Science and Engineering, CASSMAR, University of Texas at El Paso, El Paso, TX, USA; 2Metallurgical and Materials Engineering, University of Texas at El Paso, El Paso, TX, USA

2:00 p.m.
Multiscale FEM for Analyzing Flexible Waveguide Forming: Mr. Joseph O’Day, Boeing Research & Technology, The Boeing Company, Los Angeles, CA, USA
2:30 p.m.  
Chemical Characterization of Aerospace Materials—Developments and Challenges—A Comprehensive Survey of Instrumental Techniques: Dr. Rajiv Soman, Dr. Xinwei Wang and Dr. Karol Putyera, EAG - NY, Evans Analytical Group LLC., Liverpool, NY, USA

Surface Modification for Improved Performance  
1:00 - 3:00 p.m.  
Meeting Room: 403  

Session Chair  
Mercedes Keyser  
The Boeing Company  
Mukilteo, WA, USA

1:00 p.m.  
Superhard, Erosion Resistant, Nanocomposite Coatings for Practical Applications: Dr. Ronghua Wei and Dr. Kent Coulter, Materials Engineering, Southwest Research Institute, San Antonio, TX, USA

1:30 p.m.  
Fatigue Strength Restoration and Frictional Behavior Improvement of Cladding: Mr. Jun-Hyong Kim¹, Dr. Auezhan Amanov², Prof. Sang-Heup Park², and Prof. Young-Sik Pyun²; ¹Mechanical Engineering, Sun Moon University, Asan, South Korea; ²Kongju National University, Cheonan, South Korea

2:00 p.m.  
Investigations on Pretreatment Processes for Structural Bonding Of Titanium With Composites: Dr. Tobias Mertens, Metallic Technologies & Surface Engineering, Airbus Group, Munich, Germany

2:30 p.m.  
UNSM Treatment Temperature Effect on the Microstructure, Mechanical and Tribological Properties of D2 Tool Steel: Mr. Sang-Mu Kim¹, Dr. Auezhan Amanov², Dr. Jun-Hyong Kim², Prof. Jar-Myung Koo², and Prof. Young-Sik Pyun²; ¹Advanced Materials Engineering, Kongju National University, Cheonan, South Korea; ²Mechanical Engineering, Sun Moon University, Asan, South Korea

3:00 p.m.  
3:00 p.m. Afternoon Refreshment Break

Titanium Alloy Technology I  
1:00 - 5:30 p.m.  
Meeting Room: 402

Session Chair  
Dr. Don Li  
RTI International Metals, Inc.  
Niles, OH, USA

1:00 p.m.  
Cost-Effective, High Strength and Ductility Titanium Materials by Powder Metallurgy Process: Prof. Katsuyoshi Kondoh, Dr. Takanori Mimoto and Dr. Junko Umeda; Joining and Welding Research Institute, Osaka University, Ibaragi, Japan

1:30 p.m.  
Powder Metallurgy Ti-6Al-4V Alloy with Wrought-like Microstructure and Mechanical Properties by Hydrogen Sintering: Dr. Zhigang Z. Fang¹, Mr. Pei Sun¹², Dr. James Paramore³, and Prof. Ravi Chandran³; ¹Department of Metallurgical Engineering, University of Utah, Salt Lake City, UT, USA; ²Army Research Lab, Aberdeen, MD, USA

2:00 p.m.  
Densification Behavior and Properties of Ti-based Alloys Consolidated by Spark Plasma Sintering: Dr. Kevin Plucknett, Mr. Hung-Wei Liu, and Dr. D. Paul Bishop; Materials Engineering, Dalhousie University, Dept. of Process Engineering and Applied Science, Halifax, NS, Canada

2:30 p.m.  
A Novel Process for Direct No-Melt Production of Spherical Titanium and Titanium Alloy Powders from Oxides: Dr. Yang XIA, Dr. Zhigang Z. Fang, Dr. Ying Zhang, Dr. Pei Sun, Mr. Tuoyang Zhang, Mr. Zhe Huang, Mr. Hyrum Lefler, and Prof. Michael Free; Department of Metallurgical Engineering, University of Utah, Salt Lake City, UT, USA

