



Connecting the Dots

Quarterly Newsletter

Welcome to the Spring 2022 NCDIDI Newsletter

— *Michael Mullins, Director NCDIDI,
NC State Industry Expansion Solutions*

It is critical that textile manufacturers adapt and produce advanced and smart textiles that meet the changing requirements of the Department of Defense. Just as advances in technology are vital to evolving changes in weapons, transportation and communications platforms, the textile industry must also meet the ever evolving demands of the battlefield to protect the warfighter. The key to ensuring that revolutionary textile products are developed and provided by the defense industry is innovation.

In this issue, business leaders, a university professor, an innovation advisor, and an expert on the textile industry share insights and information on smart textile innovation in the textile industry.

- Devin Steele, Founder and publisher of eTextileCommunications.com begins this edition

by providing a brief history of the textile industry.

- Sam Buff, Vice President and General Manager at the Manufacturing & Textile Innovation Network (MTIN), describes the new facilities being built at the Textile Technology Center and Manufacturing Solutions Center, that will support North Carolina textile manufacturers in the pursuit of innovation.
- Dr. Salil Desai, Distinguished Professor at North Carolina Agricultural and Technical State University, provides a description of the Center of Excellence in Product Design and Advanced Manufacturing (CEPDAM).
- Steve McManus, an Innovation Advisor at RTI International, provides an overview of the North Carolina Center for Optimizing Military Performance (NC-COMP).
- Scott Dorney, Executive Director, North Carolina Military Business Center (NCMBC) and DMCSF partner, describes the NCMBC, its programs to increase federal contracting and improve the capabilities of federal contractors statewide.

Additionally, we have included links to relevant articles, military workforce transition programs and upcoming events that you may find beneficial to attend.

Innovation in the Textile Industry

— *Devin Steele, Founder and publisher of eTextileCommunications.com*

In the years leading up to and following the turn of this century, much of the U.S. textile industry found itself in dire straits as globalization began to gain a foothold. With the North American Free Trade Agreement (NAFTA) being signed into legislation in 1993 and China's joining the World Trade Organization (WTO) and gaining most-favored-nation status in 2001, U.S. textile manufacturers began to struggle as importers and retailers began to "chase the needle" around the world to find cheap labor.

Daily headlines reported closures, consolidations, layoffs, et. al., particularly among textile commodities producers who for decades had thrived and built a robust, almost-untouchable industry. Some were caught flat-footed, with little recourse as buyers were taking alternative sourcing routes for lower-cost goods.

Others, however, began to operate under a "compete or die" mantra that enabled them to turn the corner and survive. And that meant changing their business models and, in many cases, their markets served – and, most importantly, innovating, innovating, innovating. While becoming "leaner and meaner," they began to focus their attention on the Next Big Things in the industry.

As they were doing that, the contentious Central America Free Trade Agreement-Dominican Republic (CAFTA-DR) that passed Congress in 2005 gave more hope to industry players. Even those who may have opposed it decided to leverage the legislation to their benefit, as CAFTA-DR allowed fabric, yarn and thread makers the advantages of permanent and expanded duty-free trade to the region. And that model has worked well to this day, particularly since the trade pact includes a yarn-forward rule of origin that stipulates that only apparel using yarn and fabric from the U.S., Central America or the Dominican Republic qualifies for duty-free benefits.

As the landscape was changing in the early 2000s, so was the industry. Sustainability was beginning to

gain traction, and an industry that was often considered dirty and wasteful embraced this concept. In 2007, the Synthetic Yarn and Fiber Association (SYFA), which like most organizations was facing lagging attendance at its meetings, put together a full-day program on sustainability in Charlotte, N.C. The theme was "Sustainable Is Attainable," and the meeting attracted more than 200 people from around the industry – which was about double the attendance from its previous meeting. At the time, perhaps, many companies may have considered sustainability a curiosity, but they would soon realize that to do business in the future, they would need to develop sustainable practices, equipment, chemicals, etc.

And today, you'll be hard pressed to find a U.S. textile producer that doesn't put sustainability at the forefront of its mission and operations. Unifi, Inc. of Greensboro, N.C., for instance, was one of several companies that reinvented itself to become a mainstay in that realm. The company expanded its product repertoire from textured yarns into synthetic fibers made from plastic bottles, and these materials are now present in numerous well-known apparel brands. Recently, the company hit a milestone with its 30 billionth recycled bottle, and has written an outstanding sustainability and circularity story.

