



NC STATE

THINK AND DO
THE EXTRAORDINARY

Administrative Leadership Meeting

Randy Woodson
Chancellor

Tuesday, November 15, 2022

Upcoming ALMs

January 17

Athletics Update

Titmus

March 14

TBD

Titmus

Faculty and Staff Success

- Governor's Award for Excellence
- APLU's Innovation and Economic Prosperity Award – Place Category



Source Image 1: [Governor's Awards for Excellence](#)

Source Image 2: [Innovation & Economic Prosperity Universities, APLU](#)



Commencement Update

- NC State's fall Commencement will be held on Saturday, December 17.
- Dr. Chavonda Jacobs-Young will be the Commencement Speaker.

Questions





**NC STATE
UNIVERSITY**

**Office of Research
Commercialization**

Advancing Research Innovations to the Marketplace & Solving Complex Problems

Wade Fulghum

Assistant Vice Chancellor Research Commercialization
Managing Director, Co-founder, Wolfpack Investor Network (WIN)
PI, NSF I-Corps Hub for NC State



NC STATE
UNIVERSITY

**Office of Research
Commercialization**



who are we?

2018 - Present

NC STATE
UNIVERSITY

**Office of Research
Commercialization**

2013 - 2018

NC STATE

**OFFICE OF TECHNOLOGY COMMERCIALIZATION
& NEW VENTURES**

1984 - 2013

**TECHNOLOGY
TRANSFER**

WIN

**WOLFPACK
INVESTOR
NETWORK**



**NSF I-CORPS HUB
MID-ATLANTIC REGION**

Ask the Pack

1924 progress

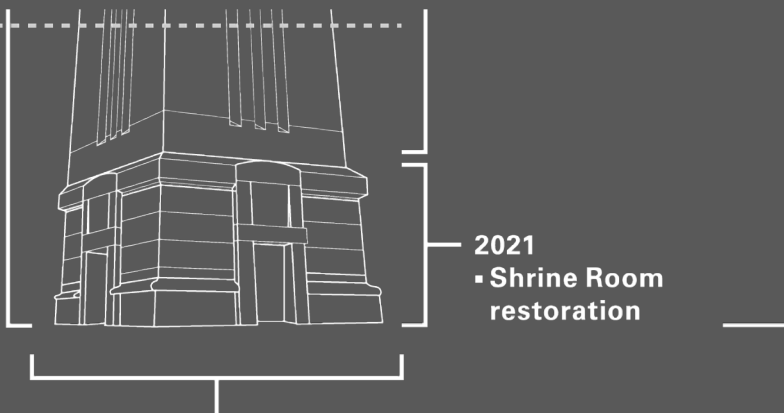
Shrine Room
entrance

2021

▪ New universally accessible plinth

2021

▪ Shrine Room
restoration





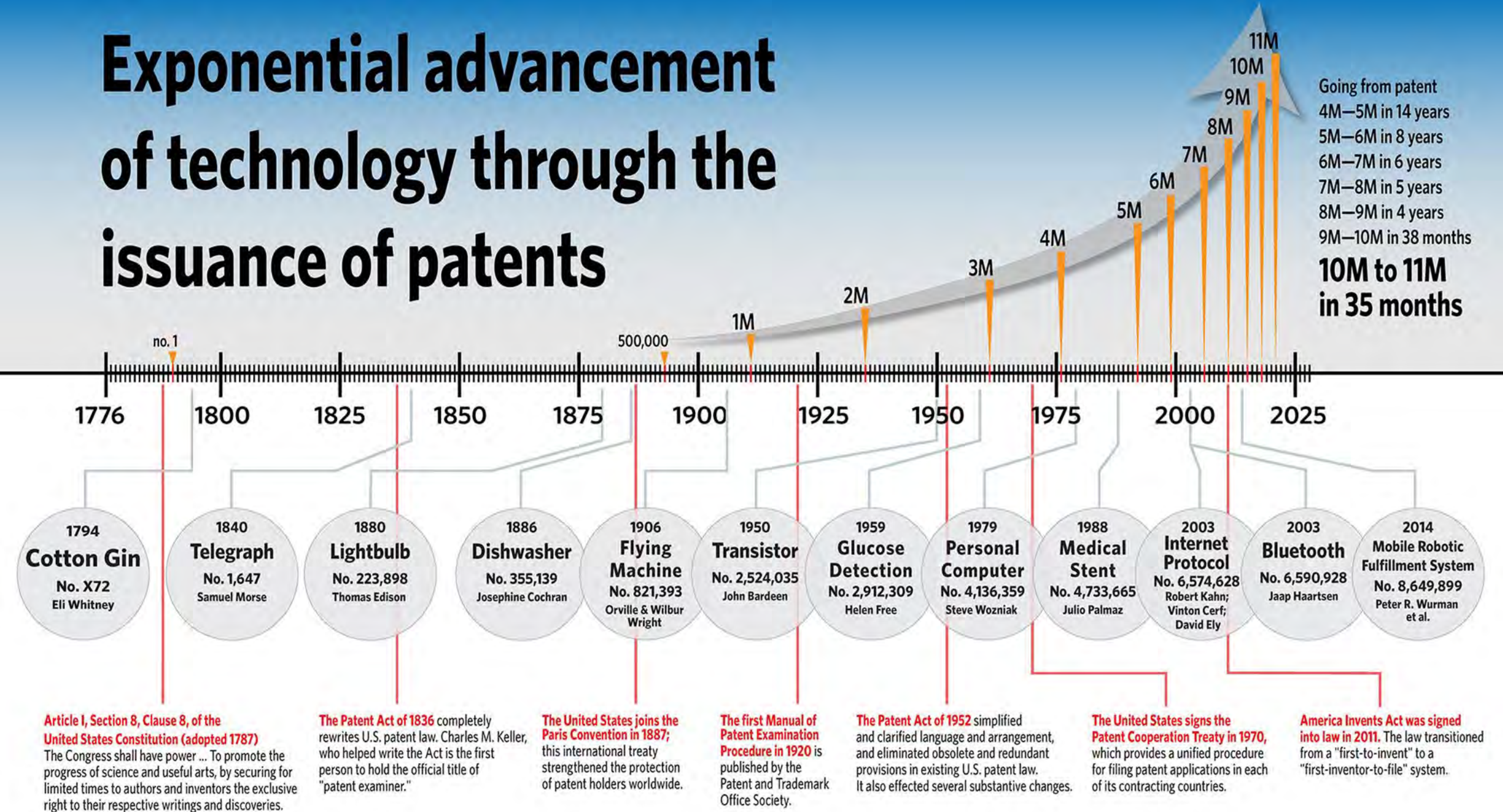
Bayh-Dole Act

(Why do universities patent?)

