February 2019

Did You Know...

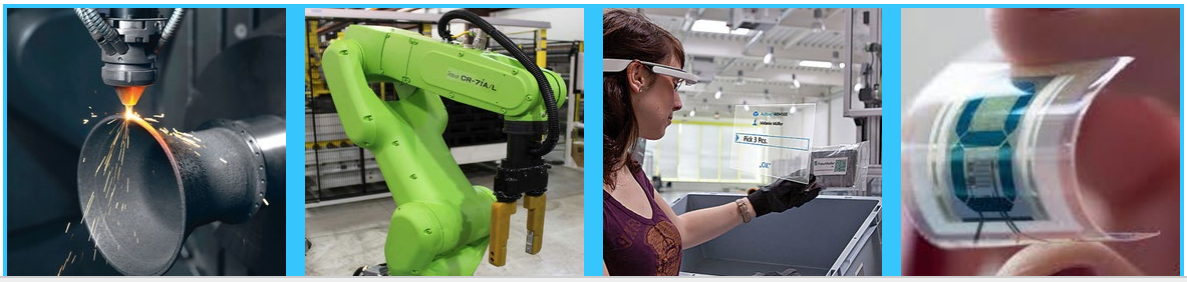
New for 2019: Senate Bill No. 1343 Amends Harassment Avoidance Training Requirements for California Manufacturers

If you are an employer who employs five or more employees, including seasonal employees, you must now provide:

- **At least two hours of harassment avoidance training to all supervisory employees**
- **At least one hour of harassment avoidance training to all non-supervisory employees**
- **Both training sessions must occur in 2019 for a 2020 compliance point**
- **Additionally, retraining is required every 18 months**

Take the Next Steps to Learn About Affordable Methods of Complying with this New Law

Scroll down or click on the links below to jump to the section you're interested in.



[Subscribe](#) to our email list

Go to: Additive Manufacturing | Go to: Advanced Robotics & Automation | SMART Manufacturing | Go to: Flexible Hybrid Electronics

What is Additive Manufacturing?

Additive manufacturing (also knowns as 3D printing) uses computer-aided-design (CAD) files to direct hardware to deposit material, layer upon layer, in precise geometric shapes. As its name implies, additive manufacturing adds material to create an object. By contrast, an object created by traditional means, is made by removing material through milling, machining, carving, shaping or other means. This generates significant waste in the production process.

GE Prepares Boeing 777X for Takeoff with 3D Printed Turbine Blades

Building on the legacy of the preceding GE90 engine – the first from GE to incorporate additive manufacturing – the GE9X includes the famed GE 3D printed fuel nozzle.

Small components, including temperature sensors and fuel mixers, and larger parts, like heat exchangers and separators are also 3D printed. Foot-long low pressure turbine blades in the GE9X are also 3D printed, reducing overall engine weight and maximizing size and power.

The 3D printed fuel nozzle inside the GE9X was 3D printed by Morris Technologies, which was acquired by GE in 2012. Other components in the engine were 3D printed by GE Additive on Concept Laser machines.

Click Here to Read the Article

Powering Next-Gen Helmet Protection - AM and Carbon Fiber

Additive Manufacturing coupled with carbon fiber is changing the way the world designs and manufactures protective gear for football and beyond.

Developing a Business Case for Additive Manufacturing
Rethinking Stamping using Additive Manufacturing

The invention of the metal stamping press occurred in England in the late 1700s. In the centuries since, this process has been used to produce everything from automotive body parts to architectural features. The method, which is relatively straightforward, involves three main components: a sheet of copper, a press, and a mold, which contains two dies (an upper and lower). One side of the mold is convex and the other is concave, resulting in the pressure of the press forming the pattern of the dies in the copper sheet.

The most costly and time-consuming part of copper stamping is the creation of the molds. Molds are sculpted by hand out of rigid epoxy utilizing the talents of skilled artisans. This process has been used for years with success, but there are certain limitations.

Additive Manufacturing has been shown to be a viable alternative production process to create copper stamping molds. By utilizing polymer powder bed fusion, molds can be created that are durable, functional and economically viable.

