



IMSI ENDORSES NACFAM LOBBYING ON BEHALF OF U.S. MANUFACTURING

During the Intelligent Manufacturing Systems International (IMSI) meeting of March 22, 2019, the Board unanimously endorsed a recommendation to NACFAM (National Council for Advanced Manufacturing) to revitalize its' lobbyist activities in support of industry driven manufacturing policy needs. With the IMSI 2017 launch of the ManuVation 4.0 program, the IMSI Board wants to stress the need for congressional awareness of manufacturing policy needs, as critical to achieving the overall vision of IMSI: Foster sustainability and growth of manufacturing through business process change and technology adoption.

The IMS International Board of Directors is comprised of seasoned experts in manufacturing: Jack Harris (Rockwell Collins, Retired), Dean Bartles (General Dynamics, Retired), Atul Kelkar (Mechanical Engineering Chair, Clemson University), William Mahoney (ASM International, CEO), Gen. Robert Mansfield (USAF Retired), Jack Todd, Treasurer (CPA, Marpan).



IMSI Board from left to right: Nagy, Kelkar, Bartles, Harris, Todd, Mansfield. (insert: Mahoney)

IMSI SIGNS MOU WITH CAM-I

IMS International and CAM-I (Consortium for Advanced Management International) are pleased to announce a Memorandum of Understanding to cooperate and collaborate to support the IMSI ManuVation program that helps SME manufacturers understand and integrate new technologies through guidebooks, workshops, and sharing best practices.



Dan Nagy (IMSI) and Ashok Vadgama (CAM-I) sign MOU.

CAM-I will develop a ManuVation workshop session that will help manufacturers understand if they have the right resources in place and suggest resource adjustments in order to integrate Industry 4.0 technologies.

CAM-I will also develop a technical session for the September 25-27 World Manufacturing Forum (www.worldmanufacturingforum.org) that will explore evaluating readiness levels for technology uptake and costing for production and supply chains. IMSI will support CAM-I meetings with expert speakers and provide technical assistance.

WMF OPEN CALL

*Submit best practice initiatives for manufacturing skills to be featured in the WMF Annual Report.
More information on Page 3.*

IMSI MANUVATION PARTNERSHIPS CONTINUE TO GROW

NCMS (www.ncms.org) joins ASM International (www.asminternational.org), CAM-I (www.cam-i.org), and Tallo (www.tallo.com) in support of the IMSI ManuVation program (www.ims.org). The outreach of the ManuVation program has increased by tens of thousands through these organizations to the benefit of SME manufacturers.

IMSI SIGNS MOU WITH NCMS



As a further expansion collaborative outreach and support, IMS International (IMSI) and the National Center for Manufacturing Sciences (NCMS) are pleased to announce a Memorandum of Understanding. Through this agreement, the IMSI ManuVation program gains a valuable partner to strengthen services to SME manufacturers that provides understanding and integration of new technologies through guidebooks, workshops, and sharing best practices.

NCMS will be speaking at an upcoming aerospace workshop that will help manufacturers understand current cyber security risks and how to reduce exposure. The two organizations will explore developing tracks of content for joint workshops and in support of the World Manufacturing Forum. The organizations will also cross-promote activities and services. More announcements to follow.

IMSI HOSTS MANUVATION WORKSHOP IN PRETORIA, SOUTH AFRICA

IMSI along with partners ASA, Aerosud, ASM International, CAMASA, CSIR and PDES Inc held an IMSI ManuVation 4.0 workshop in Pretoria, South Africa on February 25-26 at the CSIR International Convention Centre. The two-day workshop included presentations from Professor David Romero of the World Manufacturing Forum on the 2018 WMF Annual Report, Dan Nagy of IMSI on the 4th industrial revolution driving workforce innovation, General Robert Mansfield of Solomon Bruce Consulting on aerospace readiness and Johan Steyn of Aerosud on South African aerospace preparedness and impact of digitalization.



IMSI Facilitators map manufacturing challenges with local industry.

Following the plenary session, Dr. Steve Ray of IMSI and Carnegie Mellon University presented pre-workshop survey results to define breakout groups for the workshop session. During the two-day event, four working project groups were formed in the areas of simulation, additive manufacturing, business systems, and IoT. South African manufacturers worked together to find common issues in areas of non-competitive or pre-competitive research in order to enable best practice solutions for their businesses.

Three projects were formed and you may find their activity update on page 3. If you are interested in joining one of the project clusters or in hosting an IMSI ManuVation Workshop in your area please email: dnagy@ims.org.



During breakout session, IMSI Facilitators develop pathways to solve manufacturing challenges.

IMSI TO HOST MANUVATION WORKSHOP IN HUNTSVILLE, ALABAMA



University of Alabama Huntsville campus.

