

- 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 renowned for being 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 2015/2016 academic year has been one filled with excellence and growth for our College. Our 60 renowned faculty members and 84 dedicated and talented staff members are proud to have served our key stakeholders with impactful education, discovery and innovative programs and service. Some key data include:

- 980 undergraduate students
- 196 enrolled master's and Ph.D. students
- graduation of a record 339 total students in 2015/2016 academic year
  - record 262 undergraduate students
  - record 46 master's students
  - record 31 Ph.D. students
- generation of 21,800 student credit hours (6% increase from five years ago)
- record 2,300 professionals educated throughout the world (on-campus & distance learning)
- investment in new staff and faculty (total 144)
- 60% of tenure-track faculty are female and 100% increase in female full professors this year
- > 180 peer-reviewed papers and juried exhibits
- greater than 190 industry partners, including eight federal agencies
  - research, testing and fabrication services totaling more than \$14 million
- greater than \$1.4 million in endowment and annual giving
- four patents issued, five filed and 18 disclosed
- equipment and building renovations greater than \$1 million over the past year.

Our impact aligns and contributes to the continued resurgence of the textiles industry in our State and nation, with more than 500,000 jobs nationally, greater than \$300 US billion apparel industry and greater than \$50 billion in textiles exports. North Carolina continues to lead the nation in manufacturing of textile yarns and fabrics with billions of dollars of investment in NC and the region in the last two years, in part

due to our College's strong workforce development and engagement activities. This industry strength is reflected in our College's unprecedented industry engagement with career placement approximately 90% three months after graduation and 74 companies participating in our fall 2015 Textiles Career Fair (the most in 30 years). We have invested strategically in growing the diversity and numbers of our faculty and staff and have completed a major renovation of our academic department offices to foster enhanced collaboration as a first phase of master planning of our entire space. We have finalized a major revision of our College Strategic Plan and begun implementation, including investment in hiring new staff positions: a research proposal developer, an instructional designer and a social media specialist. Our funding success is due to The Nonwovens Institute (NWI) with its remarkable growth including increase in approximately 31,000 square feet of pilot manufacturing, laboratory and office space; our Textile Protection and Comfort Center (TPACC); our Zeis Textiles Extension (ZTE); and our renowned faculty and staff. Furthermore, we are being recognized for our efforts with our educators and students winning dozens of prestigious awards. The North Carolina Textile Foundation and our alumni and corporate partners continue to be vital to the College with a combined and growing endowment and annual giving of approximately \$42M with greater than \$1.4 million in new donations. Our activities this year have provided our students with remarkable opportunities that enable fulfilling and happy lives and a high impact on society.

### **University 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 continues to be brighter than it's been for at least two decades. Our College, with its two strong departments (Department of Textile and Apparel, Technology and Management, and Department of Textile Engineering, Chemistry and Science), Zeis Textiles Extension, centers and institutes, has a long tradition and strong international reputation for preparing leaders for success in industry, academia and civic life. 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. One new strategic investment this year with the goal of enhancing these and other career skills follows the donation of more than \$500,000 from our key Burlington, NC partner, ITG, to establish a Student Life Center. Our major growth and impact includes:

