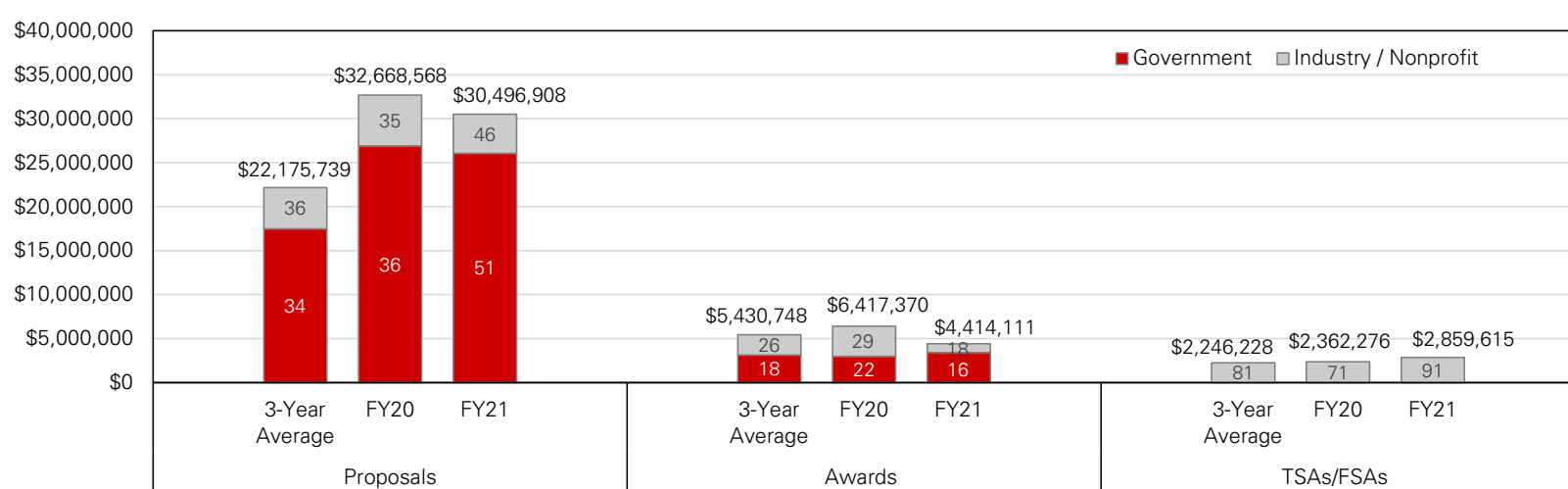


The research programs in the Wilson College of Textiles at NC State University are innovative, life-saving, creative, global and thriving. The college also provides tech service to all stakeholders and supports the economic development of the State and beyond. This newsletter gives a brief overview on the research and tech service activities of the faculty, staff and students during the fourth quarter of Fiscal Year 2021.

## FY21 vs. FY20 vs. Three-Year Average (Q1 - Q4)



## NUMBERS TO DATE (FY21 Q4)

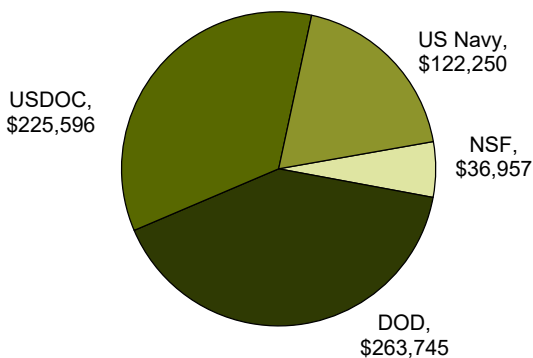
### Research Awards Received (\$684,928)

- Federal: \$648,548 | DHHS, NIH, NSF, US Army, USDA, USDOC
- Industry/Non-Profit: \$36,380 | Australian Wool Innovation Limited, Inha University, Patagonia

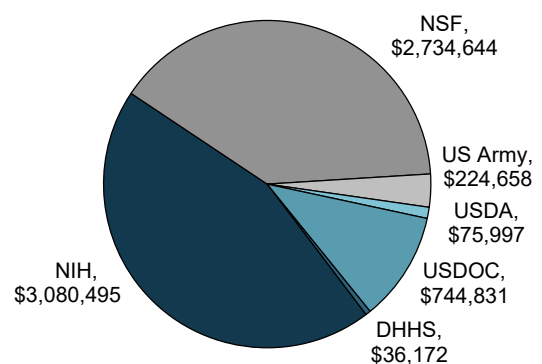
### Research Proposals Submitted (\$8,322,663)

