

Breakout Discussions National Summit 2017

Emerging Technologies

Data/Analytics

- Big Data: becoming usable information
- Data (analytics, ownership, etc.)
- Predictive analytics (big data)
- Industrial big data analytics
- big data as it applies to manufacturing
- data analysis
- Machine learning
- cybersecurity
- Advancement of cloud computing
- AI
- Social network analysis
- High performance computing
- block chain
- block chain technology to supply chain certification

Materials

- Composites and light weighting (materials)
- Advanced materials technologies
- Bio-plastic
- Bioplastics NOW!!
- Connecting materials with design capabilities
- Maturation of metamaterials
- Metamaterials @ scale
- ICME
- Metamorphic materials

Nanotechnology

- Nanotechnology
- Graphene in 3D
- nanomaterials

Robotics/interface

- Co-Bots. Human – machine production
- Robotics
- robotics and automation
- Virtual reality
- Virtual reality training options
- 3D entertainment
- Connected technologies

- IOT – collaboration of ideas and machines
- IOT
- IOT sensors
- Autonomous

Training/Workforce

- Educational technology
- Amatrol’s “skill boss” trainer. Trains and assess students on 60+ skills performed on plant floor
- youth (K-20) talent pipeline with hands-on intuition
- Movement as Workforce Development

Bio

- Bio – customized templates
- Invention of manufacturing methods / technologies for “bio” products (e.g. organs, tissues, cells, etc.)
- CRISPR
- augmented brain
- biotechnology
- precision medicine (3D printed organs)
- cognitive engineering

Energy

- Battery technology
- High density power storage
- energy intensive manufacturing (to leverage low energy costs)

Collaboration/Makerspaces

- Crowd funding
- Crowd thinking
- Crowd sourcing
- Sustaining Makerspaces and developing more opportunities for inter-generational interactions
- Makerspaces as workforce development distributed small batch manufacturing and R&D centers
- MakerNet.work
- access to manufacturing machine components
- Maturation of crowd design and micro-factories

Miscellaneous

- 3D printing
- Transportation technologies (e.g. hyper loop)
- supply-based technologies are established

Supporting Roles

Education/Training

- Education needs to be rethought – how we foresee a career
- Provide robust incentives for youth
- Manufacturing education
- Address STEM skills gap at elementary education level
- Education and course development. Re-education / continual learning. Framework to connect industry to academia
- Workforce development. Strategies for accepting tech
- Training. Educational opportunities. Apprenticeships
- Government can leverage to address the skills gap
- Re-integrate arts and social sciences into STEM
- Empower / Expand auto – didactic technologies
- Need stakeholders to invest in win/win/win partnerships for workforce development
- Early Education: STEM + manufacturing + entrepreneurship)
- workforce education
- 3D printers capture the imagination of the younger generation. It is a bridge for them to move from their virtual world to the physical world

Policy/Standards

- Policy / Regulatory Changes
- Tax structure more conducive for manufacturing in U.S
- Government as first buyer for new technologies (e.g. computer chips / IC)
- Regulations that level the world market playing field (e.g. safety)
- Next-generation supply chain investment. Tax policy, developing local contacts
- More manufacturing USA Institutes. More funding for manufacturing USA. More funding for MEP's
- "Map" of government resources
- Standards
- Standards for developing technology and cyber security

Research/Funding

- More funds for both fundamental and applied research
- As corporate research labs (e.g. Bell Labs) ramp down, Federal Funding ramp up is needed to fill the gap (e.g. NSF, ERC Program)
- Research funding
- Funding opportunities
- Technology readiness funding
- Support transitional research
- research support
- basic science

- Focus more on “real world” application and deployment
- Financial support

Collaboration

- MakerNet aims to connect government, edu’s, and industry with Maker Movement. short-batch distributed manufacturing, and investment in entrepreneurship
- Translators between industry and academia
- Information sharing
- Set-up “silo busting” roundtables. Create event where key stakeholders work to solve key challenges together
- Consortia and partnerships
- Facilitated partnerships (PPPs)
- Partnership with maker spaces and other vocational institute
- Industrial Commons

Miscellaneous

- Assistive Tech. Disability, age, cultural (linguistic)
- Celebrate the success that we want. How many 3 point shooters can power a city?
- Organizations need to be able to move faster
- Infrastructure

Manufacturing Challenges

Workforce/Training

- Need to get a way or add to funding for building educational content. Most focus is on 4+ degrees
Need to include 2 year and others. Leverage ATE’s
- Manufacturers need to work with communities and universities to create specific educational content to build skilled workers
- Workforce: evaluating societal norm stigmas, stereotypes that are inhibiting performance
- Short: robots to do the dirty, dangerous jobs to free workers to do high value added
- Culture for workers to take ownership
- Workforce: new ways of thinking. Usability / universality of computing tools. Information gaps in SME on how to join larger supply chains
- Skills gap – what is it really and how do we address it
- Reactive Educational Policy Development versus Proactive Educational Policy Development
- competitive compensation strategies. Employment shift to independent contractors. Example: UBER and LIFT
- Attracting innovative talent by redefining and marketing “the new manufacturing worker”
Partnering with MakerSpaces for make-over and recruitment. MakerNet work
- Workforce skilled in automation repair
- How to prepare workers to have proper training, including skills for life-long learning and self-learning
- High school administration and school boards

- Getting manufacturing science respect as a science – image of manufacturing
- Understanding of manufacturing (mindset change)
- Systems level thinking and problem solving

Security

- Cyber security
- Cyber-physical system security. Digital drawing file security
- Cybersecurity of “OT” / shop floor
- Security of processes
- Digital anarchists threaten the future of the digital landscape

Government/Policy

- Government regulations – vestiges of previous eras - solutions to old problems are now obstacles
- Government dialogue
- Sluggish policy development results in antiquated policy deployment
- Unfair trade practices
- Pay to play is an issue

Intellectual Property

- Antitrust.
- IP
- Intellectual property protection

Supply Chain

- Supply chain awareness and deployment of advanced materials and technologies
- Robust supply chain

SME

- Help SMEs access tools and services (MEP)
- Advanced manufacturing. Facilities and equipment (for SMEs, especially)
- Finance for SMEs

Collaboration

- Missing middle leverage MFGUSA. Bring manufacturers and universities together to identify and solve manufacturing challenges
- Barriers to collaboration and communication
- Need for National Innovation Foundation for manufacturing and meld with makerspace community

Speed/Change

- Speed of change. Helping manufactures keep up
- Fast manufacturing ramp up associated with advanced materials / production
- Agile R&D and acquisition

Data

- data ownership
- Data cleaning

- Connectivity – info/data and equipment

Miscellaneous

- Integrating biological develops into product.
- Control / Interface with AI
- Food, water, energy
- Prototyping in microelectronics is difficult
- Validation / certification of small lot part quality (e.g. 3D printing)
- Scaling personalized manufacturing