

IMS PROJECT CLUSTERS LAUNCHED

IMS is funding a new program that will cluster projects around thematic areas under Industry 4.0. Known as the IMS Project Clustering Platform, it will facilitate on-going projects to share knowledge, provide broader solutions in less time, reduce research costs, and expand networks through building of international coalitions. Possible outcomes include combining and collaborating project research activities.

The first cluster to be formed was around the topic of additive manufacturing. IMS selects a member region to lead each cluster, and the European Union volunteered to shepherd the Additive Manufacturing Project Cluster. Due to the high level of interest, the Additive Manufacturing theme was divided into three subthemes; metals, polymer-ceramics-biomaterials, and generic technologies. Through the IMS network, thirty-nine projects (39) shared their exploitable results with TRL levels with each other. Nascent clusters are currently developing work plans. Please visit the IMS website for more information or contact your local IMS Secretariat.

INDUSTRIALLY ROBUST AM CHAIN

Prabir Chaudhury, Global Metals Technology Director Designate, Exova

The objective of the cluster is to develop an industrially robust Metal Additive Manufacturing (MAM) supply chain in order to establish MAM as a global mainstream manufacturing technology. Work will include development of cost effective and performance specific raw materials, testing and qualification protocols, generation of design properties database, enhancement of machine capabilities, and identification of NDT techniques and in-situ quality testing. This cluster will also examine (a) the opportunities in use of low cost powder via machine enhancement or by using novel processing techniques and (b) enhancement of MAM surfaces for net shape manufacturing. This cluster will

involve users of the MAM technology and its supply chain from raw material to finished and qualified metal parts. This report is a short synopsis of the discussion in Barcelona on May 2nd and a tentative plan arising from the discussions. The intention of this report is to inform the members about the opportunities and scope of the Cluster to put together a comprehensive plan for future collaboration.

Cluster Formation: At the IMS meeting in Barcelona on May 2nd, the Industrially Robust AM Chain cluster was



formed based on the review of exploitable results (ERs) from the AM enthusiasts around the globe and interests shown by participants at the workshop. A total of 54 participants from US, EU, MX, and SA attended the workshop, 39 ERs were reviewed from three disciplines (Metal Parts, Polymer-Ceramic-Biomaterial Parts, and General

Technologies), and 6 Clusters were established for further by the attendees. Industrially Robust AM Chain was one of the three in metals AM area. Interested participants from US, EU, SA, and MX joined together to form this cluster.

Cluster Members: Seven teams from all regions of IMS made commitments to join this cluster and discuss the scope and immediate actions for the cluster. The seven teams are: Questek, Exova, AMAZE, Borealis, NDTLBM, FOFAM, and MANSYS.

Cluster Discussion: The team of seven committed

cluster members discussed the scope of this cluster and came up with the cluster name as Industrially Robust AM Chain. Then a cluster champion was selected and regional cluster leads were identified as shown above. The members decided to incorporate related ERs from the present members and discuss the scope of the cluster. The team also discussed focus on large structures versus small parts limited by the current machines. It was decided to focus on both large structural and small parts in this cluster. Based on these discussions, the goals and objectives were identified as shown below in the order of AM chain from raw material to finished products:

1. Develop new AM alloys for specific performance requirements in various industries
2. Explore machine modifications to use low cost, such as non-spherical powder in powder-based AM processes
3. Develop AM materials property database for design engineers
4. Explore in-process and post processing surface finish enhancement opportunities
5. Develop testing and qualification protocols for process, machine, and product for various industries
6. Investigate in situ quality assurance opportunities
7. Explore Non-Destructive Testing (NDT) techniques for product acceptance.

Action Plan: Although the team discussed technical action plans at the cluster meeting, it is felt that first and foremost we need to focus on organizational action plan. Therefore, the action plans are divided into organizational and technical actions in the order of priority and execution.

Organizational Actions:

1. Develop the Memorandum of Agreement (MOA) for all partners to sign. This will be done by the regional leads by August, 15 2016.
2. Sign the MOA – All current partners by August 31
3. Recruit additional partners for the cluster from the AM supply chain including: AM alloy developers, powder and rod producers, AM machine developers, AM prototype and part manufacturers, AM product designers and users (OEMs), AM database developers, process and product analysis software developers, destructive and non-destructive testing laboratories, standards agencies, accreditation agencies, and others service providers. This work will be on-going and will be reported regularly at cluster meetings.
4. Coordinate technical actions with other cluster programs to avoid duplication and enhance complementary work.

Technical Actions:

1. Research current machine capabilities for use of low cost, non-spherical powders
2. Research current AM methods for production of large structures
3. Foster collaboration with international standards bodies.
4. Develop a comprehensive technical program for funding from international sources covering the following issues globally:
 - a. Develop new alloys for Aerospace, Energy, Gas and Oil, Automotive, and Medical sectors based on AM process characteristics
 - b. Collaborate raw material suppliers for new AM alloys
 - c. Develop AM material standards and specifications with international standards bodies
 - d. Develop material properties database for engineering design and material and process selection
 - e. Develop qualification protocols and standards for AM processes and machines
 - f. Develop protocols and standards for product testing and qualification
 - g. Develop NDT methods for in-process and post processing quality assurance
 - h. Develop in-process and post processing methods for surface enhancement
 - i. Develop AM machines to use low cost raw materials.

