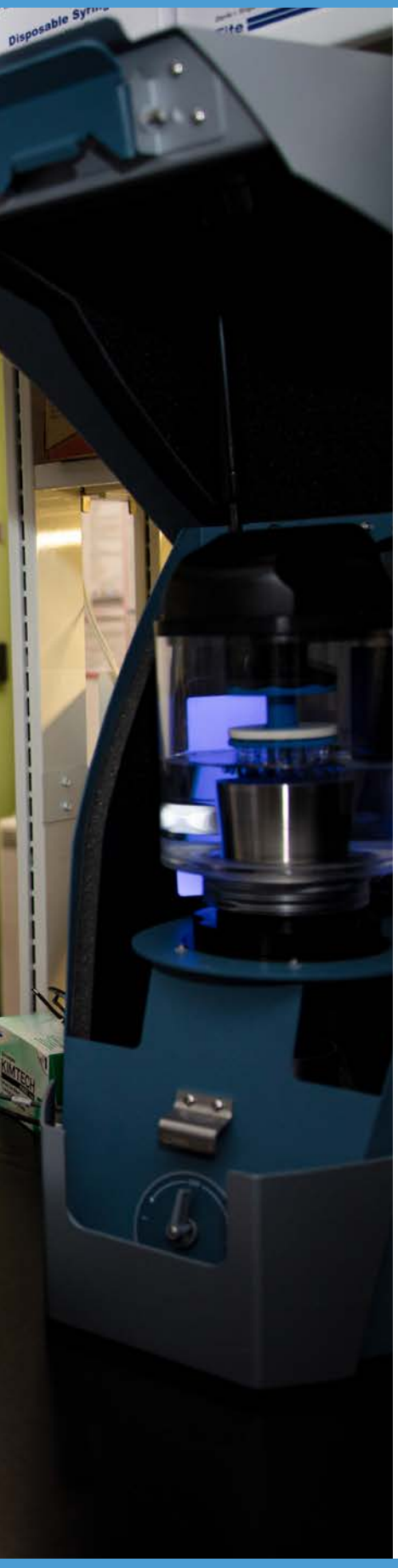

Triangle Biotechnology



1. Technology Commercialization

COMMERCIALIZATION PATH

8 Steps to Commercialization at Carolina

COMMERCIALIZATION DASHBOARD

11 Multi-Year Trends and Comparisons

12 UNC-Chapel Hill Licenses

13 Commercialization Activity by Academic Unit

14 Moving Research-Based Products to Market

IP-BASED STARTUP BRIEFS

15 UNC-Chapel Hill IP-Based Startups, FY25

NATIONAL ACADEMY OF INVENTORS

16 UNC-Chapel Hill Chapter

18 NAI Fellows

19 NAI Ranking

Technology commercialization at UNC-Chapel Hill transforms research discoveries into real-world products and services, creating societal impact and improving lives. It drives economic growth by supporting startup creation, attracting industry partnerships and generating revenue through licensing of the University's intellectual property (IP).

Innovate Carolina's Office of Technology Commercialization (OTC) manages all aspects of UNC-Chapel Hill's IP. It is critical to the University because the significant volume of sponsored and federally funded research conducted at the University creates a major pipeline of ideas and translational activities that have commercial potential. This pipeline continues to grow. In fact, as of late 2024, research expenditures at Carolina topped $1.55 billion, pushing the University's ranking into the top 10 research institutions in the U.S. by volume and annual expenditures.



IMPACT AT A GLANCE

DOUBLE-DIGIT
COMMERCIALIZATION GROWTH

Carolina achieved more than 20% year-over-year growth (FY25 vs. FY24) in four core commercialization categories: invention disclosures, provisional patent applications, issued U.S. patents and IP-based startups. This included corresponding growth in FY25 compared to the most recent three-year average (FY23-25).

RECORD YEAR
FOR NEW IP-BASED STARTUPS

Twelve new UNC-affiliated IP-based startups launched in FY25, tying the all-time Carolina single-year record — more than doubling the number of startups launched in FY23.

CLIMBING
INVENTION DISCLOSURES

Invention disclosures increased by 21% in FY25 over FY24 and by 9% compared to both FY23 and the most recent three-year average.

SURGE
IN ISSUED U.S. PATENTS

The number of issued U.S. patents increased by 30% during FY25 over FY24 and by 28% over FY23.

RECORD-SETTING RISE
IN NATIONAL ACADEMY OF INVENTORS RANKINGS

Carolina jumped 32 spots (from 94 to 62) in the National Academy of Inventors global rankings — the largest single-year leap in UNC-Chapel Hill history.

