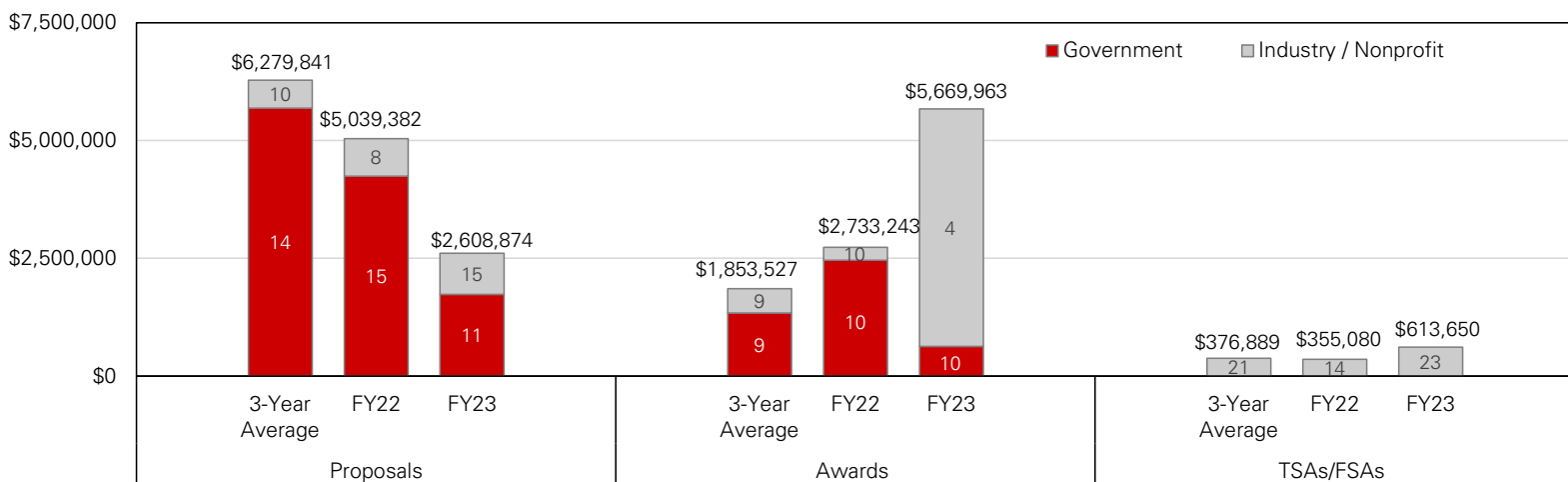


The research programs in the Wilson College of Textiles at NC State University are innovative, life-saving, creative, global and thriving. The college also provides tech service to all stakeholders and supports the economic development of the State and beyond. This newsletter gives a brief overview on the research and tech service activities of the faculty, staff and students during the first quarter of Fiscal Year 2023.

FY23 vs. FY22 vs. Three-Year Average (Q1)

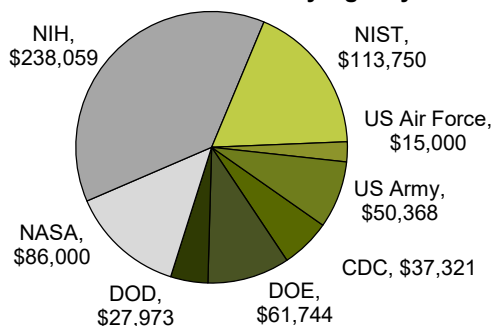


NUMBERS TO DATE (FY23 Q1)

Research Awards Received (\$5,669,963)

- Federal: \$630,215 | CDC, DOE, DOD, NASA, NIH, NIST, US Air Force, US Army
- Industry/Nonprofit: \$5,039,748 | Duke University, Novo Nordisk Foundation, Small World LLC, R5 Labs

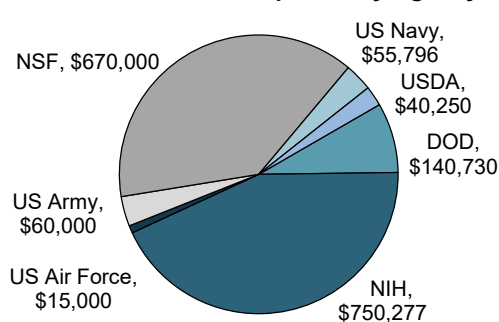
FY23 Q1 Federal Awards by Agency



Research Proposals Submitted (\$2,608,874)