Design Lab at Lincoln Mall.

IMSI will host a workshop in Huntsville, Alabama on June 26-27 at the Design Lab at Lincoln Mill. This event is in collaboration with ASA, The University of Alabama Huntsville, VCSI, and PDES Inc.

The two-day workshop will contain plenary sessions with expert speakers along with breakout sessions for SMEs in order to identify common issues and create non-competitive working projects.

If you are interested in attending or hosting an IMSI ManuVation workshop please visit: www.ims.org.

IMSI AND BSA TO PARTNER FOR WORLD SCOUT JAMBOREE



IMSI and Boy Scouts of America are currently partnering to provide manufacturing education to scouts from around the globe at the 24th Annual World Scout Jamboree. IMSI along with ManuVation partner PDES Inc. are currently working to set up manufacturing related activities for scouts at the World Jamboree. These activities will not only provide team building and fun exercises for scouts but will give them an insight into key skills necessary for future jobs and the benefits of a career in the manufacturing industry. The World Scout Jamboree will take place from July 22 to August 2, 2019 in West Virginia, USA. For more information on World Scout Jamboree please visit: <https://www.2019wsj.org/>.

IMSI and Boy Scouts of America are continuing their partnership on STEM education and are actively working to incorporate more manufacturing related activities into the program.

UPCOMING EVENTS

Aeromat Conference May 6-8, 2019: Join IMSI and ASM International at Aeromat in Reno Nevada. More information is available on: <https://www.asminternational.org/web/aeromat-2019>

IMSI ManuVation 4.0 Workshop June 26-27, 2019: Join IMSI for a ManuVation 4.0 workshop in Huntsville, Alabama. More information is available on <http://www.ims.org/alabama-workshop-2019>

Heat Treat Conference October 12-17, 2019: Join IMSI and ASM International at Heat Treat in Detroit Michigan. More information is available on: <https://www.asminternational.org/web/heat-treat-2019>

World Manufacturing Forum 2019 September 26-27, 2019: Join IMSI and the World Manufacturing Foundation for the 2019 World Manufacturing Forum at the Villa Erba in Cernobbio, Italy. More information is available on: www.worldmanufacturingforum.org

IMAT September 14-17, 2020: Join IMSI and ASM International at IMAT in Cleveland, Ohio. More information is available on: <https://expo.asminternational.org/IMAT2020/Public/Enter.aspx>

IMSI PROJECT UPDATES

Below please find the project summaries and progress from the IMSI ManuVation workshop in Pretoria, South Africa. If you are interested in any of these projects please email teresa.morin@ims.org for more information and to be connected with members.

■ IoT and Business Systems Cluster

Background: Project participants noted they wanted to work to get a software consultant to see if there is something with an MRO that could be a potential solution or view someone else who has had a potential implementation. On the business side, it was also noted that there was a staff retention issue where foreign workers tend to stay but it was hard to maintain domestic workers. One idea that was mentioned was to pay skilled workers more or to make up for this some with TIC (though replacing with TIC is not a viable option). They are looking at something that could help to solve this problem and come to a lasting solution.

Plan: For an initial phase regard to the IoT Project, members have planned to compile a pre-visit questionnaire that will be distributed to a group to complete and articulate problems and options. Then the problem statement will be distributed to get input from internal stakeholders of the group. Next, they would identify all stakeholders for an invite, define a meeting structure and topic presentation and decide availability. Then there would be a setup show at Aerosud with returned feedback. After this, a second phase will be determined for the project surrounding IoT.

Progress: Members have sent out a questionnaire to all participants about more potential problems and setting up a date to go to Aerosud. Some members of the cluster have responded and noted that their interest is to understand the local challenges and how IoT works within Industry 4.0. Johan is now putting together potential dates for meeting and a tour of Aerosud to further communications and work within the group.

One on One sessions are beginning to be set up. Aerosud is hosting an information sessions business systems and PLM on the 12th of April to further create awareness of what the future systems and process requirements are in terms of digital transformation and Industry 4.0. Members of the breakout session are attending and further interfacing on these issues.

■ Simulation Certification Cluster

Background: The simulation cluster had developed a project idea of working with authorities to create simulated certification and make this cost effective. They hope to raise the credibility of the SA CAA so other countries could accept this as sufficient so there are not as many bilateral agreements or certification products.

Plan: The group plans to write a project narrative, interact with the SACAA, investigate solutions, interact with the group and bring in new members, and then start populating and running the simulation to conduct basic testing on components and build up the product.

Progress: The group has been working to establish operations with SACAA and has been working with them on a daily basis and they are working on approval for Parts 96, 141, 145, and 148. They particularly have been working with Part 24, aircraft type approval, Part 148, Aircraft manufacturing approval, Part 145 Aircraft Maintenance Organization as well as a few other sessions with the authorities. Members of the group have been assisting with logistics, we are they are busy looking at VR Training and a few other things that were networked on during the breakout session.