Click Here to Read the Article

Additive Manufacturing

Chris Wentworth

Chris is CMTC's Additive Manufacturing (AM) and product development expert. With over 20 years of experience in manufacturing, Chris brings a wealth of knowledge to Small and Medium-Sized Manufacturers. Chris is always happy to answer any questions you may have about AM or CMTC. Please contact Chris if you are interested in learning how Additive Manufacturing can help reduce manufacturing costs and reduce waste.

Email Me

Tel: 310.598.8681

Go to the top of the page

What is Advanced Robotics and Automation?

Advanced robotics and automation consists of devices that act largely, or partly, autonomously, that interact physically with people or their environment and that are capable of modifying their behavior based upon sensor data. With advances in sensing and machine learning, today's robots are more intelligent, versatile, flexible, and steadily falling in cost. With collaborative robots (cobots), workers are able to safely interact with the machines that can now do repetitive, hazardous and ergonomically challenging tasks.

Join the CMTC Robotics Working Group

We meet on a quarterly basis to promote the exploration & adoption of robotics and automation in our region!

CMTC Robotics Working Group Charter:

The purpose of the CMTC Robotics Working Group is to promote the exploration and adoption of robotics and automation. The Working Group will provide members with resources and information to determine how their organization could benefit from automation. Additional benefits:

- Participate in learning from experts in the field
- Share and learn from mutual challenges and exchange best practices

- Build professional relationships with peers, suppliers, integrators, and academics who work on automation and robotics

There is no cost to join the Working Group. For further information, contact Raminder Sandhu at rsandhu@cmtc.com. Please note: The Robotics Working Group is designed exclusively for Small and Medium-Sized Manufacturers.

Empowering Robotics in Manufacturing Through Measurement Science

The U.S. National Institute of Standards and Technology (NIST) is dedicated to advancing measurement science, technology, and standards, thus promoting innovation and industry competitiveness. In particular, the Robot Systems for Smart Manufacturing (RSSM) program within NIST's Engineering Laboratory focuses on advancing measurement science for industrial robot systems, specifically to address issues that may hinder ease of adoption and advances in the performance of robotic technologies.

Click Here to Read the Article

Advanced Robotics and Automation

Raminder Sandhu

Raminder brings over 30 years of experience in manufacturing automation, engineering and technical sales to CMTC. He has worked at a diverse range of organizations, from Silicon Valley startups to Fortune 50 companies. In addition to Raminder's expertise, CMTC has developed relationships with key resource partners across the state from industry, economic development and academia to support the advanced robotics and automation needs of Small and Medium-Sized businesses. Please contact Raminder if you are interested in learning how Advanced Robotics and Automation can fundamentally change how products are manufactured.

Email Me

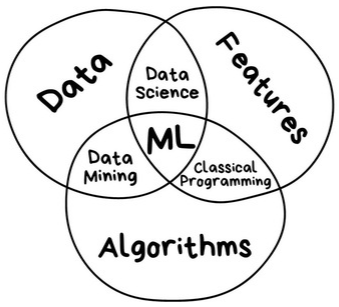
Tel: 310.984.0632

Go to the top of the page

What is SMART Manufacturing?

Smart Manufacturing consists of systems that are fully-integrated and collaborative that respond in real time to meet changing demands and conditions in the factory, in the supply network, and in customer needs. These systems take advantage of recent technical advancements and cost reductions in sensors, wireless components and computer capacity. Smart Manufacturing has the ability to solve existing and future problems via an open infrastructure that allows solutions to be implemented at the speed of business while creating advantaged value.

Machine Learning for Everyone
In simple words. With real-world examples.



If you have ever tried to read articles about machine learning on the Internet, most likely you stumbled upon two types of them: thick academic trilogies filled with theorems (I couldn't even get through half of one) or fishy fairytales about artificial intelligence, data-science magic, and jobs of the future.

This is a simple introduction for those who always wanted to understand machine learning. Only real-world problems, practical solutions, simple language, and no high-level theorems.