Industrially Robust AM Chain cluster is established for international collaboration to rapidly develop AM industry supply chain and assist in global acceptance of AM as a main steam manufacturing process.

COMMERCE SECRETARY ANNOUNCES MANUFACTURING USA -- NEW BRAND FOR NATIONAL NETWORK FOR MANUFACTURING INNOVATION

(Commerce News – 9-12-16) Commerce Secretary Penny Pritzker today delivered the keynote address at the [International Manufacturing Technology Show](#) (IMTS) in Chicago. The IMTS is the premier manufacturing technology show in North America, featuring more than 2,000 exhibiting companies on the cutting edge of manufacturing technology and innovation. In her remarks, Secretary Pritzker [announced](#) that *Manufacturing USA* is the new brand name for the National Network for Manufacturing Innovation which consists of public-private institutes dedicated to securing the nation's future through manufacturing innovation, education, and

collaboration. “With our new name, *Manufacturing USA* captures the geographic reach of a network that spans our country and is positioned to benefit companies of all sizes from coast to coast,” she added. “But more importantly, this name embodies our vision for a unified American manufacturing sector – where the brightest minds and the most innovative companies come together to develop the most cutting-edge technology in the world.” ... *Manufacturing USA* leverages \$600 million in federal funding into \$1.3 billion in greater private investment in key national manufacturing areas.

BILL FORD SAYS ROBOT-CAR ETHICS NEED SOCIETAL REVIEW

(IW -- Keith Naughton: 9-13-16) The great-grandson of Henry Ford called on the auto industry and public institutions to address ethical issues emerging in a world where robot cars will make life-and-death decisions in roadway crashes -- and to do it soon. “These cars will have the ability to process data and make decisions much faster than we will as humans,” said Bill Ford, executive chairman of [Ford Motor Co.](#), which has promised to have robot taxis on the road by 2021. “No individual company is going to program these vehicles with a set of ethics that isn’t bought into by society at large.” The discussion to set robot-car ethics must include the auto industry, government, universities and ethicists, said Ford, who commented today after a speech at the company’s headquarters in Dearborn, Mich. With self-driving cars set to hit the road over the next five years, the need for this discussion is urgent, he said. “How do you want these vehicles to behave?” Ford asked during his speech. “Whose lives are they going to save?” ... Since warning of “global gridlock” in a 2011 TED talk, Ford has pushed his company to embrace new methods of mobility, including ride-sharing and driverless cars.

THE WORLD MIGHT NOT BE READY FOR QUANTUM COMPUTERS

(New Equipment Digest: 9-6-16) Quantum mechanics, Carl Sagan once observed, is so strange that "common sense is almost useless in approaching it." Scientists still don't understand exactly why matter behaves as it does at the quantum level. Yet they're getting better at exploiting its peculiar dynamics -- in ways that may soon upend the technology business. One of the most interesting applications is in computing. In theory, quantum computers could take advantage of odd subatomic interactions to solve certain problems far faster than a conventional machine could. Although a full-scale quantum computer is still years off, scientists

have lately made a lot of progress on the materials, designs and methods needed to make one. And that could have some striking benefits. Quantum computers could simulate how atoms and molecules behave, to the great advantage of chemists and drug designers. They could [solve optimization problems](#) -- say, how to efficiently route airplane traffic -- far faster than current technology can. They could speed advances in artificial intelligence, improve sensors, and lead to the design of stronger and lighter industrial materials. Unsurprisingly, investment in the field is surging. IBM, Microsoft and Google are building quantum research labs. Startups are gearing up. And banks are very interested.

THE PROMISE OF A DIGITALLY ENABLED CIRCULAR ECONOMY

(GreenBiz – Joe Iles: 9-8-16) Where is innovation heading in the 21st century? For every new technology poised to reinvent the way we live, work and interact, there seem to be many more incremental or even superficial improvements rolled out by businesses wrestling for customer dollars. Enter the circular economy: a rich and largely untapped seam of innovation that not only works for businesses, citizens and governments, but also can support the switch to a positive development path for the global economy. This comes at a time when the linear "take-make-dispose" model that worked so well for so many is starting to reveal its limitations. A loud chorus, dispersed across countries and industries, is calling for a new model, one that embraces feedback, encourages regeneration and facilitates access and abundance. The digital revolution holds a lot of promise for this circular economy, and there’s good reason to be optimistic about the future, in which emergent trends in technology and computing enable us to move to a model that understands and harnesses flows of resources, energy and information, creating the conditions for a new 21st century prosperity.

WHAT MAKES A COUNTRY INNOVATIVE?