■ Additive Manufacturing Cluster

Background: The Additive Manufacturing group discovered have a common issue with rapid prototyping before taking a product fully to scale. 3D printing is available but they need a full prototyping solution.

Plan: Members will brainstorm what type of 3D printing they could use and would disseminate this throughout the group.

Progress: Members are working to interface with Aerosud on ways to prototype and look into various prototyping solutions.

MANUVATION STRATEGIC GROWTH

IMSI continues expansion of its ManuVation program through the addition of partners, new project clusters, and expansion of services. IMSI is currently in negotiation with a European Tier 1 auto supplier to be a lead in a newly developed automotive cluster. The new ManuVation cluster will help SME's through facilitated workshops, guidebooks, and exchange of best practices.

IMSI is also negotiating with additional organizations to sign MOUs to further the ManuVation program. Currently, our partners include NCMS (www.ncms.org), ASM International (www.asminternational.org), CAM-I (www.cam-i.org), and Tallo (www.tallo.com). The outreach of the ManuVation program has increased by tens of thousands through these organizations to the benefit of SME manufacturers for transformation of their manufacturing processes with advanced technologies.

For the latest information on IMSI please visit: www.ims.org.

WMF OPEN CALL, BEST INITIATIVES ON SKILLS FOR FUTURE MANUFACTURING

The World Manufacturing Forum opens a global call to map the 10 best initiatives on how to develop key skills for the future of manufacturing. The selected ten initiatives will be mentioned within the 2019 WMF Annual Report which will focus on one of last year's Report key recommendations, *"Promote Education and Skills Development for Societal Well-being"* and will be presented during the 2019 Annual Meeting in Cernobbio, Como, Italy – 25-27 September. The focus of this year's meeting is *New Skills for Future Manufacturing*.



The WMF Annual Report will outline the different skills required for future manufacturing and the different initiatives to promote a productive and skilled workforce. In line with this theme, the WMF will engage different manufacturing stakeholders to contribute their most promising and innovative initiatives to develop skills for future manufacturing to be featured in the 2019 WMF Annual Report. This will increase your company or organization's visibility while providing readers with valuable insights on the best practices to support skills development.

The selected ten organizations and their corresponding initiatives will:

- Be a featured case study in the 2019 WMF Annual Report
- Receive a special mention during the 2019 WMF Annual Meeting
- Be invited to the prestigious 2019 WMF Annual Meeting

The submitted initiatives must focus on developing the skills needed for future manufacturing and may contain one or a combination of the following elements:

1. *Reskilling current workers through employee education and training*
2. *Educating future workforce through schooling or industry-academe collaboration*
3. *Upskilling displaced workers (including ageing workforce)*
4. *Other industry, government, and NGO led initiatives to skills development*

The deadline for submission is June 30, 2019. All will be reviewed by the WMF Editorial Team, which will then select ten outstanding initiatives to be featured in the 2019 WMF Annual Report.

SUBMIT YOUR ENTRY AT

<https://www.worldmanufacturingforum.org/open-call>

MANUFACTURING NEWS

• Winning with IoT

(IW – Spencer Lin: 4-5-19) Manufacturers face challenging business landscapes as industries converge, data proliferates and virtually everything becomes interconnected. New digital companies are establishing themselves in traditional markets, and changing customer expectations are driving established companies to expand into new areas. As they ramp up performance, market leaders in manufacturing are capturing numerous forms of data from a variety of interconnected devices. Applying intelligence to that deluge of data allows them to develop more personalized customer services and experiences, transforming their brand and opening up new opportunities. The opportunity is vast. Gartner has predicted that 2019 will usher in the deployment of 20.4 billion Internet of Things (IoT) devices, in a market that statista forecasts to be valued at more than \$1.7 trillion dollars this year. According to our IBM Institute of Business Value study, which focused on interviews with 271 industrial products manufacturing leaders (automotive, aerospace & defense, chemical and petroleum, electronics, industrial machinery manufacturers, tools, lumber production, construction) from multiple countries, visionary leaders take a long-term approach to an intelligent IoT strategy.