- Federal: \$1,732,053 | DOD, NIH, NSF, US Air Force, US Army, US Navy, USDA
- Industry/Nonprofit: \$876,821 | Academy of Finland, Aja Labs, American Heart Association, Celularity, Cotton Inc., Duke University, Duke/NC State Translational Research Grant, Edwards Lifesciences Corporation, Google, Small World LLC, Henkel Corporation, Under Armour

FY23 Q1 Federal Proposals by Agency



NUMBERS TO DATE (FY23 Q1) Cont.

Inter-college Research Proposals (2)

- Wilson College share: \$541,657
- With COS, CVM

Inter-college Research Awards (3)

- Wilson College share: \$4,888,585
- With CALS, COE, COS

Inter-department/unit Research Proposals (3) \$313,692

Graduate Student Support

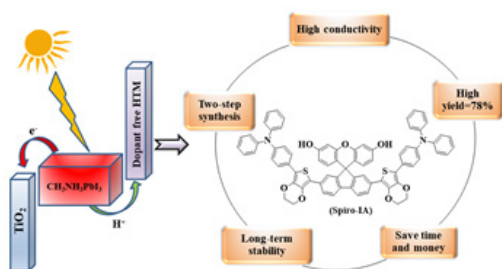
- 64 Ph.D. Student RAs (Avg Stipend: \$18,807 / year)
- 12 M.S. Student RAs (Avg Stipend: \$14,500 / year)

RESEARCH AWARDS AT OR ABOVE \$50,000 (FY23 Q1)

1. Sonja Salmon, Igor Bolotnov, Douglas Call, Nathan Crook, Amy Grunden, Fanxing Li, Flora Meilleur, William Sagues, Yaroslava Yingling, Novo Nordisk Foundation, \$4,749,587.
2. Ericka Ford, R5 Labs, \$258,536.
3. Nelson Vinueza Benitez, Denis Fourches, University of California - San Francisco (NIH), \$138,998.
4. Andre West, Cassandra Kwon, AFROA (NIST), \$113,750.
5. Yang Zhang, University of Miami (NIH), \$99,061.
6. Wei Gao, Paragon Space Development Corporation (NASA), \$86,000.
7. Sonja Salmon, National Renewable Energy Laboratory (DOE), \$61,744.
8. Ericka Ford, Technology Holding, LLC (US Army), \$50,368.

RESEARCH HIGHLIGHTS

Highly conductive yarns open promising future for advanced functional textiles, but textile industry has been struggling with its processability. Dr. Minyoung Suh and her team evaluate the sewability of conductive yarns for engineered manufacturing of sewn and embroidered e-textiles. Numerous commercial conductive yarns were investigated under diverse sewing conditions and their sewability was evaluated from multiple sewability issues: bird-nesting, loose stitches, uneven stitches, etc. Sewability models developed by machine learning enable predictions on unknown yarn sewability and suggestions of optimal sewing conditions for best performance.



Perovskite solar cells (PSCs) are thin-film devices that harvest and convert solar energy into electricity. PSCs are a promising candidate for replacing silicon-based solar cells because of their simpler manufacturing process and lower cost. One of the major challenges that limit their commercialization is the instability of their components in air, at high temperature and the high cost of the hole transporting material (HTM) benchmark Spiro-OMeTAD. Professor Ahmed El-Shafei's group is working on the development of efficient, photostable and thermally stable HTM for efficient and more stable PSCs to overcome the high cost and time-consuming synthesis of Spiro-OMeTAD, which limit their commercial application on a large-scale. Recently, they developed a promising HTM, coded Spiro-IA, that outperformed the benchmark dopant-free Spiro-OMeTAD in terms of power conversion efficiency (PCE), cost, long-term stability and conductivity. This new development can potentially lead to a new generation of dopant-free HTMs with the primary objective of exceeding PCE of 28% while achieving high photostability and thermal stability.