The industry has innovated itself into relevance again in other ways, too. It has pushed suppliers to create machinery and equipment that is faster, more efficient and more automated, which in turn has enabled better quality goods produced in shortened times. It has leaned into R&D to develop niche products that are not easily reproducible. And it has expanded into horizons that could hardly be envisioned two decades ago.

A couple of examples: Digital textile printing technology, which for years was relegated to basic sampling and short-run printing of items, has become more sophisticated and mainstream, with multiple advantages such as the demand for environmentally responsible



output, innovative designs and the need to improve supply-chain operations while reducing waste (read: sustainability). And secondly, a lot of investment is being made into “smart” or “e-textiles” – that is, intelligent textile structures or fabrics that can sense and react to environmental stimuli, which may be mechanical, thermal, chemical, biological and magnetic. (Heavily engaging the textile industry, the Department of Defense is funding a lot of this research for military uses, but the possibilities are endless on the consumer side, as well.)

COVID-19, no doubt, pushed the textile sector to find even bigger and more-needed solutions. The industry’s mass pivot into personal protective equipment (PPE) at the onset of the pandemic underlined its flexibility and merit. The dire need for PPE helped the industry in many ways get out of its siloes and work together, even among competitors. The cooperation and collaboration shown during the first few months of the crisis was unprecedented.

The pandemic also gave the industry a chance to slow down and “think,” in many instances – think about new innovations, think about new ways to operate business, think about new ways to join forces. And we

are beginning to see the fruits of some of that thinking manifest in the form of cutting-edge technologies and capital investments.

Instead of present-day resilience, “stick-to-itivness” and survival being a destination, the U.S. textile industry’s finds itself on a journey. As made-in-America, reshoring and nearshoring are all gaining steam – brought to light during the pandemic, subsequent supply chain issues and now a horrific war – U.S. producers are showing their true mettle and importance to the country and the world.

Advanced Fiber Development Capabilities Coming to MTIN

— *Sam Buff, Vice President and General Manager at Manufacturing & Textile Innovation Network*

The Manufacturing Solutions Center (MSC) at Catawba Valley Community College and the Textile Technology Center (TTC) at Gaston College have served industry for over 32 and 79 years respectively. They have long provided product development, sourcing, testing and training needs to a range of clients including individuals, entrepreneurs, start-ups, other colleges and universities as well as established local, national and international companies. Fiber, yarn, knitting and weaving commercialization efforts are at the core of their service expertise but each is uniquely positioned to pivot to meet industry needs. The Centers are prepared to “go it alone”, join forces or collaborate with multiple individuals and organizations to help solve client problems and spark opportunities for innovation.

The Centers’ parent colleges recently formed a

partnership to create the Manufacturing and Textile Innovation Network (MTIN) with a focus on increasing opportunities to enhance collaboration and create a stronger regional support mechanism for the textile industry. One of the first results of this budding partnership has been the receipt of a \$14.3M appropriation by the North Carolina Legislature (HB 1105 – The Coronavirus Relief Act 3.0) to be used to develop an innovation launchpad for Personal Protective Equipment (PPE) development. The funding will be primarily used to build new facilities at each Center. that will support the industry’s innovation ecosystem for years to come.

The MSC 2 building will include a two story 30,000 ft² space for MSC expansion along with a 45,000 ft² private sector funded factory floor space for MSC’s



MSC 2 Rendering

graduated incubator clients. The first floor will house MSC's structural engineering lab and fabric formation best practices automation line along with the factory space. The second floor will house the PPE and Textile Resource Lab along with conference and meeting rooms to support economic development efforts. The combined additions of equipment and space will play a critical part in the support of PPE testing, advanced materials design and logistics efforts designed to create product and train a workforce for U.S. manufacturers of PPE.