## **Students: Honors, Measures of Quality and Student Activities**

- **Quality**: Our 2016 freshman earned one of 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 more than \$750,000 in annual scholarships and fellowships to more than 170 students with tremendous support from the North Carolina Textile Foundation, likely the highest ratio of students within a college receiving merit scholarships across the University. To continue to attract the best students, and with the support of the NC Textile Foundation, our Centennial Scholars stipends was increased to a total of \$87.5K for Distinguished Centennials and \$67.5K for all others.
- **Retention**: We have consistently high first year retention (96% for 2014/15) for our five undergraduate degrees, a result of our dedicated and outstanding advising staff and improved faculty mentoring.
- **Quantity**: We have achieved near record enrollment in our 117 year history, nearing our 2020 targets with 980 undergraduate, greater than 100 master's and 112 Ph.D. students.
- **Career Opportunities**: ~ 90% career placement within three months of graduation; > 50% of graduates were employed in North Carolina; > 140 students with faculty- and staff-assisted summer internships; and the Textiles Career Fair set another record with 74 participating companies.
- **Enriching Curricula and Extra-Curricular Experiences**: The majority of our students are learning through the enriching experiences of undergraduate research, internships, 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 visited in recent years.
- **Honors**: More than 70 students received significant research, scholarship, and design awards.
- **Dedicated Teaching and mentoring**: We are so proud that Dr. Jeff Joines received the 2016 Board of Governor's Award for Excellence in Teaching, a very well deserved accomplishment. Also, Drs. Melissa Pasquinelli and Xiangwu Zhang received the NC State College of Engineering Faculty Mentoring Award. Approximately one third of our faculty are members of the NC State Academy of Outstanding Teachers and more than 20 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 4,000 hours of hands-on *pro bono* instruction to the academic departments (c.a. \$400K value to the

academic departments). 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 \$192,000 of industry support.

- Entrepreneurship: More than 12 start-up companies were created by our students and recent alumni, including Sharon Bui ('13), Fashion and Textile Management, who co-founded a thriving Raleigh company that won investment on ABC's "Shark Tank" with follow-up TV appearances.
- 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 Revolution, engages > 30 students and faculty from both departments in helping women in India develop their own apparel businesses. This has inspired some of our industry partners and has received growing philanthropic corporate support (> \$80,000).

**Diversity: Initiatives and Progress**: While we need to do much more to increase our diversity in all its forms, our student body is majority female in both the undergraduate (75%) and graduate (53%) programs. Our underrepresented student population was 20% of the student body, a ten percent increase from five years ago. Our growth in female student body is paralleled with our growth in female faculty members, which increased from 35% to 40% since July 2014. There has been a 33% increase in T/TT female faculty over the last five years. We are proud that seven of the last eight tenure-track faculty member hires have been female and for the first time a female is serving as Associate Dean. Over the last five years, underrepresented faculty members increased from 13.3% to 16%.

**Instructional Program Advances**: We have strategically increased our graduate student enrollment and increased our self-funded Accelerated Bachelor's Master's and "3+X" international BS/MS programs. These two programs constitute 40% of all Master's, approximately double from five years ago. We have increased our international partnerships, including adding a new 3+X partnership with Istanbul Technical University (the first outside China where we have three) and programs in Ecuador and India are in planning. To support our international engagement, we have formal partnerships for study abroad programs with Hong Kong Polytechnic and Donghua University. We are developing with our College partners a Professional Science Master's (PSM) and Ph.D. in Forensic Science and are developing PSMs in filtration (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.

The TE program faculty is one of the pilot programs for vertically integrating creative and critical thinking throughout the curriculum.

## **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 the majority being generated by the Nonwovens Institute. Our faculty and staff have achieved unprecedented diversity of funding from >190 separate companies and eight federal agencies. 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, across the University and with University partners.

**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: >130 peer-reviewed papers and juried exhibits; >190 non-refereed publications / presentations (88 international); four patents issued, five filed and 18 patent disclosed; and 12 books written, edited or chapters written.

**Faculty Honors, Awards and Recognition:** Our internationally renowned faculty members have been recognized with many major awards for their remarkable impact on our State and globally, including: Dr. Jeff Joines received the 2016 Board of Governor's Award for Excellence in Teaching, the highest teaching award in the UNC system; Dr. Philip Bradford won the national Air Force Office of Scientific Research Young Investigator Program Award, a first for our College; Dr. Helmut Hergeth received the Outstanding

Global Engagement Award; Dr. Russell Gorga received the NC State Alumni Association Outstanding Teacher Award. Dr. Xiangwu Zhang and Dr. Stephen Michielsen received the NC State Alumni Distinguished Graduate Professor Award.

**Faculty growth and Diversity:** With Provost support, we have grown our faculty to 60 tenure tenure-track and non-tenured faculty and plan to add two more positions in FY17. Also, see Goal 1 above.