- Federal: \$6,896,797 | NSF, DOD, USDOC, US Navy
- Industry/Non-Profit: \$1,425,866 | Aja Labs Inc., Australian Wool Innovation Limited, Burroughs Wellcome Fund, Cotton Inc., Eastman Chemical Company, FRPD, Kaneka America's Holding Inc., LG Chem, Manchester Mills, NC Sea Grant, Patagonia, RISF, UES Inc., United Soybean Board

**FY21 Q4 Federal Awards by Agency**



**FY21 Q4 Federal Proposals by Agency**



## NUMBERS TO DATE (FY21 Q4) Cont.

### Inter-college Research Proposals (8)

- Wilson College share: \$5,609,335
- With CED, CNR, COE, COS

### Inter-college Research Awards (3)

- Wilson College share: \$129,207
- With CED CNR, COE, COS, The Graduate School

### Inter-department/unit Research Proposals (5) \$1,307,463

### Graduate Student Support

- 66 Ph.D. Student RAs (Avg Stipend: \$16,096 / year)
- 18 M.S. Student RAs (Avg Stipend: \$13,333 / year)

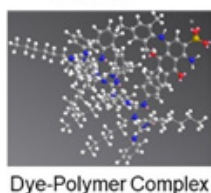
## RESEARCH AWARDS ABOVE \$50,000 (FY21 Q4)

1. Philip Bradford, Kara Jo Peters, US Navy-Office of Naval Research, \$92,250.
2. Nelson Vinueza Benitez, National Institute of Standards & Technology, \$225,596.
3. Emiel Den Hartog, TDA Research, Inc. (US Dept. of Defense (DOD)), \$259,745.

## RESEARCH HIGHLIGHTS

The Faculty Research and Professional Development (FRPD) program is a funding partnership between the Office of Research, Innovation and Economic Development (ORIED) and the 10 academic colleges. The program was established to assist faculty in initiating research and professional development activities. The primary objective of this program is to provide individual investigators seed funding to pursue larger awards and grants from outside agencies. The following three projects (\$8,000 each) were selected for funding in FY 2022.

**Cleaner Production of Woven Textiles via a Size-free Approach (Rong Yin).** For weaving, warp single yarns have always been temporarily sized to achieve efficient weaving. However, both warp sizing and subsequent fabric desizing add no value to the final fabrics but consume a lot of expensive chemicals, energy, and water, and generate a large amount of wastewater that must undergo an expensive treatment for its safe discharge. To achieve size-free weaving, Dr. Yin is collaborating with Dr. Andre West to develop an advanced spinning technology to substantially improve the yarn performance. Inspired by the plant roots that have several primary branches and multiple secondary branches which hold soil firmly under the ground, a yarn with such hierarchical structure should be able to have excellent fiber security and fiber-to-fiber cohesion that can withstand the high abrasion during weaving. This innovative idea, once successful, will contribute to shortening the conventional production process of transforming staple fibers into woven fabrics, reducing the cost of production, and improving environmental protection.



**Efficient Removal of Textile Dyes from Wastewater (Januka Budhathoki-Uprety).** Dyes enhance aesthetics and add commercial values to textile products. However, about one million tons of textile dyes are annually lost to the effluents during dyeing and finishing operations. Most of these dyes escape wastewater treatment process, reach to the environment, and persist for longer period. Presence of dyes in water sources contaminate essential drinking water sources, impair aquatic ecosystem, enter, and climb up food chain. The impact in aquatic ecosystem includes decrease in light penetration through water which directly affects the photosynthesis of aquatic plants, altering CO<sub>2</sub> fixation, and causing oxygen deficiency. Besides, many of those dyes such as azo dyes have been found to cause toxicity, mutagenicity, and carcinogenicity among other adverse health effects. Dr. Budhathoki-Uprety is developing polymers that can efficiently remove textile dyes from aqueous system. These polymers will have potential for recycling to minimize waste and create a sustainable solution to this lasting environmental problem.