

- Vision** The global leader in textile innovation: education, research, and service.
- Mission** Through innovative educational practices and multi-disciplinary research activities in textiles, we provide visionary leadership and collaborative services to the university, State and global communities.
- Core Values** Leadership | Innovation | Engagement | Inclusiveness | Respect | Connectedness

Executive Summary

The College of Textiles is internationally recognized as the leading textiles institution. We seek to be:

- the preferred global provider of textile education and innovation
- the global leader in textile public-private partnerships
- recognized as the leading interdisciplinary team of problem solvers
- an excellent place to work, learn and collaborate

We are proud to provide this report, which shows that by almost all measures the 2014/2015 academic year has been a banner one for the College. We are a College on the move. We are proud to serve our stakeholders – especially our students – with consistently impactful education, discovery and innovative programs and service. We're excited by a resurging textile industry in our State and nation, especially national job growth > 4000 in the last 18 months; \$56 billion in US textile shipments, including 2014 US exports > \$18 billion, up 45% from 2009. This is reflected in our College's unprecedented industry engagement with career placement > 90% shortly after graduation and > 60 companies participating in our Textiles Job Fair (the most in 20 years). The College engaged > 160 industry partners and eight government agencies who funded our work with > \$14M in grants and contracts (a record). This is due to The Nonwovens Institute (NWI) with its remarkable growth; our Textile Protection and Comfort Center (TPACC); our Zeis Textile Extension (ZTE); and our stellar faculty and staff. The North Carolina Textile Foundation continues to be a critical partner to the College with its endowment growing > \$3.7M to >\$44M. This growth provides our students with opportunities that impact careers locally and globally and justifies our record student quality and numbers, including our first Fashion and Textile Design cohort. As our data show, we consistently "punch above our weight" because our College community knows what it means to think and do. Furthermore, we are being recognized for our efforts with our educators winning this year's highest faculty awards within the University and UNC System, as well as multiple other prestigious university and national awards.

UNIVERSITY STRATEGIC GOAL 1: ENHANCE THE SUCCESS OF OUR STUDENTS THROUGH EDUCATIONAL INNOVATION

Strategic outcome: *College of Textiles graduates will be internationally renowned as being the highest quality career-ready textile graduates who are the future leaders of the textile enterprise.*

The outlook for our current and future students and our young alumni is brighter than it's been for at least two decades. Our College, with its two strong academic departments (TATM and TECS), extension, centers and institutes, has a long tradition and strong international reputation for preparing leaders for success in industry, academia and civic life. We are especially adept at educating them to advance an increasingly innovative, diverse and rapidly changing global textile industry. Fundamental to our success is the development of graduates that are career-ready, innovative and adaptable future leaders with high integrity, a strong foundation of relevant and interdisciplinary applied technical knowledge, and strong communication and leadership skills. Our two academic departments, in collaboration with the growing and internationally renowned Nonwovens Institute, Zeis Textile Extension Department, and Textile Protection and Comfort Center, are enabling this success. Together, we are preparing our students to improve our world by helping to solve society's grand challenges and creating new knowledge and opportunities by fostering a life-long think and do and service mindset. The 2014/15 year was one of major growth and impact:

Students: Honors, Measures of Quality and Student Activities

- **Quality:** Our 2014 freshman earned the highest average SATs and high school GPAs in our history, with almost 50% in the top 10% of their class. Our quality enhancement is enabled by our > \$650K in annual scholarships to >200 students with tremendous support from the North Carolina Textile Foundation, likely the highest ratio of students receiving merit scholarships across the University.
- **Retention:** We had 96% freshman retention (up 12% from 10 years ago) for our five undergraduate degrees, a result of our dedicated professional advising staff and improved faculty mentoring.
- **Quantity:** We have achieved the highest enrollment in our 116 year history, nearing our 2020 targets with > 1000 enrolled undergraduates, > 200 enrolled graduates, as well as 12 post-doctoral research associates, all with only 56 faculty members. For the first time in our history we have more than 100 enrolled Ph.D. students with the potential for more from increasing industry and government support.

