SPECIAL SYMPOSIUM & POSTER SESSION:
Building Regional Leadership in Additive Manufacturing

Wednesday, May 10, 2017
10:00 a.m. – 4:15 p.m. Symposium, 5:00 p.m. – 6:00 p.m. Poster Session
Most up-to-date room numbers will be available on the official RAPID + TCT mobile app: bit.ly/2oxPepU

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Collaborations among academic, industrial, nonprofit, and government organizations have pushed Southwestern Pennsylvania and the surrounding region forward as a hub for additive manufacturing (AM). Universities are researching AM to advance the state of the art in materials and processing, resulting in breakthroughs that will enable part manufacturers and their suppliers to increase capability, lower costs and reduce time to market for new product development. Materials producers and part manufacturers in the region are making significant investments in applying AM technology and have emerged as leaders in their respective industry sectors. New developments will be described that are accelerating materials and process development, industry adoption, qualification and certification, workforce education and training. Opportunities for new partnerships and collaborations will also be presented. Interact with regional leaders in AM during the symposium and at the poster session that will follow in the Exhibit Hall.

10:15 a.m. – 10:40 a.m.
Additive Manufacturing’s Role in the TechBelt Region’s Renewed Growth
PRESENTERS: Ms. Petra Mitchell, President and CEO, Catalyst Connection;
Mr. Ralph Resnick, America Makes Founding Director, NCDMM President and Executive Director

As the national accelerator for additive manufacturing (AM), America Makes works with industry, academia, government, non-government agencies, workforce and economic development organizations to innovate and accelerate AM to increase the nation’s global manufacturing competitiveness. Beginning in 2017, four Manufacturing Extension Partnership (MEP) Centers will work with America Makes to accelerate the transition of AM awareness, knowledge and technology to advance TechBelt manufacturers as well as value chains of suppliers. Together, we will build an AM Ecosystem that harnesses and maximizes the benefits of the rapidly evolving technological landscape. Ultimately, this model will allow us to successfully transition new technologies from America Makes, and other National Manufacturing Innovation Institutes, through MEP Centers to regional manufacturers, thus rapidly introducing advanced technologies across the U.S.
Industry-Inspired AM Processing Research at Carnegie Mellon University

AUTHORS: Jack Beuth, Anthony Rollett, Sandra DeVincent Wolf
PRESENTER: Dr. Jack Beuth
Professor, Mechanical Engineering
Director, NextManufacturing Center
Carnegie Mellon University

Researchers at Carnegie Mellon are experts in a wide range of additive manufacturing (AM) technologies using materials that range from biological and soft materials to metals; however, the CMU NextManufacturing Center has a particularly strong focus on the direct metal AM processes. The center currently has a consortium membership of 14 industry and government organizations who support the center and guide its research. The center is focused on performing research helping to define and enable advances in metals AM over the next 5-10 years. This talk will outline process-related research targeted to significantly impact industry practice within 5 years. Specifically, research will be described in the areas of process design, spatial control of microstructure, process monitoring and control, and expanding the range of powders useable in powder bed AM machines. Research topics from this talk will be covered in more depth by posters presented in the poster session following this symposium.

Industry-Inspired AM Materials Research at Carnegie Mellon University

AUTHORS: Anthony Rollett, Jack Beuth, Sandra DeVincent Wolf
PRESENTER: Dr. Anthony (Tony) Rollett
Professor, Materials Science and Engineering
Associate Director, NextManufacturing Center
Carnegie Mellon University

The Carnegie Mellon NextManufacturing Center is focused on performing industrially relevant research helping to define and enable advances in metals AM over the next 5-10 years. This talk will outline materials-related research targeted to significantly impact industry practice within 5-10 years. Specifically, research will be described in the areas of powder characterization, porosity control, merging of computer science with AM technologies, and development of new alloys for AM. Research topics from this talk will be covered in more depth by posters presented in the poster session following this symposium.

Accelerating Industry Adoption of Metal-Based Additive Manufacturing: Lessons Learned from an Additive Manufacturing Demonstration Facility

PRESENTER: Dr. Timothy Simpson
Professor of Mechanical & Industrial Engineering
Co-Director, CIMP-3D: Center for Innovative Materials Processing through Direct Digital Deposition
The Pennsylvania State University