3:00 p.m.  
Comparison of the Cooling Rate Effect on the Structure and Mechanical Properties β- and α+β Processed VST5553 Alloy: Dr. Mikhail Leder, R&D Center, VSMPO, Sverdlovsk Region, Russia

3:30 p.m.  
Laser Assisted Machining of Titanium and Titanium Metal Matrix Composites: Prof. Yung Shin, Purdue University, West Lafayette, IN, USA

4:00 p.m.  
Characterization and Evaluation of Microstructural and Mechanical Properties of Friction Stir Welded Three Titanium Alloys: Mr. Kapil Gangwar¹, Prof. Ramulu Mamidala¹, and Dr. Daniel G.
Additive Manufacturing Concurrent Session 1
8:00 – 10:30 a.m.
Meeting Room: 404

Session Chair
Mr. Hank Phelps
Lockheed-Martin
Marietta, GA, USA

8:00 a.m.
Rolling Assisted Wire + Arc Additive Manufacture of Meter-Scale Aerospace Components: Dr. Anthony McAndrew, Dr. Paul Colegrove, Prof. Stewart Williams, Dr. Filomeno Martina, and Mr. Jan Hönnige; Welding Engineering and Laser Processing Centre (WELPC), Cranfield University, Cranfield, United Kingdom

8:30 a.m.
Effects of HIP Processing on EB-DED AM Materials: Mr. Hank Phelps, Mr. Jeff Langevin, and Mr. Adam Sutton, Lockheed-Martin, Marietta, GA, USA

9:00 a.m.
Advanced Electron Beam Equipment Opening New Prospects for the Additive Manufacturing: Mr. Dmytro Kovalchuk, Dr. Vitalii Melnyk, Dr. Ihor Melnyk, and Dr. Borys Tugai; JSC NVO Chervona Hvilya, Kyiv, Ukraine

9:30 a.m.
Laser Deposition Technology for Additive Manufacturing: Mr. Robert Mudge, RPM Innovations, Inc, Rapid City, SD, USA

10:00 a.m.
Alcoa Additive Manufacturing and Ampliforge™ Process Development: Mr. Ed Colvin1, Mr. Brandon Bodilly2, Mr. Mike York3, and Mr. Rod Heiple4; 1Alcoa Forgings and Extrusions, Lafayette, IN, USA; 2Alcoa Forgings and Extrusions, Cleveland, OH, USA 3Alcoa Technical Center, Alcoa Center, PA, USA

10:30 a.m. Morning Refreshment Break

Additive Manufacturing Concurrent Session 2
8:00 – 10:30 a.m.
Meeting Room: 403

Session Chair
Dr. Richard Freeman
TWI Ltd
Cambridge, United Kingdom

8:00 a.m.
Material Quality in Laser Powderbed Melting Has to be Manufactured Directly—and Not Assured by NDI: Mr. Frank Palm, TX1, Airbus Group Innovations, Munich, Germany

8:30 a.m.
Additive Manufacturing Strategy: Dr. Richard Freeman1 and Dr. Robert Scudamore2; 1TWI Ltd, Cambridge, United Kingdom; 2TWI Technology Centre (Yorkshire), Rotherham, United Kingdom

9:00 a.m.
Effects of Selective Laser Melting and Post Heat Treatment on the Microstructure and Mechanical Properties of Aluminum Alloy A357: Mr. Heng Rao1,2, Prof. Chris Davies1,2, and Prof. Xinhua Wu1,3; 1Monash Centre for Additive Manufacturing, Notting Hill, Australia; 2Mechanical and Aerospace Engineering, Monash University, Clayton, Australia; 3Materials Science and Engineering, Monash University, Clayton, Australia

9:30 a.m.
Thermal Post-Treatments of Powder-bed, Laser-Fused Ti6Al4V and Their Effect upon Fatigue Strength: Dr. Todd Mower, MIT Lincoln Laboratory, Lexington, MA, USA