• CTE Classes Are Popular, but Only 25% of Students Take Courses That Could Lead to the Nation's Biggest Industries, New Study Finds

(The 74 – Kate Stringer: 4-3-19) Business, marketing, tourism and manufacturing make up more than half of U.S. jobs — but students in high school probably don't know that. Only one-quarter of the career and technical education classes students take are focused on these industries, according to a new report from the Thomas B. Fordham Institute, a conservative-leaning think tank in Washington, D.C. The study is a first-of-its-kind look at how career and technical education courses match up with U.S. job opportunities, and because of this, there are as many questions as answers, the report's authors admit. Still, the findings provide a unique perspective on whether education is living up to the demands of the economy, as well as federal education policy that says CTE courses should prepare students for labor market needs. Nearly 90 percent of high schoolers take at least one CTE course. "We have to do a way, way better job of tracking this stuff — every state, every district should have its own version of this study and be monitoring it on a yearly basis," said David Griffith, senior research and policy associate at Fordham, who wrote the report with Cameron Sublett, associate professor of education at Pepperdine University.

• Leading in a Time of Transformation

(IW—Laura Putre: 4-2-19) Pittsburgh's riverbanks used to be covered with steel mills—and soot. In the middle of the day, the street lights had to come on light up the city. Workers had to change their shirts at lunch, they got so dirty. Just a few decades later, the city is a very different story. The riverbanks host bike trails and wooded parks. It's a city of great transformation. PPG, which began as Pittsburgh Plate Glass in the 1800s, has persisted and changed with the times as well, said Rebecca Liebert, senior vice president of Automotive Coatings for PPG. The opening speaker at the 2019 IndustryWeek Manufacturing & Technology Conference this week, Liebert spoke about transforming manufacturing in a time of disruption. In its early days, the glass company acquired a paint company and provided the paint for the Ford Model T. In 1963, it developed the technology to electro deposit coatings on metal surfaces, allowing automotive paint to have a much longer life. Now, PPG looking to the future in areas like clearer laminated windows for airplanes – "China needs 7,700 airplanes and wants to sell every window that goes into those airplanes," says Liebert.

• Why Hypotheses Beat Goals

(MIT Sloan Management Review – Jeanne Ross: 4-1-19) Not long ago, it became fashionable to embrace failure as a sign of a company's willingness

to take risks. This trend lost favor as executives recognized that what they wanted was learning, not necessarily failure. Every failure can be attributed to a raft of missteps, and many failures do not automatically contribute to future success. Certainly, if companies want to aggressively pursue learning, they must accept that failures will happen. But the practice of simply setting goals and then being nonchalant if they fail is inadequate. Instead, companies should focus organizational energy on hypothesis generation and testing. Hypotheses force individuals to articulate in advance why they believe a given course of action will succeed. A failure then exposes an incorrect hypothesis — which can more reliably convert into organizational learning. ... A hypothesis emerges from a set of underlying assumptions. It is an articulation of how those assumptions are expected to play out in a given context. In short, a hypothesis is an intelligent, articulated guess that is the basis for taking action and assessing outcomes.

• We Need to Re-engineer Our Organizations for a New Era of Innovation

(Innovation Excellence -- Greg Satell: 4-1-19) In the early 20th century, Alfred Sloan created the modern corporation at General Motors. In many ways, it was based on the military. Senior leadership at headquarters would make plans, while managers at individual units would be allocated resources and made responsible for achieving mission objectives. The rise of digital technology made this kind of structure untenable. By the time strategic information was gathered centrally, it was often too old to be effective. In much the same way, by the time information flowed up from operating units, it was too late to alter the plan. It had already failed. In recent years, agility and iteration has become the mantra. Due to pressures from the market and shareholders, long-term planning is often eschewed for the needs of the moment. Yet today the digital era is ending and organizations will need to shift once again. We're going to need to learn to combine long-range planning with empowered execution. ... New technologies, such as revolutionary computing architectures, genomics and artificial intelligence are coming to the fore, not nearly as well understood as digital technology. So we will spend years learning about them before we can develop applications safely and effectively.

• ISM Reports Gains in March Manufacturing Output

(Modern Materials Handling -- Jeff Berman: 4-1-19) March manufacturing output finished on an upswing in the first quarter, according to the monthly manufacturing Report on Business, which was issued today by the Institute for Supply Management (ISM). The report's key metric, the PMI, headed up 1.1% to 55.3 (a reading of 50 or higher indicates growth), following a 2.4% decrease from January to February and a 2.3% increase from December to January. Despite the uneven pattern in recent months, the index has now grown for 31 consecutive months, with the overall economy now having grown for 119 consecutive months. The March PMI reading is down 2.4% compared to the 12-month average of 57.7, and the first quarter PMI is 55.4. ISM reported that 16 of 18 manufacturing sectors reported overall growth in March: Printing & Related Support Activities; Textile Mills; Food, Beverage & Tobacco Products; Petroleum & Coal Products; Computer & Electronic Products; Electrical Equipment, Appliances & Components; Furniture & Related Products; Chemical Products; Plastics & Rubber Products; Wood Products; Nonmetallic Mineral Products; Transportation Equipment; Miscellaneous Manufacturing; Fabricated Metal Products; Primary Metals; & Machinery.