Penn State’s Center for Innovative Materials Processing through Direct Digital Deposition (CIMP-3D) is the Manufacturing Demonstration Facility for Additive Manufacturing for DARPA’s Open Manufacturing Program. CIMP-3D also serves as Penn State’s interface to America Makes, the National Additive Manufacturing Innovation Institute. In this capacity, CIMP-3D’s mission is to (1) advance enabling technologies required to successfully implement additive manufacturing (AM) technology for critical components and structures, (2) provide technical assistance to industry through selection, demonstration, and validation of AM technology as an “honest broker”, and (3) promote the potential of AM technology through training, education, and dissemination of information. This talk will discuss how CIMP-3D is helping companies accelerate industry adoption of AM through its industry-friendly research practices, industry-focused hands-on training, and industry-oriented technology exchanges that provide forums for companies to learn about the latest advancements in AM.
Additive Manufacturing Research and Capabilities at the University of Pittsburgh

AUTHORS: Markus Chmielus, Minking Chyu, M. Ravi Shankar, David Schmidt, Sangyeop Lee, Wei Xiong, Steve Ludwick, Howard Kuhn, Prashant Kumta, Albert C. To

PRESENTER: Dr. Markus Chmielus
Assistant Professor, Mechanical Engineering and Materials Science
Additive Manufacturing Research Lab
University of Pittsburgh

The University of Pittsburgh (Pitt) has been engaging in a wide variety of research activities in additive manufacturing the last few years, which have led to the establishment of the ANSYS Additive Manufacturing Research Laboratory (AMRL) a year ago. This AMRL not only equips with several state-of-the-art metal and plastic additive manufacturing (AM) systems, but also engages in AM research with strong collaboration between faculty, industry partners and other universities and research facilities. In this presentation, there will be a brief summary of the AM capabilities, as well as research and development efforts in AMRL, which include development of design tools, modeling of processes and topology optimization tools for additive manufacturing, biomedical applications, including the development and qualification of materials for AM, development of additive manufacturing for structural, functional and biocompatible materials, and the use of additive manufacturing in mechanical engineering applications. We will also summarize how RAPID participants can engage with the AMRL at Pitt and leverage the laboratory’s capabilities.

LUNCH BREAK

2:15 p.m. – 2:40 p.m.
Empowering Metal Additive Manufacturing through ANSYS Tools

PRESENTER: David Conover
Chief Technologist, Mechanical Products
ANSYS

The product design and physics-based simulation software suites from ANSYS, Inc. have long been used to enable an optimal design for traditionally manufactured products. While additive manufacturing (AM) offers improved and more cost-effective designs for many industrial products and components, it requires a distinct set of tools to harness its full potential. ANSYS, Inc. is addressing three areas that are required to do so in collaboration with our partners in the Pittsburgh region. First, the design freedoms AM offers are uncovered using tools such as topology optimization and latticing while respecting the design for manufacturing constraints (DFAM). Secondly, the AM process for metals introduces strong thermal gradients leading to thermal distortions that must be simulated in order to provide physics-based process parameters, build orientation, and optimal build supports. Lastly, the same thermal gradients lead to spatially varying microstructure that must be understood and controlled. As always, ANSYS provides these tools in a user-friendly workflow under their Workbench platform.
Southwestern PA is a hub for additive manufacturing and associated services. The opening of GE CATA here accelerated growth in the AM supply chain by purchasing more than $1.5M in products and services in the calendar year 2016. Project examples of the supply chain progress in several AM modalities, that are well-served by the metal manufacturing heritage of SWPA region will be highlighted. In addition, maps of partnerships that enabled those projects will be discussed.

The aerospace market is one of the leading industries embracing Additive Manufacturing for real production parts. Arconic is an established innovation leader in aerospace and 3D printing, with unique and comprehensive capabilities from raw material to finished part. In this presentation, the current state of the art of additive manufacturing in metal will be described with a view on where it is going from a vertically integrated supply chain solution. The components of this advancement has to be leveraged from structure, materials and manufacturing which has to be fueled by innovation and increasingly through engagement with people.

Industrial interest in additive manufacturing has exploded with the promise of dramatic decrease in lead time and final part cost. This technology has potential to enable novel, high-performance designs not available with traditional manufacturing and the potential for print-to-order parts. ATI has been producing powder and wire for demanding applications for decades and our approach to additive is vertically integrated, focusing on material behavior in the manufacturing process first. Highlights of the ongoing work with Ni, Ti, Zr and ATI C-103™ powders and laser and electron-beam additive manufacturing techniques will be presented.

At this unique show floor feature, event attendees view poster displays of projects or research in the areas of 3D printing, additive manufacturing, and 3D imaging. They gain additional information of interest including a glimpse into future additive manufacturing research, developments and applications. Poster presenters will be available at their respected posters to interact with guests, answer questions and discuss the technology/features of their display. 

Please note that photographing posters without the permission of the presenters is prohibited.