10:00 a.m.
Advances in Metallic AM at EWI: Dr. Ian Harris1 and Dr. Shawn M. Kelly2; 1EWI, Columbus, OH, USA; 2Additive Manufacturing, EWI, Columbus, OH, USA

10:30 a.m. Morning Refreshment Break
Sustainability of Aerospace Materials and Processes  
8:00 – 10:30 a.m.  
Meeting Room: 405

Session Chair  
Mr. David Jackson  
CleanLogix LLC  
Santa Clarita, CA, USA

8:00 a.m.  
Restoration of Rolling Contact Fatigue Stress Built Up in Rolling Bearings: Mr. Shirmendagva Darisuren, Mr. Jun-Hyong Kim, Dr. Auezhan Amantov, and Prof. Young-Sik Pyun; Mechanical Engineering, Sun Moon University, Asan, South Korea

8:30 a.m.  
CO₂ Composite Spray Cleaning in Aerospace Manufacturing: N/A Jessica Boze¹ and Mr. David Jackson²; ¹The Boeing Company, Seattle, WA, USA; ²CleanLogix LLC, Santa Clarita, CA, USA

9:00 a.m.  
Another Approach to Using Sustainable Alloys Without Increasing Part Weight: Mr. Gene Sheldon, GPS Metallurgical Solutions, Mattapoisett, MA, USA

9:30 a.m.  
Diffuse Mode Combustion—Ultra-Low NOₓ Technology with Proven Temperature Uniformity Benefits for Forge and Heat Treat Applications: Mr. Justin Dzik¹ and Mr. William Tracey²; ¹Steel and Forging Group, Fives North American Combustion, Cleveland, OH, USA; ²Specialty Sales Group, Fives North American Combustion, Cleveland, OH, USA

10:00 a.m.  
7155-T76 Drawn Aluminium Tubing—Improved Strength and Corrosion Resistance vs. Current Alloys in Aging Aircraft Applications: Mr. Todd Cogswell¹, W. DelaCruz², Ms. Jodi Yim³, and Mr. Les Yocum⁴; ¹Alcoa, Lafayette, IN, USA; ²Alcoa Forgings and Extrusions, Lafayette, IN, USA

Titanium Alloy Technology II  
8:00 – 10:30 a.m.  
Meeting Room: 402

Session Chair  
Mr. Rodney R. Boyer  
Consultant  
Issaquah, WA, USA

8:00 a.m.  
Study of SCC Mechanism by Direct Observation and Analysis of Dislocation Substructure in a Phase of Ti-8Al-1Mo-1V in Stress Corrosion Cracking: Mr. Sheng Cao¹, Dr. Chao Voon Samuel Lim², and Prof. Xinhua Wu³; ¹Materials Science and Engineering, Monash University, Clayton, Australia; ²Monash Centre for Additive Manufacturing, Monash University, Melbourne, Australia

8:30 a.m.  
Direct Extrusion of As-Cast Ti 6Al-4V Ingots into Aerospace Structural Components: Dr. Sesh Tamirisakandala and Dr. Padu Ramasundaram, Alcoa Titanium & Engineered Products, Niles, OH, USA

9:00 a.m.  
Developing Enhanced Strength and Texture in Ti 6AL-4V Tubes, Hollows and Shapes: Mr. George I. Legate, Nu-Tech Precision Metals Inc., Arnprior, ON, Canada

9:30 a.m.  
Timetal 407: A New Impact Resistant Titanium Alloy: Mr. Steven James¹, Mr. Roger Thomas², Mr. Paul Garratt³, and Dr. Yoji Kosaka⁴; ¹TIMET - Titanium Metals Corporation, Henderson, NV, USA; ²TIMET R&D, Swansea, United Kingdom; ³TIMET R&D, Birmingham, United Kingdom; ⁴Henderson Technical Laboratory, TIMET, Henderson, NV, USA

10:00 a.m.  
Properties of High-Strength Alpha-Beta Titanium Alloy TIMETAL® 575: Dr. Yoji Kosaka¹, Mr. Roger Thomas², Mr. Paul Garratt³, Dr. Matthew Thomas⁴, and Mr. Tim Barstow⁵; ¹Henderson Technical Laboratory, TIMET, Henderson, NV, USA; ²TIMET R&D, Swansea, United Kingdom; ³TIMET R&D, Birmingham, United Kingdom