• Cybersecurity Industry will have 3.5 Million Unfilled Jobs by 2021

(Southern California News Group -- Kevin Smith: 3-29-19) Businesses, utilities and government agencies are scrambling to protect their data and computer systems in the face of rising cyberattacks, fueling an increased demand for cybersecurity workers. A report from Cybersecurity Ventures predicts 3.5 million cybersecurity jobs will go unfilled worldwide by 2021. The research and statistics firm compiled that number after

reviewing dozens of employment figures from analysts, job boards, vendors, governments, the media and other organizations. Cybercrime also is expected to cost the world \$6 trillion a year by 2021, up from \$3 trillion in 2015, the company reported. Biggest threat to mankind.

“Cybercrime is the single biggest threat to humanity we have seen in our lifetime besides nuclear weapons,” said Kevin McDonald, chief operating officer and chief information security officer for Alvaka Networks. The Irvine company provides network management and security for businesses looking to protect their technical assets and data. “The impact on our infrastructure - including gas, electric power, water ... all of these things - is enormous,” he said.

• Preparing Your Organization for Innovation

(Innovation Excellence – Greg Satell: 3-18-19) In 1919, Mahatma Gandhi initiated a campaign of civil disobedience, including the sale of banned literature, fasting, prayer and work stoppages to protest the oppressive Rowlatt Acts the British had recently passed. These initiatives were an immediate success but soon turned disastrous and ultimately ended with the massacre at Amritsar. He would later call this his Himalayan miscalculation. “I realized that before a people could be fit for offering civil disobedience, they should thoroughly understand its deeper implications,” he would later write in his autobiography. The same can be said for innovation. Before you embark on a game changing initiative, your organization needs to be prepared for it. In a recent article for Harvard Business Review, columnist Scott Kirsner pointed to a survey of 270 corporate leaders that found that the most significant obstacles to innovation are not things like budget, skill sets or CEO support, but politics and culture. Those are pervasive issues and can’t be solved overnight, but can be overcome. Here are four things you can do: Focus on Your Mission More Than Your Metrics ... Empower Exploration and Experimentation ... Connect Your Silos ... Adopt A “Grand Challenge” Mindset.

• Boeing’s Supply Chain Waits for Answers Too

(Bloomberg -- Brooke Sutherland: 3-18-19) The grounding of Boeing Co.’s 737 Max jet will have ripple effects – not all of them bad – across an aviation industry that’s been a steadying force for industrial conglomerates. The U.S. Federal Aviation Administration on March 13 followed virtually every other relevant regulator in issuing a precautionary ban of the Max after a combined 346 people died in two fatal crashes over the past five months. On the one hand, with the Boeing best-seller out of commission, carriers such as Southwest Airlines Co. and American Airlines Group Inc. may be forced to turn to older aircraft to maintain capacity, notes Bloomberg Intelligence analyst Douglas Rothacker. Older planes are more apt than newer ones to require maintenance and repair work, which is the biggest profit driver for most suppliers. The longer the delay drags on, though, the bigger the risk that Boeing has to re-calibrate its target for producing 57 planes a month, potentially hamstringing a top source of revenue growth for parts makers such as Spirit AeroSystems Holdings Inc., United Technologies Corp., Honeywell International Inc. and General Electric Co.

• Behind a \$25 Million Plan to Elevate Women in STEM and Use their Stories to Inspire Girls

(Inside Philanthropy – Caitlin Reilly: 3-17-19) A longtime supporter of science research and STEM education, Lyda Hill Philanthropies recently made a big bet on getting girls interested in careers in STEM, while supporting women already forging a path in those fields. The ambitious \$25 million IF/THEN initiative is an attempt to boost girls’ interest in STEM by changing the narrative around careers in those fields. The bet is that if girls see women excelling at those jobs, they’ll be able to picture themselves in the same fields. Efforts to boost interest in STEM, especially among girls, are popular right now in philanthropy. This is true even as some critics cast doubt on whether the actual demand for STEM skills from employers justifies the money pouring into the sector. Many funders support initiatives that focus on improving STEM instruction in the classroom and supporting enrichment

programs outside of school. IF/THEN stands out for its focus on changing the narrative and cultural assumptions around STEM. The initiative takes its name from the mantra, “If we support a woman in STEM, then she can change the world.” It’s tackling the gender gap in STEM from several angles.