- Bayh Dole Act was passed in 1980
- Allows universities to take ownership of inventions made by their researchers using federal funds.

- **Actively promote and attempt to commercialize the invention.**
- **Give preference to US businesses and small businesses.**
- **Provide financial incentives to inventors with the goal to encourage innovation.**
- **Use remaining income for research and education.**

Exponential advancement of technology through the issuance of patents



Driving the Innovation Economy

Academic Technology Transfer In Numbers

From 1996 to 2017, up to...

\$1.7 trillion

contributed to
U.S. gross
industrial
output



\$865 billion

contributed to
U.S. gross
domestic
product



5.9 million

jobs supported



480,000+

inventions disclosed...

117,000+

U.S. patents issued...



to research institutions since 1996

15,000+

startups formed



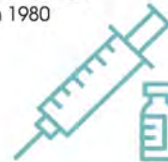
68%

of university
licenses are to
startups and
small companies



200+

drugs and vaccines
developed through
public-private partnerships
since Bayh-Dole Act
enacted in 1980



For more information visit
www.autm.net

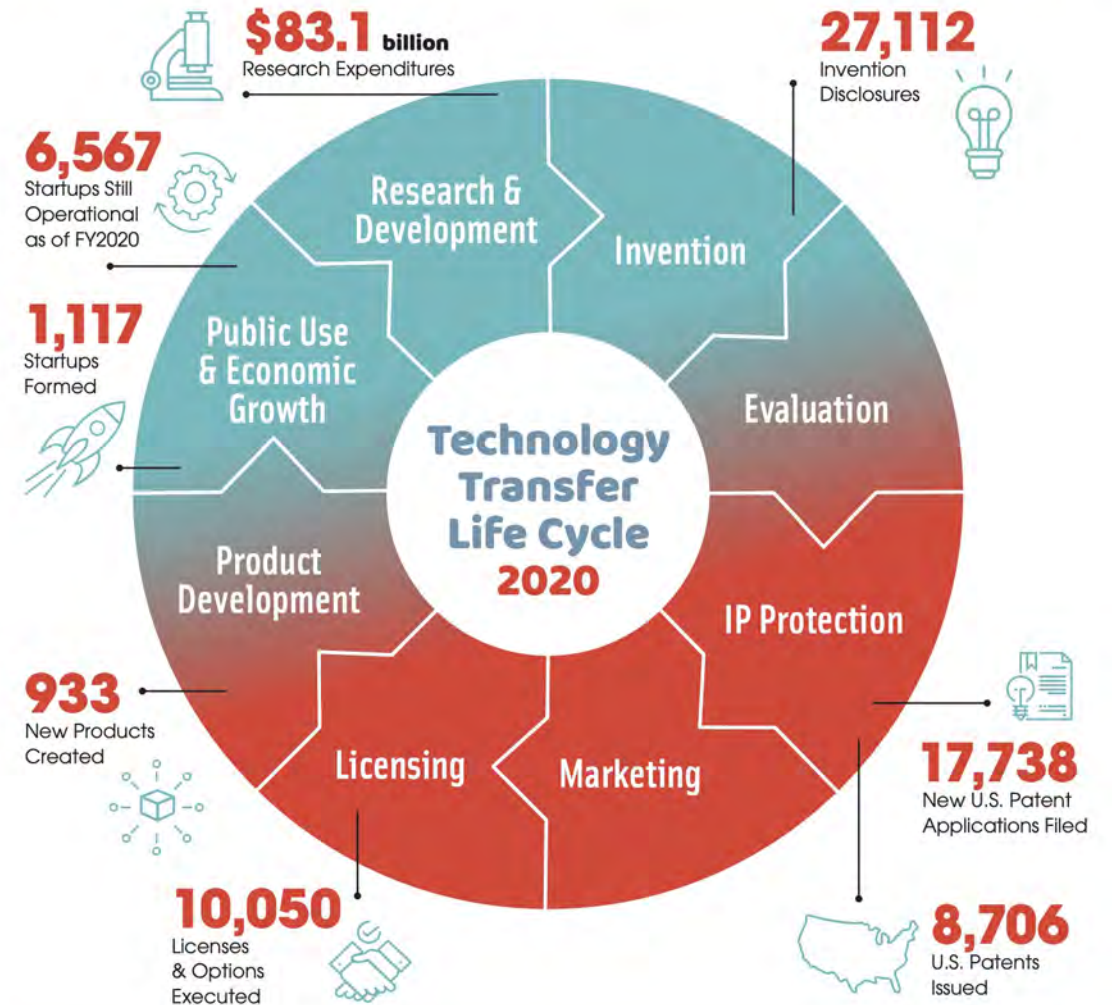
This information was compiled from AUTM and the Biotechnology Innovation Organization: The Economic Contribution of University/Nonprofit Inventions in the United States: 1996-2017; June 2019 as well as the AUTM 2020 Licensing Activity Survey and Statistics Access for Technology Transfer Database, www.autm.net/STATT, and the Academic Patent Licensing Helps Drive the U.S. Economy, IPWatchdog.com, June 20, 2017.