- Career Opportunities: ~90% career placement within three months of graduation; > 50 % of graduates were employed in North Carolina; > 130 students with faculty- and staff-assisted summer internships; and the Textiles Jobs Fair had 61 participating companies (> 1/3 were first time participants).
- Enriching Curricula and Extra-Curricular Experiences: The majority of our students are learning through the enriching experiences of undergraduate research, internships (>120 last year), and study and work abroad programs. The number of our undergraduate students that had an international experience was > 50 % of our total graduating class, adding to the now 30 countries and six continents visited since 2012, as shown below:



Figure 1. Locations of undergraduate students' international experiences since 2012.

- Honors: More than 20 students received significant external research, scholarship, design and other awards, including a NSF Graduate Fellowship. Ten fashion students were invited to the White House to participate in the First Lady's Reach Higher program. Our students were sought after because of our B.S. Fashion program's focus on science and technology as a base for artistic design.
- Dedicated teaching and mentoring: Approximately one third of our faculty are members of the NC State Academy of Outstanding Teachers and 15 faculty received Thank a Teacher recognition.
- Relevant Education Programs: All of our students engage in hands-on education in our model manufacturing facilities managed by our Zeis Textile Extension department, which provided over 3,300 hours of hands-on *pro bono* instruction to the academic departments (c.a. \$330K value). All our curricula incorporate rigorous senior design, team project and studio design programs in strong collaboration with our industry partners, including funding in excess of \$50,000 of industry support.

- Entrepreneurship: More than 10 start-up companies were created by our students and recent alumni (within two years), including Sharon Bui ('13), Fashion and Textile Management, who co-founded a thriving Raleigh-based company that won investment on ABC's "Shark Tank".
- Local and Global Service Learning: Interdisciplinary teams of faculty across the College are mentoring students at all levels in service learning. One of our programs, called Hunar, sees our students helping women in India develop their own apparel businesses. This has inspired some of our industry partners and is likely to become externally funded via corporate giving.

Diversity: Initiatives and Progress: While we need to do much more to increase our diversity in all its forms, our student body is now majority female in both the undergraduate (76%) and graduate (56%) programs. Our growth in female student body is paralleled with our growth in female faculty members, which increased from 31% to 38% of all faculty. We are proud that five of the last seven faculty members are female, including two African American and two Asian faculty hires, as well as one Hispanic male. Under-represented faculty members increased from 19% to 21%. Also, we have hired a new staff member to direct our College diversity programs and increased our diversity programs budget. African American representation on our staff increased by 4%.

Instructional Program Advances: We graduated our first class of Fashion and Textile Design students, the first Bachelor of Science graduates in this discipline in the country. Using our assessment data, we are increasing our graduate student enrollment and self-funded Master's programs. We have added an Accelerated Bachelors-Master's in the TATM department; are increasing our self-funded international 3+X partnerships with leading textile universities (three in China currently and two more under development, in Turkey and Ecuador); are developing with our College partners a Professional Science Master's (PSM) in Forensic Science and an interdisciplinary PhD in Forensic Science; and are developing PSMs in nonwovens and textile protection and comfort. We are increasingly focused on classroom innovation, and have increased our classes that use our new "scale-up" interactive classroom.

UNIVERSITY GOAL 2: ENHANCE SCHOLARSHIP AND RESEARCH BY INVESTING IN FACULTY AND INFRASTRUCTURE

Strategic Outcome: *The College of Textiles is recognized as having the world's best textiles faculty, staff and resources that develop future leaders and supports the global textiles enterprise in education and research, workforce development, and industry service.*

Our faculty and staff hail from five continents and span a diverse research and teaching expertise from textile designers and management to engineers and chemists. With many faculty winning coveted teaching awards, our commitment to teaching and mentoring is as strong as our passion to advance the polymer, fiber, textile, retail and related industries through discovery and creative innovation and knowledge dissemination, as demonstrated by:

Research: Volume of activity and achievements of significance: This year, we won record funding in research and industry technical service contracts and grants of >\$14M with unprecedented diversity of funding from >160 separate companies and eight federal agencies. This constituted an average of >\$271K / faculty member (27% higher than the University average of \$211K / faculty member). This growth has been facilitated substantially by the leadership and infrastructure of the NWI and TPACC, which are institutional models for interdisciplinary research, education and service, and support a growing number of faculty and students across both departments in the College and across the University.