• The Importance of 5G in the Auto Industry

(NED – Ralf Llanasas: 3-15-19) The momentum for the realization of autonomous vehicles in mainstream use is reaching critical mass. Tesla and Toyota are now testing self-driving vehicles on roads in Pittsburgh, Boston, and Phoenix. But while many Americans already had grave concerns surrounding driverless cars, a recent fatal accident by an autonomous Uber vehicle has many questioning if autonomous cars will ever be safe enough to feel confident with them sharing our roads. Still, with self-driving features already in widespread use, it appears that autonomous cars will be appearing on our roads. Even more surprising, they will be considered much safer than human-controlled vehicles. For autonomous car technology to be unlocked, experts agree that large-scale adoption of 5G - the next-generation wireless technology - is required. Nokia’s Jane Rygaard in a recent interview said: “We need to know how long it takes for a message to be transmitted between sensors and then get to the computer in each car ... and then how long it takes for the computer to make a decision, and all this has to be in less time than a human would take to make a decision - 2 milliseconds.

• Reasons Why Innovation Fails

(Innovation Excellence -- Enrique Ramirez: 3-11-19) Getting innovation results is somewhat difficult, but keeping innovation going is even harder. Regular innovation depends on many factors such as the top management’s leadership, the corporate culture, the available resources and the methodology. After years of conversations with professionals in multiple sectors (e.g. construction, energy, manufacturing...), we have identified some tips to overcome factors that either kill or slow down innovation in companies. Your organization is not ready to innovate. If you want your company to change the way it works, you need to help the organization get their buy-in. First of all, the management of the company needs to play an active role in communication and change management. Get people excited. Show your company vision and goals. Explain how the world is changing and how technology entry barriers are getting lower. Encourage the organization to work together and build knowledge networks to scale up your innovation capabilities. Get people excited. Show your company vision and goals. Explain how the world is changing and how technology entry barriers are getting lower.

• Manufacturing Industry Learning Lab Introduces Students to Manufacturing

(KKTU – Jenna Middaugh: 3-10-19) Wearing safety glasses and holding wood slabs in hand, Mesa Ridge freshman Angelo Williams works on what will soon be an end table. “It’s really cool. We cut wood, we build it,” Angelo said. “We learn a lot about the vocabulary of woodworking and the ways and efficiency of how to get it done.” Angelo is just one of about 200 students who attend class at the Manufacturing Industry Learning Lab National Training Center (MiLL), every day. “Growing up, it was always ‘sit down in classrooms. Take notes. Take tests,’” Angelo said. “But here, it’s open room. They teach you how to use it, and it’s hands-on, really. So I think it’s really cool. It’s not like any other classroom ever.” The training center came together as a partnership between Widefield School District 3 and Peyton School District 23JT. The school districts worked together to buy the 46,600-square-foot building near the airport and bring in millions of dollars’ worth of equipment from industry partners for the students to learn on and use. “Industry is the leading source here. They tell us what they want their next generation of employees to look like, how they want them to be taught. They give us the technology. We do the teaching.

• Memphis College Receives Grant to Increase STEM Training for Students

(Memphis Commercial Appeal – Phillip Jackson: 3-8-19) Rhodes College was awarded \$1.2 million grant to support students at the college interested in teaching math and science to kids from K-12 in high-need school districts. Eighteen students majoring in STEM will be recruited during their sophomore year to be a part of the Urban Teacher Partnership for Culturally Relevant STEM Education. Scholars in the program will start working the summer between their sophomore year and junior year and continue until graduation. “Very few colleges offer STEM majors with as many opportunities to do hands-on research with faculty mentors as we do here at Rhodes,” said Zac Casey, assistant professor of educational studies at Rhodes and the project’s principal investigator. “The NSF recognized this as a strength of our college and agreed with us that we can use these already existing strengths to recruit more high impact STEM teachers to working-class urban schools.” Scholarships will be paid out in both junior and senior years. The student teaching semester will last from 2019 to 2024.

• Gates Foundation, Chan Zuckerberg Asked for Big New Education Ideas. Here’s What They Got

(Digital Education -- Benjamin Herold: 3-8-19) The Bill & Melinda Gates Foundation and the Chan Zuckerberg Initiative “share a view that there is enormous unrealized potential for students and that breakthroughs driven by innovation can help students and teachers,” according to the report, titled Education Research & Development: Learning From the Field. Ongoing investments in such R&D work are expected, although the groups have not yet made any funding decisions, according to a Gates Foundation spokesperson. The underlying premise of the new effort is bold: Founded with the multi-billion-dollar fortunes amassed by two of the biggest figures in the tech industry, the Gates Foundation (started by Microsoft founder Bill Gates) and Chan Zuckerberg Initiative (started by Facebook founder Mark Zuckerberg) have teamed up to create a new R&D model for K-12 education. According to the new report, the effort will be modeled on DARPA, an agency of the federal Department of Defense that invests in new technologies related to national security, and Bell Labs, a private research and development company now owned by Nokia.