2020 Survey
Sponsored by



Benefiting Society and the Economy

Academic Technology Transfer For 2020



For more information visit
www.autm.net

Every year university research yields discoveries with commercial potential.

Technology transfer professionals associated with universities and other academic institutions manage the complex process of shepherding ideas from the lab to the marketplace – from evaluating and protecting discoveries to commercializing the inventions through new and existing companies.



NIHF and NAI

*NC State has **6 inductees** into the National Inventors Hall of Fame*



**Sylvia
Blankenship**

1-MCP for Fruit,
Vegetable and
Flower Freshness



**Donald
Bitzer**

Plasma Display



**Frances
Ligler**

Portable
Optical
Biosensors



**Bantval
Jayant Baliga**

Insulated Gate
Bipolar
Transistor



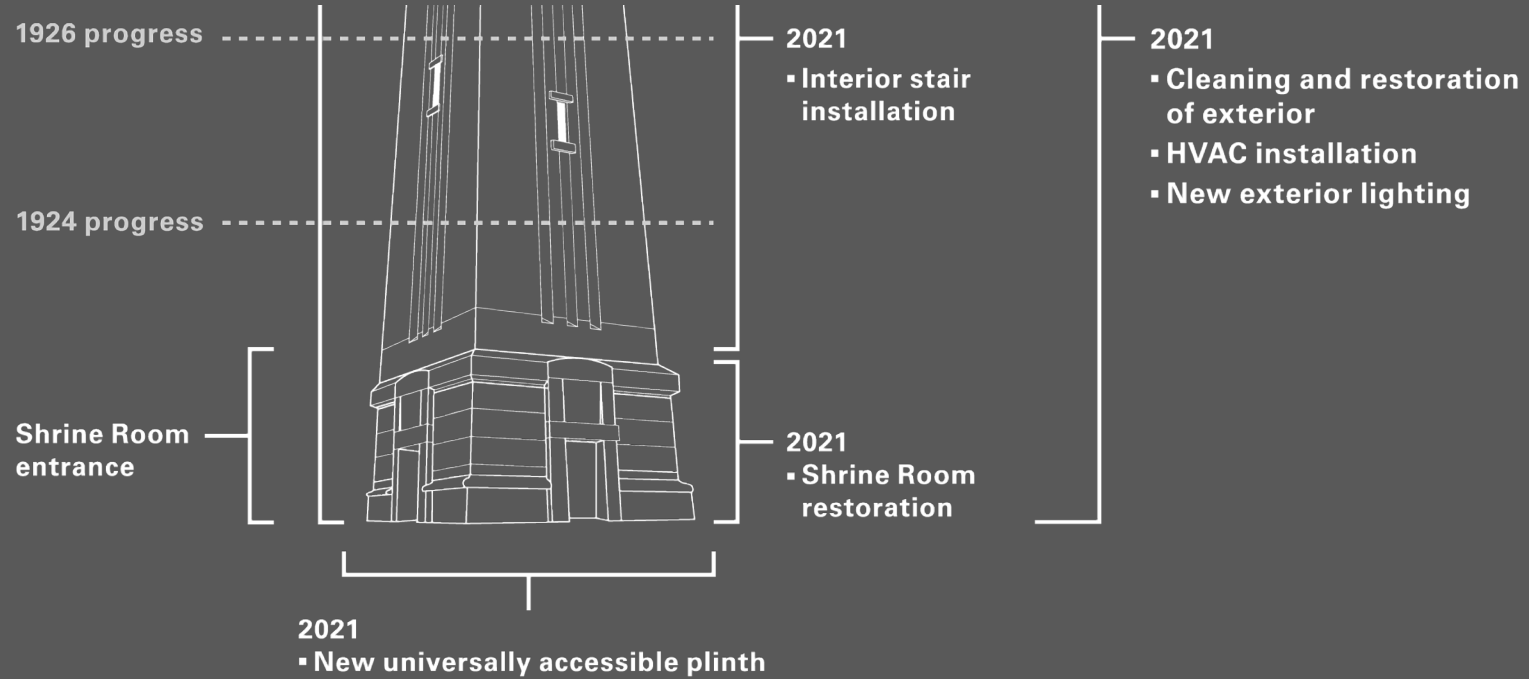
Edward Sisler

1-MCP for Fruit,
Vegetable and
Flower Freshness



**Peter
Wurman**

Mobile Robotic
Material
Handling for
Order
Fulfillment



Track Record of Success



Powering More. Consuming Less.™



Advancing the future of freshness



Smart teaching. Inspired learning.

Cree/Wolfspeed

Leading Semiconductor &
LED producer

Agrofresh

Extending produce shelf
life – \$164M in sales

Webassign


Leading provider of online
instructional tools

VISION



Office of Research Commercialization

- Protecting and promoting university research discoveries and intellectual property
- Engaging and guiding industry partners
- Boosting the acceleration of startups
- Solving complex problems



Driving **economic growth** by facilitating the **commercialization** of **research discoveries**

Technology Transfer Process at NC State



- Reviewing Invention Disclosures
- Research Compliance
- Technology Evaluation
- Patentability Assessment and Coordinating/Manage Patent Filings
- Negotiating and Drafting Agreement (Confidentiality Agreements, Material Transfer Agreements, Inter-institutional/Joint IP Agreements, Option Agreements, License Term Sheets & License Agreements)
- Managing Existing Licenses
- Evaluating Potential Start-Up Opportunities

- Cost to obtain a US patent application: \$15K – \$50 K
- Cost to obtain foreign patent protection: \$100 K+
- **The potential market size and future royalty returns to the university must be large enough to justify the expenditure and risk.**
 - Ex. If the market size is \$100 K of sales per year, assuming a 3% royalty to the patent owner...\$3K/year in royalties. This will likely not cover patent costs!
 - However if it is an exclusive license and the licensee is willing to cover patent costs separately, then the opportunity might be worth it!
- **And remember...not every technology needs to be patented in order to be licensed (plants/software/tangible property/copyright/know-how).**

POL 10.00.01 - Patent and Tangible Research Policy

1. PREAMBLE

1.3 It is in the public interest for the University, when appropriate, to secure intellectual property protection for the products of its research to facilitate commercialization, to encourage entrepreneurship, to contribute to the professional development of University inventors, and to enhance the educational opportunities of participating students.