The Fiber Innovation Center (FIC) at Gaston College will provide a state-of-the-art facility to develop and test high performance fibers for the advanced materials industry. These products range from Personal Protective Equipment, smart textiles for the defense sector to other proprietary products developed by national and

international clients of the MTIN. The FIC will be a single-story building that will house polymer reactors, extrusion, texturing, drawing, fiber opening, blending, staple spinning, winding and twisting equipment. Feedback from clients suggests that the FIC will be the only facility in North America open to industry that will house the entire range of advanced fiber development capabilities where scientists can start with an idea, move to small-scale trials and work up to a commercially viable product ready for production. Through growing local and regional support from the textile industry, the college expects the Kimbrell Campus will become a world-class Fiber Innovation Center.



Fiber Innovation Center Rendering

Center of Excellence in Product Design and Advanced Manufacturing (CEPDAM)

— Dr. Salil Desai, Professor and Director of CEPDAM
North Carolina Agricultural and Technical State University

The Center of Excellence in Product Design and Advanced Manufacturing (CEPDAM) at North Carolina Agricultural and Technical State University (NC A&T) is a university-wide center leading in transformational design and manufacturing themes that address global challenges by innovating convergent solutions through inclusive partnerships. Supporting our land-grant mission, CEPDAM provides comprehensive R&D expertise for industry, non-profits, and regional community partners throughout the entire product realization life cycle. Key facets include the design, prototype development, systems modeling, processing, characterization, and supply chain management of manufactured products across different industry sectors. CEPDAM exemplifies A&T's emblem "Mens et Manus" meaning "Mind and Hand" aptly bringing "ideas" into "action."

CEPDAM interdisciplinary faculty affiliates span across seven (7) colleges on A&T campus bringing holistic perspective and cutting-edge research themes. CEPDAM clusters include:

- Creative Design and Product Realization
- Smart Manufacturing and Automation
- Multiscale Modeling and High-performance Materials
- Bio, Agro and Environmental Systems Manufacturing
- Next-Gen Design and Manufacturing Workforce Development



Fig. 1: Harold L. Martin Sr. Engineering Research and Innovation Complex

The center is engaged in curriculum development, training, and certifications in frontier fields such as Industry 4.0, smart, bio and sustainable manufacturing. CEPDAM focuses on developing a 21st century workforce thereby, serving as an innovation incubator for advanced discovery and knowledge translation. CEPDAM continues to host flagship events such as the National Manufacturing Day, Joint Research Symposiums, Student Case Competitions and has established the Women in Design and Manufacturing Academy. As an integral partner of North Carolina Defense Manufacturing Community Support Program (NC DMCSPP), CEPDAM provides smart manufacturing technologies including integrated and flexible electronics for embedded textiles serving the defense and commercial industrial base. CEPDAM is leading to transform manufacturing in North Carolina via innovation in Industry 4.0 through workforce development opportunities in smart manufacturing, automation, and AI-based infrastructures partnering with K-12 districts, community colleges, and the NC Manufacturing Extension Partnership.

CEPDAM is housed at various satellite locations around NC A&T campus and is supported with state-of-the-art design studio, digital manufacturing suite, additive manufacturing laboratories, nano-bio fabrication cleanroom, and high-performance modeling facility to name a few. The Harold L. Martin Sr. Engineering Research and Innovation Complex (Fig. 1) houses cutting-edge virtual reality 3D holographic studio and 3D metal-ceramic printing suite (Fig. 2) to manufacture complex functional 3D components for automotive, aerospace, medical, and textile industry sectors. CEPDAM provides a robust cybersecurity architecture to support digital twinning, model-based systems engineering, industrial internet-of-things (IIoT) sensors, and resilient supply chain management. Our partnership highlights include ongoing relationships with national laboratories, industry partners, federal agencies, and NC Carolina Core – mega site for next-generation advanced manufacturing corridor. CEPDAM is committed to contributing to our nation's global competitiveness in product design and advanced manufacturing through inclusive partnerships.