• Workers Suddenly Have More Power to Demand Higher Pay and Better Jobs

(Washington Post – Heather Long: 3-8-19) Workers are receiving the fattest wage increases since the Great Recession as employers struggle to find enough people to fill their ranks and employees have more leverage to demand higher pay and jump to better jobs. Wages grew 3.4% in the past year, the government reported Friday, the fastest pace in nearly a decade and well above inflation, suggesting that employers are hustling to lure and retain workers. Many are slashing requirements for jobs and are hiring workers quickly to prevent them from being scooped up by competitors, a far cry from the days when job seekers felt lucky to even get a callback. The unemployment rate fell to 3.8% in February, marking one year of sitting at or below 4%, a level many economists regard as “full employment” - when there are few people left who want jobs and cannot get them. Job creation also cooled in February, falling to a paltry 20,000 jobs gained. Economists have long predicted that the job growth would slow as the nation approached full employment and the pool of available workers shrank dramatically, giving current employees even more ability to ask for more money, flexibility and promotions.

• Bumps in the Road to Smart Manufacturing

(IW – Stephen Gold: 3-6-19) My childhood was spent listening to songs piped out of an AM transistor radio, selected at the whim of a DJ. Today my 4-year-old grandson merely needs to tell his virtual assistant named Alexa the music he would like to hear. Technology has changed so dramatically in my lifetime that it’s hard to envision a future state when there isn’t the kind of exponential growth we’ve seen since the mid-1990s. Arguably the

most significant technological advance for American business—IIoT which holds the promise of unimagined productivity gains and untold benefits to consumers—isn’t assured. That’s the essence of a new study, Smart Factories: Issues of Information Governance, produced by the Manufacturing Policy Initiative (MPI) out of Indiana University’s School of Public and Environmental Affairs. MPI Director Keith Belton’s original purpose in creating this collection of analyses which my organization had a role in developing was to determine the key policy solutions that could spur the growth of smart manufacturing. But after conferring with top manufacturers in MAPI’s community of leaders, he realized that smart manufacturing in this country faces some bumps in the road.

• Non-Automotive Manufacturing Sectors Flocking to Robotics

(Advanced Manufacturing Now – Ilene Wolff: 3-6-19) Cheaper robots with more functions, along with more flexible work cells and installations that facilitate robotics, are accelerating the growth of automated manufacturing facilities in the non-automotive sector. Ideas on whether robotics and automation lead to lights-out manufacturing on the shop floor, though, are mixed. While the overall number of units sold and revenue for robotics in 2018 were down, industrial robot orders actually grew 24% over the previous year in the life sciences, food and consumer goods, plastics and rubber and electronics industries, according to the Robotics Industries Association. There are many reasons for the growth—among them are robotic systems are easier to install, integrate into an automation system and program. For example, the approach of Switzerland-based ABB is to produce a range of standardized, modular automation solutions vs. designing and engineering bespoke work cells for each of its clients. “All of that cuts the time down because we’re not spending weeks or months designing and engineering them,” said Dwight Morgan, VP of sales and marketing for ABB USA Robotics, Auburn Hills, Mich.

• Machine Monitoring: The Strategy to Achieve Exponential Efficiency Gains

(IW – Lou Zhang: 3-3-19) Since the industrial revolution, manufacturers have been churning out goods which have bettered the livelihoods of billions of people. Machines have been fed raw material and transformed them into finished goods hundreds or thousands of times more valuable. Society’s engine has hummed along for centuries as manufacturing powered the transformation of mankind’s way of living at the same time. With the birth of the “information age,” a new paradigm has emerged. Instead of physical objects, our most valuable assets now are ethereal and exist solely in the digital realm. Information is king – knowledge about individuals, organizations, and groups can now refine existing processes to be thousands or millions of times more effective. Information can guide us in what decisions to make, cutting out the many headaches involved with trial and error. “Life experience,” so famed by oracles old and new, can now partially be substituted by rigorous, data-driven insight. ... Netflix, Amazon, and other “digital natives” are built from the ground up with data. Data informs how they target recommendations, how much they demand from vendors, and how much they charge the market without losing revenue.

• Reskilling: The New Trend in Recruiting

(Workforce – Sarah Fister Gale: 2-27-19) It doesn’t matter how talented your new hires are, or what stellar technology training they’ve received. Chances are within a few years those skills will be obsolete. Technology evolves so quickly that it is no longer enough to hire for the skills needed today. To stay relevant, companies need to hire people who have the ability to constantly learn new skills that may not yet exist. This focus on reskilling as a talent management strategy is already taking place, said Art Mazor, principal of Deloitte’s human capital management consulting practice, in Atlanta. “Most big companies today are focused on reskilling, and for good reason: The half-life of skills is two to five years,” he said. “That has huge implications for recruiting.” With demand for talent at an all-time high, companies can’t expect to pluck these skills ready-made from the talent pool. They will have

to create them in-house by providing employees with constant access to training, and incentives to continuously reskill. Research from McKinsey found 82% of executives at large organizations believe retraining and reskilling must be at least half of the answer to addressing their skills gap, with 27% calling it a top five priority.