Research and creative scholarship output: In part from the success of the funding above, our faculty and students had an outstanding year in knowledge dissemination: 165 peer-reviewed papers; >150 non-refereed publications / presentations; 1 patent and 10 patent disclosures; and 18 book chapters.

Faculty Honors, Awards and Recognition: Our internationally renowned faculty members have been recognized with major awards for their remarkable innovative impact on our State and globally, including: Dr. Behnam Pourdeyhimi: O. Max Gardner Award, the highest faculty award bestowed by the University system; Dr. Roger Barker, the Alexander Quarles Holladay Medal, the highest faculty award bestowed by the University; Dr. Stephen Michielsen, Alumni Distinguished Research Professor; Dr. Tushar Ghosh, Chancellor's Innovation Fund; Dr. Kate Annett-Hitchcock, Community Engaged Faculty Fellow; Dr. Helmut Hergeth, Outstanding Global Engagement Award; Dr. Genessa Devine, New Faculty Advisor Award at the College and a national award; and Dr. Melissa Pasquinelli, College of Textiles Award for Advising.

Faculty growth and Diversity: With Provost support, we have grown our faculty from 53 to 56 in TECS and TATM, and have additional searches starting. Also, see Goal 1 above.

Knowledge dissemination through hosting conferences: The Zeis Textile Extension department has assisted our strategy of bringing more international awareness to our College and University by organizing two international research conferences with > 200 attendees from around the world.

UNIVERSITY STRATEGIC GOAL 3: ENHANCE INTERDISCIPLINARY SCHOLARSHIP
TO ADDRESS THE GRAND CHALLENGES OF SOCIETY

Strategic outcome: *The College of Textiles is the recognized leader in interdisciplinary scholarship addressing the grand challenges of the textile industry in the state, nation, and the world.*

Our College prides itself in its commitment to interdisciplinary discovery, innovation and service. We have led the establishment and growth of model interdisciplinary departments, centers and institutes, including:

The Nonwovens Institute: The NWI five-year review lauded the program on being a “unique model of a successful and thriving university-industry collaborative”, with a growing membership model of 68 companies (some for more than 20 years) that is used to fund approximately 50 doctoral students, post-doctoral research associates, research professors and staff members, as well as the research of tenure-track and tenured faculty in the College, across the university and externally. NWI has outgrown its space, which has led to the need for a new 100,000 sq. ft. building on Centennial Campus. With strong University support, NWI’s pilot facilities will be occupying 40,000 sq. ft. of the new Center for Technology Innovation. To sustain the on-going growth of the NWI, investment in faculty, staff, and infrastructure is needed, especially for succession planning, to capitalize on the major growth of the nonwovens industry, and as the NWI seeks to establish a new PSM in filtration and separation sciences.

The Textile Protection and Comfort Center: has seen an unprecedented year of growth not only for our students but also the military, firefighters and functional textiles markets, including textiles for medical and sports applications. TPACC won a \$1.5M FEMA award to develop advanced fire blocking materials for wildland firefighters and a \$750K award from DHS to develop emergency responder prototypes; it developed two new graduate level courses in protection and comfort; and the center employs 14 full-time EPA and SPA staff professionals, 14 graduate students, three post-docs and two research assistant professors. Its status as a world-leading center for research and education in protective textiles is essential to the long term strategic goals of the College of Textiles and University with our goal to move toward

Institute status in concert with development of PSM in Human Protection and Comfort. Additional faculty and staff are needed to support TPACC's growth.