Fig. 2: 3D Holographic Studio and 3D Metal Printing Suite

NC-COMP makes DoD connections to optimize warfighter performance

— Steve McManus, *Innovation Advisor, RTI International*

The North Carolina Center for Optimizing Military Performance (NC-COMP) is a consortium led by RTI International, focused on developing and commercializing solutions for warfighter health and performance optimization (including, but not limited to, smart textiles and wearable devices). NC-COMP consists of academic, non-profit, industry, and state government organizations with proven experience collaborating with military commands and serves as a gateway for military partners to access cutting-edge research and technology development in human performance and influence efforts that result in capabilities for mission effectiveness. This partnership brings an interdisciplinary, holistic approach to military organizations with human performance needs. NC-COMP focuses on three main areas:

- Preventing injury and speeding recovery
- Maintaining performance in multi-stressor environments
- Enhancing baseline physical and mental performance
- NC-COMP has several roles in the North Carolina Defense Manufacturing Community Support Program (NC DMCCSP):
- Utilizing its membership to engage military personnel in conducting sponsored and joint research involving smart textiles and wearable technologies with DoD investigators.
- Embedding experts with military units for research training exercises to develop a mature knowledge of material and product applications.
- Engaging service members in research at Ideation Team member Emerging Technology Institute (ETI), other NC-COMP member labs and facilities and sending researchers and research tools to military bases for use by military partners.
- Collaborating with military partners such as:
 - USASOC, MARSOC, 82nd ABN DIV, and XVIII ABN Corps.
- Conducting testing and evaluation of technologies and solutions in concert with active military personnel (particularly from Ft. Bragg and Camp Lejeune).
- NC-COMP is currently working to engage members in several funded research programs:
- NC-COMP is responding to the Medical Technology Enterprise Consortium (MTEC) Medical Prototype Advancement Initiative (MPAI), organizing teams with relevant capabilities to propose specific projects that address needs in one or more of the Research Areas identified in the Request for Project Proposals, which include at a high level, Prolonged Field Care, Medical Readiness, and Maximizing Human Potential.
- NC-COMP, along with the ASSIST Center at NC State University (another Ideation Team Member) is engaged with Defense Innovation University to explore opportunities to meet needs related to Human Factors (NC-COMP member NirSense is currently working with DIU to commercialize a sensor that monitors the brain function of Air Force pilots).
- NC-COMP is also working with Dr. Stephen Lee of the Army Research Office and other Ideation Team members to form a group that will engage DoD R&D research units to assist them in setting priorities related to wearable technology development.
- NC-COMP is working with the Emerging Technology Institute (Red Springs, NC) to plan “Techpalooza” events designed to expose military groups including JSOC, USASOC, and other military technology customers based at Fort Bragg to wearable technology and engage them in trials and other development activities.

North Carolina Military Business Center

— *Scott Dorney, Executive Director*

The North Carolina Military Business Center (NCMBC) is a statewide business development and technology transition entity of the State of North Carolina, headquartered at and supported by Fayetteville Technical Community College (FTCC). The mission of the NCMBC is to leverage military and other federal business opportunities to expand the economy, grow jobs and improve quality of life in North Carolina. The NCMBC's primary goal is to increase federal revenues for businesses in North Carolina. The Department of Defense has an annual impact of \$66 billion and is the second largest sector of North Carolina's economy (12% GDP). With six major military bases, over 100 National Guard and Reserve facilities and the third highest number of uniformed military personnel in the country, the State of North Carolina created the NCMBC to leverage opportunities with these installations, DoD commands and federal agencies operating worldwide.

Business Development. The NCMBC's business development team includes experienced business development, industry and procurement specialists operating from 12 Community Colleges across the state – from Hendersonville to Elizabeth City. These specialists identify the most lucrative federal contract opportunities (prime and subcontracts), notify and pre-position North Carolina firms for specific opportunities, and assist firms to understand government solicitations, prepare winning proposals and to successfully execute federal contracts.

MatchForce. To connect North Carolina businesses with all federal opportunities, including local opportunities at bases in the state, the NCMBC administers the State's official, FREE web portal for federal contracting – www.MatchForce.org North Carolina businesses register on the portal and receive automatic matches to federal prime opportunities and to subcontracting opportunities posted by other registered businesses. Firms identifying contract opportunities through MatchForce can then contact the NCMBC business development team for

one-on-one assistance.