(Innovation Excellence – Adi Gaskell: 9-12-16) Each year INSEAD team up with the World Intellectual Property Organisation (WIPO) and Cornell University to produce an innovation league table for the countries of the world. It ranks the infrastructure and support environment for innovation around the world. The [2016 rankings](#) have just been published, and given the desire of the EU to support [open science, open data and open to the world](#), it is no surprise to see European nations in 8 of the 10 top spots. Switzerland is in the top of the league table for the 4th year in a row, with Sweden and

the United Kingdom rounding out top 5. So what makes a country innovative? The first and most important thing is attitude. While it should be clear that innovation is crucial to the economic wellbeing of a country, few take the right approach to it. For instance, despite much of modern science and innovation being both collaborative and across national borders, too many nations still treat each other as rivals rather than collaborators. ... There is something of a PR job to be done here as the win-win nature of global collaboration is often not communicated effectively, not least during the recent Brexit referendum when the research community was largely marginalized in the debate.

[NIST RELEASES BALDRIGE-BASED TOOL FOR CYBERSECURITY EXCELLENCE](#)

(Commerce News -- 9-15-16) U.S. Deputy Secretary of Commerce Bruce Andrews today delivered a keynote address at the Internet Security Alliance's (ISA) Cybersecurity Conference in Washington. The ISA is a multi-sector international trade association combining advocacy and programming on cyber risk management. Deputy Secretary Andrews underscored the need for private and public sector collaboration to address cybercrime and evaluate risk as the digital economy continues to grow. In his remarks, the Deputy Secretary announced that the [National Institute of Standards and Technology](#) (NIST) just released the draft [Baldrige Cybersecurity Excellence Builder](#), a self-assessment tool to help organizations better understand the effectiveness of their cybersecurity risk management efforts. The NIST Cybersecurity Framework is a voluntary guidance based on existing standards, guidelines and practices. ... NIST is requesting public comments on the draft document, which blends the best of two globally recognized and widely used NIST resources: the organizational performance evaluation strategies from the [Baldrige Performance Excellence Program](#) and the risk management mechanisms of the [Cybersecurity Framework](#).

[HOW TO TRANSFORM IIOT FROM A BUZZWORD TO A COMPETITIVE ADVANTAGE](#)

(Internet of Things Institute – Brian Buntz: 9-7-6) Up until recently, the promises of the Industrial Internet seemed too good to be true for most manufacturers. Now, most are convinced of its promise, according to recent surveys from LNS Research, McKinsey, and IndustryWeek. *But tapping into the potential of the Industrial Internet will require a radically new approach to managing their business, which many manufacturers are not ready to make.* There has been a pronounced shift from companies asking: “What is the

IIoT?” to “How can I benefit from IIoT?” said Matthew Littlefield, president and principal analyst at LNS Research in [a recent webinar](#). *But for most industrial companies, significant work remains in figuring out how to transform the IIoT from a catchphrase to a competitive advantage.* LNS offers advice on how to do just that. A central part of the problem, IoT's promise to lead to the next Industrial Revolution gets undercut when manufacturers focus merely on incremental improvements. They're fixated on concepts such as Six Sigma and Kaizen, which tend to focus on incremental gains year over year. The bigger picture fades. “A lot of IoT projects [should be] about transformative gains—not 1% but 10% or rethinking the entire business model,” Littlefield says. Two out of five respondents in the LNS survey cited *process improvements* as the central goal for their IIoT initiatives.

[BUILDING THE NEXT-GENERATION MANUFACTURING WORKFORCE](#)

(IW – Ed Potoczak: 9-6-16) Manufacturers must do more than promote the “coolness” of today's technologies. They need to communicate the educational requirements for succeeding in manufacturing careers, so that students can understand the skills they will need. There's no doubt: Manufacturers today are stuck between a rock and hard place. On the one hand, many face an aging workforce that may retire without sharing key knowledge. In fact, the [Pew Research Center](#) predicts that 10,000 baby boomers will retire each day over the next 19 years. On the other, some [80%](#) of businesses are struggling to bring new talent into the door and up through the ranks. *Unless things change, [2 million jobs](#) will go unfilled even as manufacturers face a growing skills gap on their teams.* Clearly, it's a complex challenge, one that won't be solved by a single silver bullet. However a number of innovative manufacturers, generational researchers and talent acquisition professionals have developed effective strategies for attracting, engaging, developing and retaining the team members who will be central to driving manufacturing businesses forward.

[FUTURE EVENTS](#)

October 7, 2016 – *Manufacturing Day* (MFG DAY) – Nationwide
October 14, 2016 – *Brussels - Partnership (PPP) Info Day 2016*
October 26-28, 2016 – *Bratislava (SK) - REinEU2016*
October 2016 – *IMS-US Industry 4.0 Workshop*
November 17 2016 - *2016 Korea R&D Exhibition*
December 6-9 2016 - *Industry 4.0 Conference, South Africa*