4. OWNERSHIP

4.1 University Ownership. All INVENTIONS arising from (1) research conducted with University-administered funds, (2) work within the INVENTOR'S SCOPE OF EMPLOYMENT, or (3) the SUBSTANTIAL USE OF UNIVERSITY RESOURCES are owned by the University.

The background of the slide features a dark blue globe with a network of glowing orange and yellow lines and dots, suggesting global connectivity and innovation. The text is centered within a white rectangular border.

ORC VALUE PROPOSITION

Our IP & commercialization expertise accelerates university inventions into the marketplace through unparalleled support and guidance, increasing the impact of university research & innovation on a global scale.

Ecosystem Partners



POWERFUL PROGRAMS

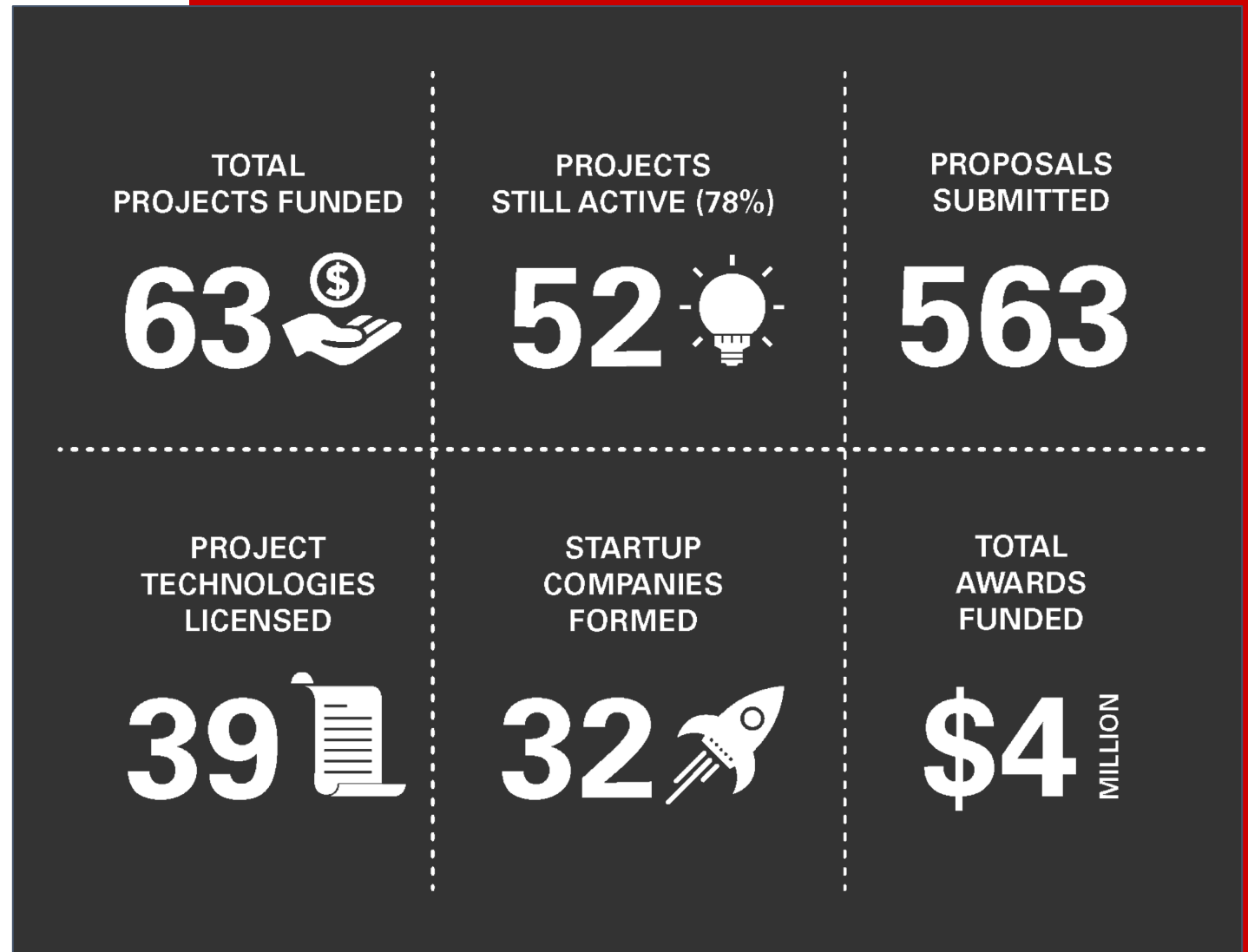


**NC STATE
UNIVERSITY**

McKimmon Conference &
Training Center

Chancellor's Innovation Fund (CIF)

- \$5M fund launched in 2010
- Supporting early-stage, industry-relevant projects



19:1 ROI

\$74.9M in follow-on funding

\$2.5M in licensing revenue

Chancellor's Innovation Fund Awards Support to Six Promising Projects

This year's awardees are researching a better way to make EKGs wireless, a novel coating to simultaneously prevent and remove ice, faster COVID-19 antibody tests, and a number of other discoveries with the potential to revolutionize human healthcare.