The Forensic Sciences Institute: is in the final planning stages with a strong inter-college partnership between COT, CHASS, and CVM. We have two remaining cluster hires to be completed, a PSM in Forensic Science in the final review stage at UNC General Administration, and a proposed Forensic Science PhD at UNC GA as well. We anticipate approval to recruit for the PSM in Fall 2016.

UNIVERSITY STRATEGIC GOAL 4: ENHANCE ORGANIZATIONAL EXCELLENCE BY CREATING A CULTURE OF CONSTANT IMPROVEMENT

Strategic outcome: *The College of Textiles is recognized by the University and our other stakeholders as a model of organizational excellence that engages in constant improvement that benefits all stakeholders.*

Our College is in a period of change that mirrors the rapidly changing and increasingly innovative US textiles industry. Our Information Technology unit is a critical and highly collaborative group that is advancing our technology and providing remarkable IT, general infrastructure and service to our students, faculty and staff with limited resources, supporting our on-campus and growing DE programs. We have:

- increased resource allocation transparency
- invested > \$1 million in academic and research equipment and software upgrades to support our academic and research programs (not including investments made by NWI and TPACC)
- invested in a strategic redesign of our website, communications and increased our marketing budget
- invested in online strategic marketing, including translating our growing online textile fundamentals short courses into Chinese and Urdu with other languages planned.
- invested in improving our college culture, including establishment of a COT Staff Monthly Merit Award; college-wide professional development training; regular College staff-only, faculty-only meetings and all personnel meetings; increased social events; and creation of a lactation room and unisex bathrooms.
- Renovated space for TPACC growth and TATM growth in digital printing.

Administration: Achievements and Staff Changes: We have had three faculty hires (plus two coming in Fall 2015), two positions discontinued due to budget. At the leadership level, we named Dr. Nancy Cassill

Interim Director of TATM; Dr. Jon Rust Interim Director of ZTE; Dr. Peter Hauser Interim Department Head of TECS; and the College is investing in a new Research Proposal Developer position.

UNIVERSITY STRATEGIC GOAL 5: ENHANCE LOCAL AND GLOBAL ENGAGEMENT THROUGH FOCUSED STRATEGIC PARTNERSHIPS

Strategic outcome: *The College of Textiles is recognized throughout the world as the leader in public-private partnerships via engaging students, staff, and faculty in serving the local and global textiles and related industries in addressing challenges critical to society.*

Our advisory boards (TATM: Industry Advisory Board; TECS: Science Advisory Board) are very active.

Major Initiative: We are engaged with >100 of our industry & academic partners in a major initiative to win DOD funding for a Revolutionary Fibers & Textiles Manufacturing Innovation Institute. This demonstrates the government's recognition of the critical importance of textiles to our national security and prosperity.

Extension: Initiative and public service activities: Despite a reduction in staffing, ZTE has had a record year in service to our industry (in addition to serving our students - see above) with gross revenue of > \$1.17M (service agreements up ~23%; lab revenue up 45%; professional training up ~10%). This is > 33% than the ZTE state appropriated allocation with an economic impact of more than \$35 million from the Lean Six Sigma program alone and partnerships with companies that are driving entrepreneurship and economic prosperity in our state and nation.

Fund-Raising Success: The North Carolina Textile Foundation provides critical support for the College with major success this year: >\$3.7M in new support, increasing the endowment to > \$44M (despite the loss of personnel during the year) enabling very strong positioning to support the Capital Campaign.

Recommendations and Concerns for the Future: We are proud of the >100% increase in degrees awarded and 114% increase in SCH in the last ten years. However, our tenure-track faculty have grown only 18%, our EPA staff declined 7% and our SPA staff increased only 10%. We recommend:

- investment in additional faculty and staff, and the retention of star performers to support our continued growth in students, research and service, and to capitalize on our myriad new opportunities.
- seeking support for State matching for our industry-led proposal to establish a FTR Institute for Manufacturing Innovation and continuing to engage our State legislature on the value of investing in our land-grant university, which continues to catalyze economic prosperity for our great State.