Click Here to Read the Article

The 6 Trends That will Define Intelligent Manufacturing in 2019

Since the start of the First Industrial Revolution, manufacturing has been the force pushing industrial and societal transformation forward. Today, we're in the midst of the Fourth Industrial Revolution, as a new generation of sophisticated technologies is transforming manufacturing into a highly connected, intelligent, and ultimately, more productive industry. The manpowered shop floor of the past is being replaced by smart manufacturing facilities where tech-savvy workers, aided by intelligent robots, are creating the products and services of the future.

Click Here to Read the Article

SMART Manufacturing

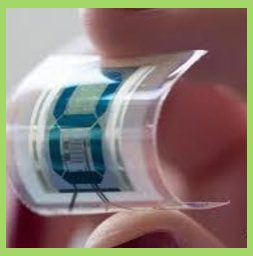
Shekhar Chandrashekhar

Shekhar brings a strong background in technology and business leadership and deep knowledge of engineering management. He is a forward-thinking leader, strategist, and innovator with a history of driving process, system, and product improvements that streamline operations and increase profitability. Please contact Shekhar if you are interested in learning how SMART Manufacturing can help improve your profits and growth.

Email Me

Tel: 310.984.9117

Go to the top of the page



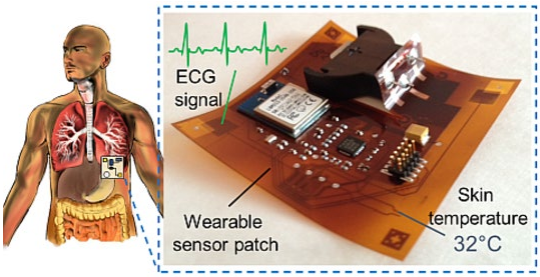
What is Flexible Hybrid Electronics?

Flexible Hybrid Electronics (FHE) combines the flexibility and low cost of printed plastic film substrates with the performance of semiconductor devices to create a new category of electronics. By adding electronics to new and unique materials that are part of our everyday lives, combined with the power of thin silicon integrated circuits to create conformable and stretchable smart products, FHE is ushering in an era of “electronics on everything” and advancing the efficiency of our world. By taking advantage of the ability to conform to organic shapes, electronic capability can now be incorporated into new and emerging consumer and industrial products.

New Workshop Announced: FHE Applications for Aerospace

NextFlex and Boeing will host a member workshop April 1 - 4 on the topic of Flexible Hybrid Electronics (FHE) in aerospace for both commercial and defense applications in Seattle, Washington. This workshop will provide NextFlex members with further insight into Boeing's commercial airline production and application needs.

Click Here for Event Details



Sensors and FHE Need Each Other: A Look Inside a Key Relationship

Flexible hybrid electronics (FHE) and sensor technologies are a perfect match for each other. Nearly every current application of FHE technology that either NextFlex or our partners are working on involve sensors, so it's beneficial for both platforms to grow and thrive alongside each other. Of course, these benefits ultimately carry down to the applications that use both FHE and sensors, such as chemical sensing systems and human health/fitness monitoring devices. When we drill down into this topic, it shows a unique symbiotic relationship that's critical to the development of next-generation manufacturing.

Click Here to Read the Article

Flexible Hybrid Electronics

Jens Paetau

Jens has over 25 years of Electrical Engineering and High Technology Sales Experience based out of Silicon Valley. He managed High Technology Semiconductor, IP sales, Telecom, Consumer Mobile, Wearable Development, Digital Health, IoT and IIoT, and followed Flexible Hybrid Technology for the last 7 years. Please contact Jens if you are interested in learning how Flexible Hybrid Electronics can help the manufacturing of electronics in higher volumes at lower costs.

Email Me

Tel: 310.984.9460

Go to the top of the page

For questions or comments about this newsletter, please contact Steve Brand - Editor at sbrand@cmtc.com.

CMTC®

California's Manufacturing Network

Go to the top of the page

CMTC
690 Knox Street, Suite 200 | Torrance, CA 90502
Tel: (310) 598-3060 | e-Fax: (310) 808-1381
Web: www.cmtc.com