10:30 a.m. Morning Refreshment Break

Plenary Session III  
11:00 a.m. – 11:45 a.m.  
Meeting Room: Exhibit Halls A&B

11:00 a.m.  
The Future Of Aerospace Metals: Dr. Daniel B. Miracle, Air Force Research Laboratory, Dayton, OH, USA
Themes for 2016 include:

- Additive Manufacturing
- Biomaterials
- Ceramic and Glass Materials
- Electronic and Magnetic Materials
- Energy
- Fundamentals, Characterization, and Computational Modeling
- Iron and Steel (Ferrous Alloys)
- Materials-Environment Interactions
- Nanomaterials
- Processing and Manufacturing
- Special Topics
Meydenbauer Center, Exhibit Halls A & B

Expo Dates and Times

Monday, May 23
Exhibits Open.................................3:00 – 6:00 p.m.
Afternoon Refreshment Break....................3:00 – 3:30 p.m.
Plenary Session on the Expo Floor..................3:30 – 4:30 p.m.
Expo Networking Reception ......................4:30 – 6:00 p.m.

Tuesday, May 24
Exhibits Open.................................10:00 a.m. – 3:30 p.m.
Morning Refreshment Break.....................10:00 – 10:30 a.m.
Plenary Session on the Expo Floor................10:30 a.m. – 12:00 p.m.
Lunch on the Exhibit Floor.......................12:00 – 1:00 p.m.
Afternoon Refreshment Break....................3:00 – 3:30 p.m.

Wednesday, May 25
Exhibits Open.................................9:00 a.m. – 1:00 p.m.
Morning Refreshment Break.....................10:30 – 11:00 a.m.
Plenary Session on the Expo Floor................11:00 – 11:45 a.m.
Lunch on the Exhibit Floor.......................11:45 a.m. – 1:00 p.m.

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*Exhibitor list as of May 6, 2016*
Advanced Composite Materials, LLC
Booth # 406
Advanced Composite Materials, LLC (ACM) is a small, high technology materials company. ACM produces silicon carbide fibers and microfibers. New proprietary technology finally delivers these fibers at reasonable cost. These fibers are pure SiC and discrete in length, with the microfiber being single crystal and the large fiber polycrystalline.
www.acm-usa.com

Ambrell Induction Heating Solutions
Booth # 404
Ambrell is a leading provider of induction heating solutions. With free applications testing from THE LAB at Ambrell, you can be certain induction will be an ideal fit for your application. Applications include hot heading, brazing, heat treating and more. Ambrell has sold more than 10,000 systems in over 50 countries.
www.ambrell.com

American Stress Technologies, Inc.
Booth # 403
AST provides laboratory services and turnkey systems to measure residual stress and stress related material defects. Our technologies include x-ray diffraction (XRD), hole drilling, ESPI and Barkhausen noise analysis. Applications include analysis and quality control of machining, grinding, heat treating, welding, forming, & forging of engineered materials. Our products include XStress™, Rollscan™ and PRISM™.
www.astresstech.com

AMT AG
Booth # 301
AMT AG, Switzerland, manufactures thermal spray guns and equipment. This includes air and vacuum plasma, low pressure systems, HVOF and Wire. AMT build plasma (F4, 03C, 9MB, 3MB) and HVOF guns (DJ, JetKote, JP). Advanced Materials & Technology Services, Inc. (AMTS) is the USA representative, and stocks equipment in California.
www.amt-ag.net

Balazs Nanoanalysis
Booth # 203
Balazs NanoAnalysis, a division of Air Liquide Electronics U.S. LP, operates ISO 17025 certified laboratories that specialize in identifying ultra-low level contamination in metals, alloys, films, coatings and parts. We analyze the surface, interface and the bulk of the material as well as water, gas, chemicals and the environment.
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Bruker Nano Analytics
Booth # 200
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Buehler
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