September 1, 2022 | [Matt Simpson](#)

Greater Protection Against Lethal Toxins



An All-in-One 'Icephobic' Coating



Stronger Antibiotics to Battle Biofilm- related Infections



Better Bluetooth EKGs



Daugherty Endowment

- To date \$518,847 has been invested (2008 – 2022)
- 45 companies and 2 research projects have received support
- Funded companies have gone on to raise \$65,576,706 combined in follow-on funding





NC State Startup Support

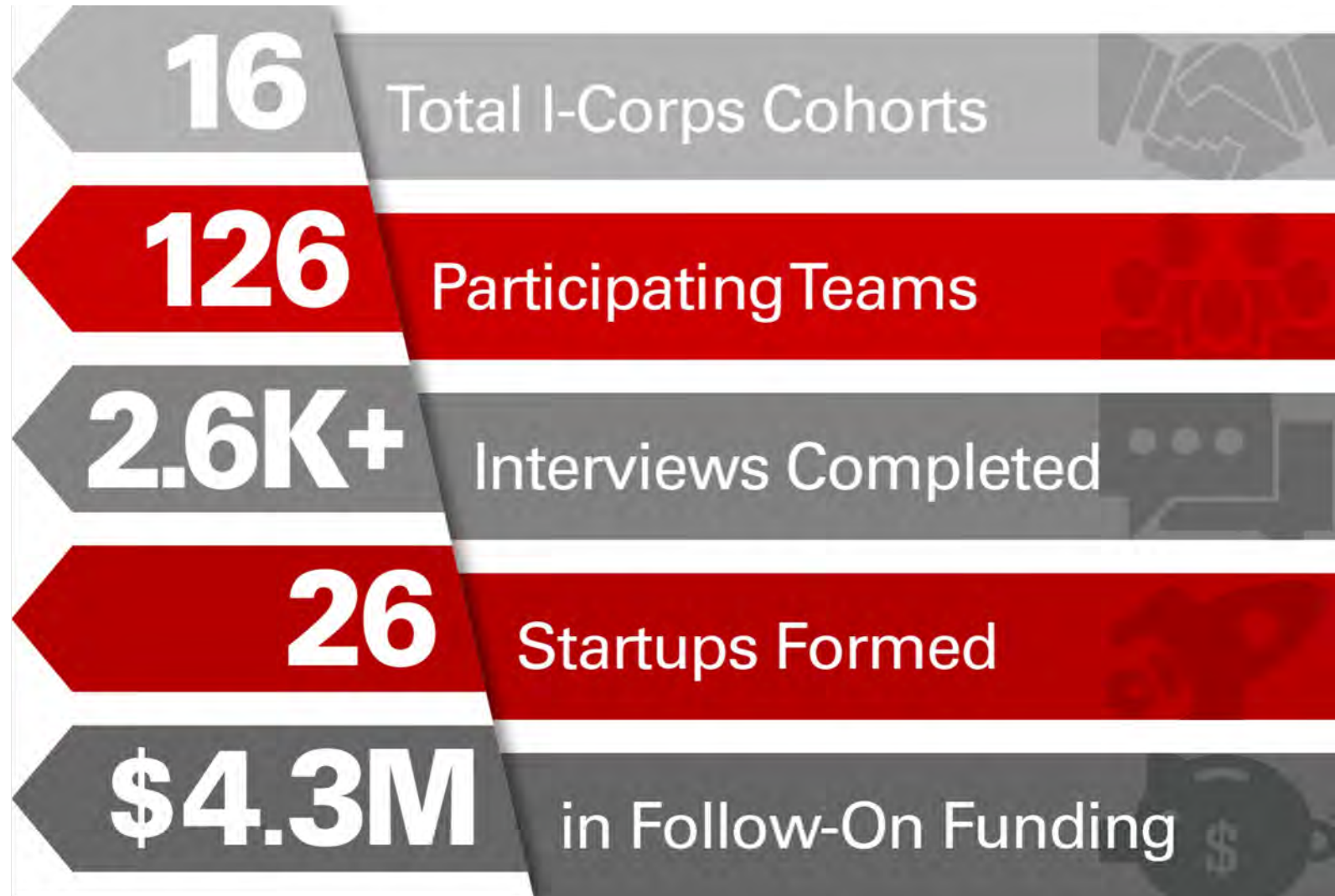
Providing early-stage
companies with free
services to boost their
growth

- 1** Discounted Incorporation
- 2** Logo & Website Design
- 3** Access to Shared Office Space
- 4** Mentorship Network
- 5** Grant Writing Assistance

National Science Foundation

NC State I-Corps Program

- Launched in 2017
- Entrepreneurial training for faculty & students



CORPS
NSF Innovation Corps

Mid-Atlantic I-Corps Hub

NSF I-CORPS HUB: MID-ATLANTIC



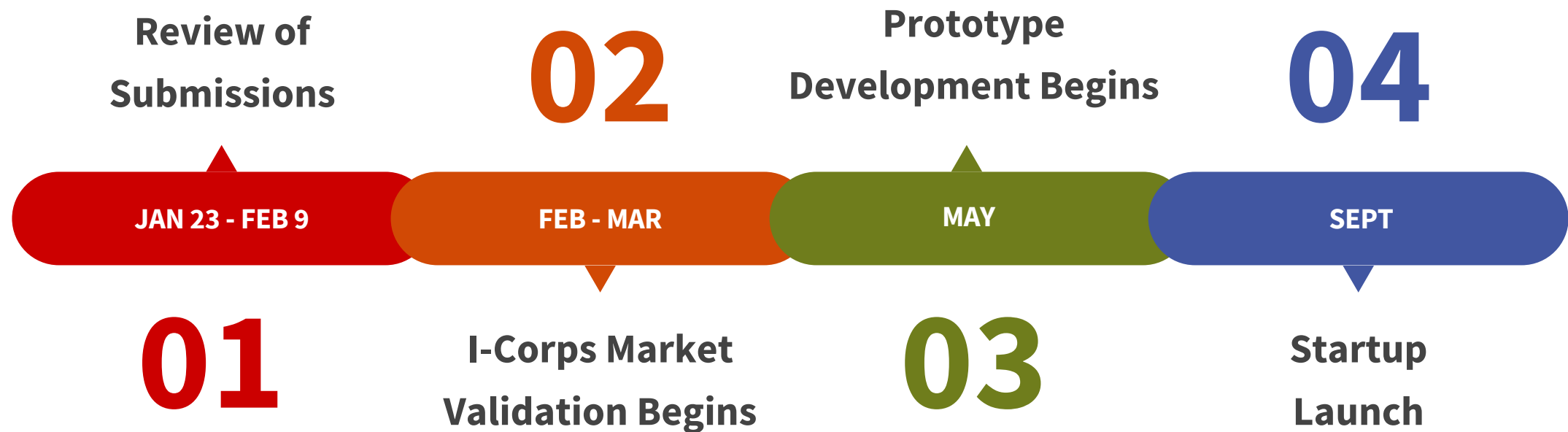
\$15M initiative to create a **diverse, inclusive innovation ecosystem** in the United States