### **University 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:** With remarkable research and technical service growth, resulting in greater than \$10 million in external support, the internationally renowned NWI grew its membership to more than 70 companies (some for more than 20 years) and funds 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. The NWI has outgrown its space, and the 100,000 sq. ft. Center for Technology Innovation is due for completion in 2016, with NWI's pilot facilities occupying 31,000 sq. ft. to house a new pilot production facility, analytical laboratory and offices. To sustain the on-going growth of the NWI, investment in faculty, staff, and infrastructure is needed, including 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:** T-PACC is the most renowned academic center for research and education in personal protection in the world, providing leading-edge education, research and service to the industry and to the military, firefighter and emergency responder communities. In the past year, T-PACC's substantial impact includes:

- Sixteen major federal and industry supported research projects generating \$1,836,181.
- Sustained growth in its service programs with greater than \$1.1M in Testing and Service Agreements.

- Supported 14 full-time EHRA and SHRA staff professionals (adding a new Research Assistant Professor and two new Research Assistants to T-PACC staff).
- Supported 11 graduate students in Masters and PhD programs in FPS and TTM.
- Developed and delivered innovative instruction in courses on textile protection and comfort.
- Funded more than \$350K in major upgrades to laboratory research infrastructure

T-PACC's 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 a PSM in Human Protection and Comfort.

**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 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 Information Technology unit is a critical and highly collaborative group that is providing IT, general infrastructure and service to our students, faculty and staff with limited resources, as well as supporting our on-campus and growing DE programs. To support our goals of raising non-state revenues, strengthening our global brand and improving our environment, we have:

- invested in new staff including: a research proposal developer (the first in our College; Mr. Mark Dutton), an instructional developer (Mr. Andrew Click), a Director of Development (Mr. Michael Ward) and two lean six sigma extension specialists (Ms. Tonda MacLeod and Mr. Jeff Blessinger.)
- invested > \$1 million in academic, research and administrative infrastructure and software upgrades to support our academic and research programs (not including investments made by NWI and TPACC)
- completely renovated our academic department offices to maximize collaboration across departments.
- received approximately \$750K in donated state-of-the-art equipment in knitting and other areas.
- established a Capital Campaign Committee to drive our aggressive fund-raising goals.

- completed a strategic redesign of our website and increased our marketing budget.
- invested in strategic online marketing, in partnership with DELTA and other groups.
- invested in improving our college culture, including a college staff and faculty field trip to state-of-the-art design and production facilities at Glen Raven, Inc, in Burlington, NC; enabled college-wide professional development training; regular College staff-only, faculty-only meetings and all personnel meetings; increased social events; and establishment of two gender neutral bathrooms.
- renovated space for growth in TPACC, digital printing (TATM), and the ZTE Knitting Laboratory.

**Administration: Achievements and Staff Changes:** In addition to the staff investments listed above, three faculty joined the College. At the leadership level, Dr. Nancy Cassill was appointed Associate Dean for Academic Programs, the first female Associate Dean in the College's history, and Dr. Trevor Little became Interim Head of TATM. Mr. Mark Fischer was appointed Interim Executive Director of the NCTF.

#### **University 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.*

**Extension: Initiative and public service activities:** Despite major changes in staffing, ZTE has achieved yet another record year in service to our industry (in addition to serving our students with over 4000 hours of *pro bono* support to education and research and funding for three PhD and two master's students) with gross revenue of > \$1.23M (and TexLab revenue up 65%). This is > 28% than the ZTE state appropriated allocation with an economic impact of more than \$13 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: >\$1.4M in new support and an endowment approximately \$42M (despite the loss of personnel during the year) enabling very strong positioning to support the Capital Campaign.

**Recommendations and Concerns for the Future:** While we are proud of the greater than 100% increase in degrees awarded and greater than 100% increase in SCH in the last ten years, our faculty numbers have not grown to keep pace. Investment is needed 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.