Strategic Initiatives Program. In addition to business development and MatchForce, the NCMBC conducts several strategic initiatives. These initiatives include:

- Market intelligence – identifying future business opportunities in key sectors
- Pre-positioning and training – for future and current opportunities
- Current business development – connecting businesses to contract opportunities
- Solicitation and proposal support – assisting businesses to compete and win
- Training and resources – providing tools to overcome contracting obstacles
- Events and networking – focused on target sectors including statewide Summits for the medical, aerospace, cybersecurity, military construction and textile and soldier systems industries

DEFTECH. The NCMBC also established the North Carolina Defense Technology Transition Office (DEFTECH) to enable North Carolina's innovation ecosystem to address complex national security problems and increase economic opportunities for businesses in the state. The NCMBC and DEFTECH serve military commands and federal agencies worldwide, connecting their requirements with the North Carolina industrial and innovation ecosystem. The NCMBC and DEFTECH are unique combat multipliers that leverage industrial capacity statewide and drive private sector innovation, research and development directly to DoD, federal agencies and major military commands worldwide.

Articles

- [NC State Wilson, ZTE Part of Major DoD Grant to Develop High-Tech Military Textiles](#)
- [Smart textiles to grow to US\\$24 billion by 2025](#)
- [New military focus for Shawmut](#)
- [Overcoming the limitations of smart fabrics](#)
- [NC State University Wilson College of Textiles. "New Community College Partnerships Provide Opportunity for Students, Industry,"](#)
- [WRAL TechWire, "First Flight Venture Center has big plans for its next 30 years."](#)

Workforce Resources - Veterans Transitions Programs

Federal Programs

DoD SkillBridge

DoD TAP Transition Assistance Program

- [Army](#)
- [Marine Corps](#)
- [Navy](#)
- [Air Force](#)

North Carolina Programs

- [North Carolina 4 Military Employment \(NC4ME\)](#)
- [NC Works Veterans](#)
- [NC Community College Customized Training](#)

Other Veterans Transitions Programs

- [Heroes Make America](#)
- [Workshops for Warriors](#)
- [Recruit Military](#)
- [Disabled American Veterans](#)
- [Hire Heroes USA](#)
- [Corporate Gray](#)
- [GI Jobs](#)

Upcoming Events

MFGCON 2022 Manufacturing Conference

May 18, 2022 at 8:00 am- 5:00pm

May 19, 2022 at 8:00am- 5:00 pm

North Carolina's premier manufacturing conference will be held May 18-19, 2022. The conference will feature the most up-to-date and relevant topics from North Carolina's most influential manufacturing thought leaders.

SOUTHEAST REGION FEDERAL AND DEFENSE TEXTILE (FEDTEX) SUMMIT

May 24, 2022 at 8:00am- 5:00pm

May 25, 2022 at 8:00am- 5:00pm

The FEDTEX Summit connects US Department of Defense clothing and textiles, individual equipment and organizational equipment buyers and requirements officials with manufacturing, supply chain, research and development, testing, workforce development and academic resources from across the southeast United States. All manufacturers of textile-based clothing, footwear, equipment and textile-based soldier systems – and their supply chain, workforce, R&D and supporting resources – should attend this Summit.

**NCMBC Medical, Biomedical & Biodefense: Support
to the Warfighter Symposium**

June 8, 2022 at 8:00am-5:00pm

June 9, 2022 at 8:00am-5:00pm

The Biomedical and Biodefense Support to the Warfighter track will feature sessions on biodefense preparedness; research & development funding and collaboration to create novel military medical solutions; and human performance.



NC Defense Industry Diversification Initiative (NCDIDI)

The State of North Carolina is home to a diverse military industry, with varied military and defense missions, needs and opportunities.

In a proactive response to changes in federal defense budgets, NCDIDI was created. The intended goal is to help companies maximize their growth potential and cybersecurity resiliency and enhance their strategic development planning and sustainability efforts to see impact beyond NCDIDI the funding period.

This program is funded through a grant awarded by the United States Department of Defense Office of Local Defense Community Cooperation.

NC STATE

Industry Expansion Solutions

Industry Expansion Solutions (IES), the administrator for [NCMEP](#), is the engineering-based, solutions-driven, client-focused extension unit of NC State's College of Engineering. Our broad portfolio and deep industry expertise help organizations grow, innovate and prosper. Our extensive partnerships with business, industry, education and government generate a unique culture of collaboration that provides access to cutting-edge expertise, research and technology.