• University-hosted Sites Carry Out Alabama Initiative to Elevate K-12 STEM Instruction

(University of Alabama Huntsman – Diana LaChance: 2-26-19) The Alabama Math, Science, and Technology Initiative (AMSTI) is recognized throughout the state as a provider of high-quality math and science instruction to over 900 schools through its 11 university-hosted sites. But less well known is the initiative's origin story, which dates back nearly 20 years to the establishment of its inaugural site at The University of Alabama in Huntsville (UAH). "Back in 1999, our superintendent of education and his deputy were having conversations about the serious need to improve math and science instruction in the state," says Sheila Holt, director of the UAH AMSTI site. "So in 2002, with the support of Congressman "Bud" Cramer and a \$3 million grant from NASA, they created the first AMSTI site at UAH." Twenty area schools took part in the Summer Institute that UAH hosted that year, making them the first official AMSTI schools. More funding soon followed, allowing AMSTI to add more sites and UAH to add more support to area teachers. Today, in addition to hosting the annual Summer Institute, Holt and her team provide year-round hands-on training and resources to teachers from over 100 North Alabama schools.

• Key Principles for Modernizing Your Company's Technology

(strategies+business - Leon Cooper and Milan Vyas: 2-26-19) The life cycle of information technology is becoming shorter every year. New competitors are disrupting industries by leveraging state-of-the-moment digital practices and processes. Customer expectations are constantly evolving in an accelerating race for the most advanced, hyperconnected, seamless experiences. IT functions are under unrelenting pressure to support leading-edge capabilities such as data analytics, cybersecurity, automated processing, and integration with third-party systems. The easiest way to do this is through platforms that connect everyone to the same cloud-based cross-industry digital infrastructure. In this context, your company's legacy IT system, which seemed so capable a few years ago, is rapidly becoming obsolete. The systems modernization you need today is more than an upgrade; you're playing a new game with new rules, in which you modernize not just the tools and functions, but the way you do IT. The vendors are largely the same, but the options and principles of the past no longer apply. Hardware no longer stands alone. Sensors and Internet connections are embedded in practically every tool.

• The Future of Logistics is Racing toward the Last Mile

(MH&L – Greg Hewitt: 2-26-19) Almost two decades into the 21st century, there is no doubt that e-commerce has radically and permanently altered the retail landscape for U.S. companies. But there is also no debate that e-commerce and mobile e-commerce are redefining what it actually means to be a U.S. company. In other words, even the smallest local store today can become a global player, accessing a vast audience of potential customers beyond our borders quickly and affordably, which means that location is now an entirely relative term. Consider that in 2017, American consumers spent almost \$454 billion online, while around the world Internet sales reached above \$2.3 trillion, and you begin to understand that the fastest road to retail growth is certainly international in scope. To keep that road open and its traffic running efficiently, logistics strategies must evolve constantly and quickly by integrating flexibility and technological innovation in the core of every process. Ultimately, all of the investments and energy that retail companies devote to product evaluation, sales, marketing and customer engagement will amount to very little if they cannot get their goods efficiently and securely into the hands of waiting buyers.

• Planning in an Agile Organization

(McKinsey Digital -- Santiago Comella-Dorda, Khushpreet Kaur, and Ahmad Zaidi: February 2019) Companies large and small are discovering that agility - the ability to quickly reorient the organization toward valuable opportunities - can improve the performance of working groups across the enterprise. A McKinsey survey found that agile teams of various kinds were 1.5 times more likely to report financial outperformance than other business teams and 1.7 times more likely to report nonfinancial outperformance. Eighty-one percent of respondents in agile units report a moderate or significant increase in overall performance since their transformations began. Agile ways of working can also reduce risk and create flexibility because they allow teams to test and validate ideas before the business commits to developing them. These benefits can be lessened, however, if companies don't apply agile concepts to enterprise-wide processes - particularly the planning and budgeting processes by which companies translate their strategy into decisions about how to allocate people and resources. When agile teams must submit ideas to planners and wait months for funding, they can miss out on opportunities to win customers or boost efficiency.

MANUFACTURING FACT OF THE MONTH

"Manufacturing helps to support other sectors in economies."

Manufacturing helps to bolster other sectors of the economy due to their multiplier effect and strong supply chains. As a result for every \$1.00 spent on a final manufactured product supports \$1.34 of output in other sectors. *Source: Manufacturing Institute*

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