A photograph of two people, a man and a woman, sitting at a desk in an office. The man, on the left, has long brown hair and glasses, wearing a dark blue sweater. The woman, on the right, has dark hair and is wearing a red blazer over a light blue shirt. They are both looking at a laptop screen. There are two laptops on the desk, one in front of each person. A clear plastic water bottle is on the desk to the right. The background shows office furniture and a window. The text "IMPACTFUL INITIATIVES" is overlaid in large white letters.

IMPACTFUL INITIATIVES

Sweat Equity Challenge



From **Idea to Startup Launch** in just **9 Months!**

SBIR/STTR

Spark Plug

- Funds for federal grant writing assistance
- \$138K awarded to 18 startups





WOLFPACK INVESTOR NETWORK



PRIVATE NETWORK

A private early stage investing network.



PROFESSIONAL MANAGEMENT

Managed by dedicated and experienced investment professionals.



CURATED OPPORTUNITIES

A credible source of curated investment opportunities.



COLLABORATIVE NETWORK

An opportunity to collaborate and network with other like-minded alumni, parents, and friends interested in early stage investing.



COLLABORATIVE PROCESS

Opportunity to network and learn from seasoned investors.



WOLFPACK PROUD

An opportunity to help fellow NC State alumni grow companies with capital and support.



GAME CHANGING TECHNOLOGIES

A chance to invest in startups focusing on game-changing technologies.



LEGACY OPPORTUNITIES

An opportunity to increase your legacy relative to NC State.



NEXT CENTURY
• SPIRITS •

Next Century Spirits is a vodka, rum and whiskey distillery using advanced technology to specialize in creating premium, cost-effective distilled spirits.



Deep Blue is developing a novel hernia mesh to address the unacceptably high rate of hernia occurrence and recurrence. Due to its simple yet revolutionary design, the T-Line Mesh has the potential to reduce hernia occurrence and recurrence by preventing or reducing mesh fixation failure.



Spiffy provides full-service mobile car washes and detailing as well as on-board diagnostics.



Mimikai is a DEET-free insect repellent with a patented active ingredient extracted from wild tomato plants formed on the principles of biomimicry; developed at NC State.



REVEAL MOBILE

Reveal Mobile creates accurate and precise mobile audience segments to help companies advertise effectively by using patented beacon detection and latitude/longitude data.



Alumni angel investor network investing in NC State startups

- 500+ engaged members
- \$20M+ invested to date
- 34 startups funded
- 2 exits
- \$3.2M return for members





ASK THE PACK Platform

**Connecting NC State
students & startups with
knowledgeable advisors**

- Launched 2021
- 250K+ alumni members in network to date

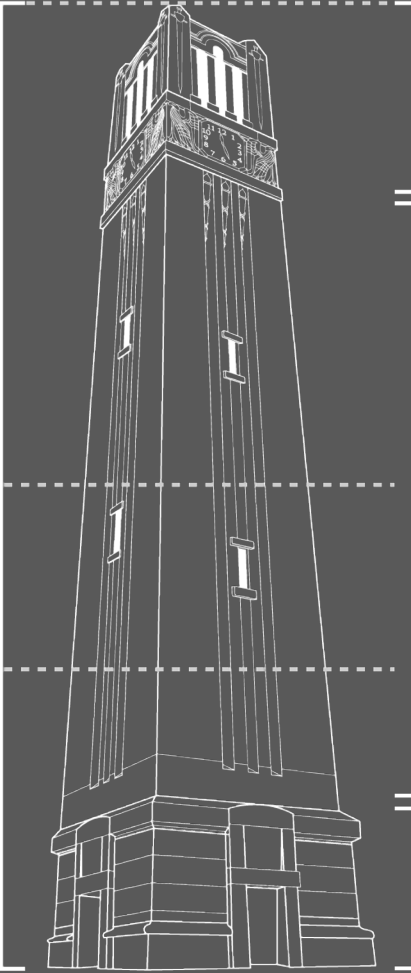
1937 tower completion

115 feet (35 meters)

1926 progress

1924 progress

Shrine Room entrance



- 2021
- New clockworks
 - 55-bell carillon and clavier playing cabin

- 2021
- Interior stair installation

- 2021
- Shrine Room restoration

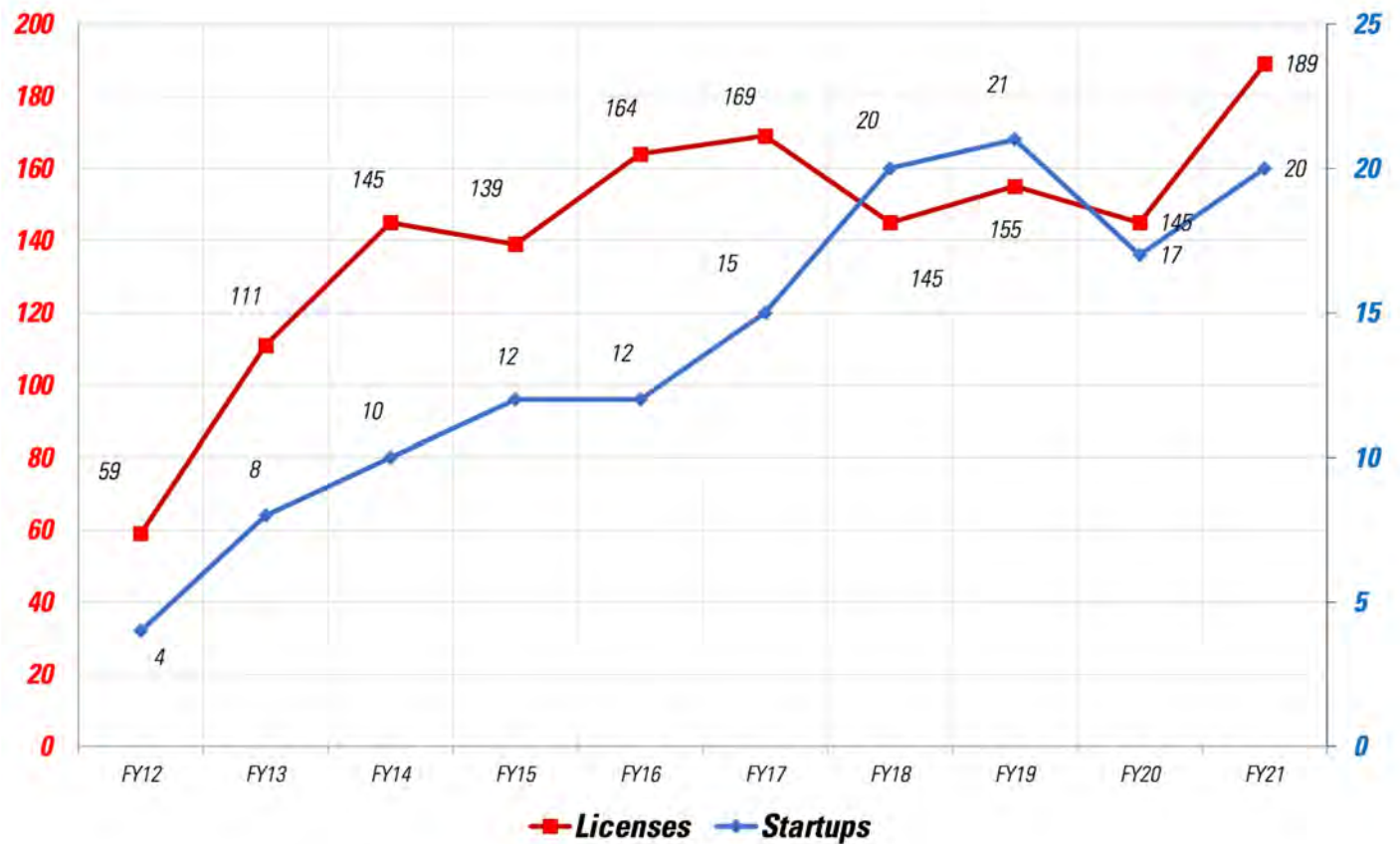
- 2021
- Cleaning and restoration of exterior
 - HVAC installation
 - New exterior lighting

- 2021
- New universally accessible plinth

Office of Research Commercialization

Licenses & Startups

FY12 - FY21



Significant Growth



800+

Commercialization
Agreements

1.7B+

in Financing Raised by
NC State Startups

190+

Startups
Launched

5K+

Invention
Disclosures

600+

Products to
Market

8.5K+

Total Jobs
Created

1.5K+

Patents
Issued

Rankings & Metrics

4th

**Startups
Launched**

1st

**Active Licenses
& Options**

6th

**Total
Disclosures**

1st

**Total
Options**

6th

**Total
Licenses**

5th

**Research
Expenditures**

Bill Spruill

- **Why is there a need for this kind of organization?**

We've got a lot of active founders, who are doing different things. But I would argue that what we don't necessarily have pro-active, exited founders, who have made it their sole mission to lift up the Triangle. I've decided that is my mission.

“national dominance by 2033.”

Growing the Triangle Ecosystem through Focused Execution on Education, Investment, and Global Collaboration



2ndF



"When thinking about the Research Triangle of North Carolina from an international perspective, CED is my selfish personal heartbeat. This small group of connected experts (since 1984) are united around a shared drive. We like to create - in order to solve problems, we enjoy throwing ourselves at the hardest challenges, even if it feels “like eating glass and staring into the abyss”- Elon [at times]. Let’s grow the next generation of companies that will solve the world’s grandest challenges. I'm blessed and honored to be asked to serve. Let’s get to work!

Go Pack! Go WIN!"

Wade Fulghum, NC State
AVC Research Commercialization
Managing Director, Wolfpack Investor Network (WIN)

Biden signs CHIPS bill in bid to supercharge US semiconductor production

The CHIPS and Science Act of 2022, which received wide bipartisan support, includes \$52.7 billion to increase domestic semiconductor production



FACT SHEET: CHIPS and Science Act Will Lower Costs, Create Jobs, Strengthen Supply Chains, and Counter China

- **Catalyze regional economic growth and development.** The CHIPS and Science Act authorizes \$10 billion to invest in regional innovation and technology hubs across the country, bringing together state and local governments, institutes of higher education, labor unions, businesses, and community-based organizations to create regional partnerships to develop technology, innovation, and manufacturing sectors.

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(c) USE OF FUNDS.—In addition to activities listed under section 10383, an eligible entity receiving an award under this section may use funds to—

(1) identify academic research with the potential for technology transfer and commercialization, particularly as relevant to the purposes of the Directorate under section 10382;

(2) ensure the availability of staff, including technology transfer professionals, entrepreneurs in residence, and other mentors as required to accomplish the purpose of this section;

(3) help offset the costs of patenting and licensing research products, both domestically and internationally;

(4) revise institution policies, including policies related to intellectual property and faculty entrepreneurship, and taking other necessary steps to implement relevant best practices for academic technology transfer;

(5) develop local, regional, and national partnerships among institutions of higher education and between institutions of higher education and private sector entities and other relevant organizations, including investors, with the purpose of building networks, expertise, and other capacity to identify

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promising research that may have potential market value and enable researchers to pursue further development and transfer of their ideas into possible commercial or other use;

(6) develop seminars, courses, and other educational opportunities for students, post-doctoral researchers, faculty, and other relevant staff at institutions of higher education to increase awareness and understanding of entrepreneurship, patenting, business planning, research security, and other areas relevant to technology transfer, and connect students and researchers to relevant resources, including mentors in the private sector; and

(7) create, support, or fund entities or competitions to allow entrepreneurial students and faculty to illustrate the commercialization potential of their ideas, including through venture funds of institution of higher education.

(d) LIMITATIONS ON FUNDING.—

(1) Awards made under this section shall be at least 3 years in duration and shall not exceed \$1,000,000 per fiscal year.

(2) Awards made under this section shall not support the development or operation of capital investment funds.

Startups on the Rise



Imagine Optix

Next-generation optics
for VR & AR

Locus Biosciences

Launching major CRISPR
gene editing clinical trial

TreeCo

Revolutionizing tree breeding
with CRISPR gene editing

WORLD-CLASS EXPERTISE





ORC TEAM



Wade Fulghum
Assistant Vice Chancellor



Kultaran Chohan
Executive Director



Miranda Drake
Executive Assistant



Amy Parker
Commercialization
Program Manager



Nicholas LeBlanc
Assistant Director, License
Maintenance & Compliance Manager



Brian Eller
Senior Licensing Manager



Bradley Aycock
Licensing Associate



Devesh Srivastava
Licensing Associate



Jillian True
Licensing Analyst



Alex Brown
Licensing Analyst



Rob Whitehead
Senior Germplasm Agreements
Associate



Gerry Sasser
Senior Agreements Manager



Tim Martin
New Ventures Program
Manager



Sasha Campbell
Creative Services Manager



Cameron Feuerhelm
Creative Services Assistant



Zach Williams
New Ventures Program
Manager



Roberta Terry
Senior Financial Manager



Melicia Ryles
Financial Manager



Jodi Falk
Patents Manager, BS, CP



Nanci McInnes
Patent & Agreements Administrative
Assistant



Christian Capobianco
License Maintenance & Compliance
Manager



Cindy Henry
License Maintenance &
Compliance Manager



Marilee Combs
Creative Services Intern

WIN TEAM



Wade Fulghum
Assistant Vice Chancellor



Miranda Drake
Executive Assistant



Abby Phillips
Assistant Director for
Membership Services



Alan Taylor
Assistant Vice Chancellor
for Principal gifts



Lisa Chang
Director of TEC Program



Raj Narayan
Associate Director Kenan Institute for
Engineering, Technology & Science



Harbright Ventures



Zach Williams
New Ventures Program
Manager



Melicia Ryles
Financial Manager



Sasha Campbell
Creative Services Manager



Cameron Feuerhelm
Creative Services Assistant

NSF I-CORPS TEAM



Wade Fulghum

Principal Investigator, I-Corps Instructor



Amy Parker

Managing Director, I-Corps Instructor



Tim Martin

I-Corps Instructor



Zach Williams

I-Corps Instructor



Lisa Chang

I-Corps Instructor



Kevin Wright

I-Corps Instructor



Robert Sheehan

I-Corps Instructor



Greg Marvin

I-Corps Instructor

Office of Research Commercialization Resources

[ORC Website](#)

[NSF I-Corps Mid-Atlantic Hub](#)

[Chancellor's Innovation Fund](#)

[Wolfpack Investor Network \(WIN\)](#)

[Office of Research Commercialization Advisors \(ORCA\)](#)

[ORC Impacts and Stats](#)

["Ask the Pack"](#)

[NSF I-Corps Mid-Atlantic Hub](#)

[SBTDC](#)

[SWEAT Equity Challenge](#)

[KIETS](#)

National Inventor's Hall of Fame

NIHF Cultivating Curiosity

<https://youtu.be/TiSLv6yU3To>

Not Your Average Hall of Fame

<https://youtu.be/Df629L9TVa4>

Dr. Jay Baliga

<https://youtu.be/YkvrcXF9ooE>

Dr. Fran Ligler

<https://youtu.be/-LXDx5OOofTE>

Dr. Peter Wurman

<https://youtu.be/y95XR2iyj0I>

Dr. Sylvia Blakenship & Dr. Ed Sissler

<https://youtu.be/NzkYwtFe9X0>

External Partners

[Council for Entrepreneurial Development \(CED\)](#)

[Bill Spruill Recent exit](#)

[2ndf.org](#)

[Association of University Technology Managers \(AUTM\)](#)

[NC Biotechnology Center](#)

Video Highlights

[Cathedral Thinking](#)

[“Unlocking Innovation”](#)

[Impact of NSF Innovation Corps \(I-Corps\)](#) pw: I-Corps1234!

[Elon Musk on Failure](#)

Selected Publications

[Heartland Forward Study](#) Part 2: RESEARCH TO RENEWAL: ADVANCING
UNIVERSITY TECH TRANSFER

[Part 1](#)

[The George W. Bush Institute study on The Innovation Impact of U.S. Universities](#)

listed NC State as one of the top 20 universities for innovation impact.

[The Milken Institute](#), an economic think tank, cited the collaboration and innovation fostered by NC State — and particularly by Centennial Campus — as key reasons why Raleigh is the one of the top 10 best-performing large cities in the United States.



NC STATE
UNIVERSITY

**Office of Research
Commercialization**

Questions?

Wade Fulghum