COMMERCIALIZATION PATH

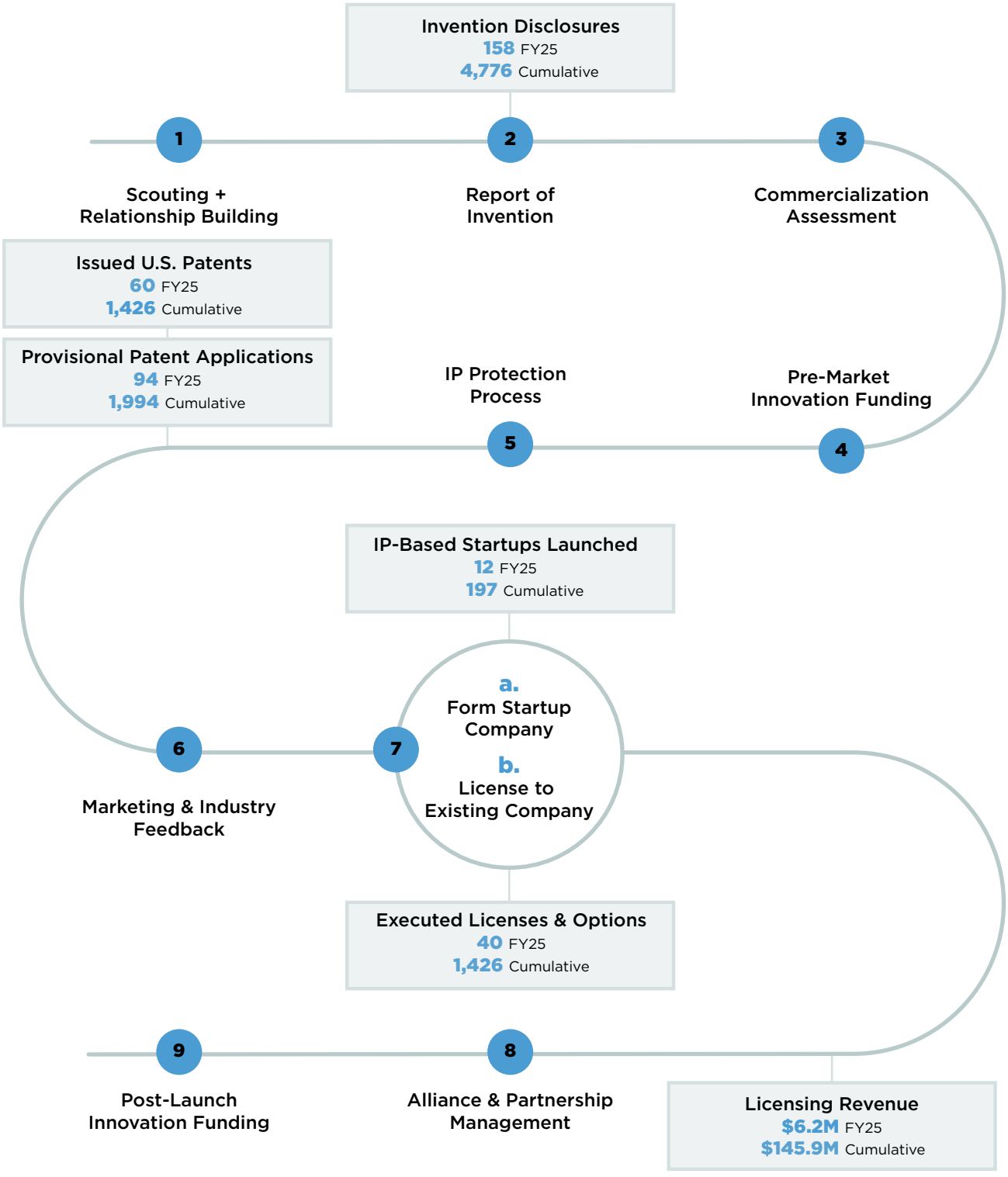
OTC partners with researchers throughout the entire translation process, which begins early and extends well beyond the initial market launch.

STEPS TO COMMERCIALIZATION AT CAROLINA

1. **Scouting and Relationship Building.** Engage researchers early to identify promising innovations and build trust.
2. **Report of Invention.** Researchers make the OTC team aware of new technologies. OTC reviews ownership, funding obligations, and other commercial and partnership possibilities.
3. **Commercialization Assessment.** Evaluate patentability, market opportunity and development gaps.
4. **Pre-Commercial Gap Funding.** Provide support for high-potential projects that require technology development and validation.
5. **IP Protection Process.** Secure patents or copyrights to attract partners and investments — critical for de-risking early-stage research.
6. **Marketing and Industry Feedback.** Seek commercial feedback to refine technologies, sunset low-potential projects or adjust strategy.
7. **a. Startup Company Formation.** Coordinate with startup support teams like KickStart Venture Services to advise startup teams on company formation and launch.
   b. Licensing to Existing Company. Formalize agreements with startups or companies, often coupled with sponsored research to continue technology development.
8. **Alliance and Partnership Management.** Maintain relationships to ensure technologies are actively developed — not shelved — and to expand collaboration.
9. **Post-Launch Innovation Funding.** Work with partners like Carolina Angel Network and KickStart to help bridge funding gaps through SBIR/STTR grants, angel investments or institutional support.

FIGURE 1

Commercialization Path at UNC-Chapel Hill



COMMERCIALIZATION DASHBOARD

In FY25, OTC worked with UNC-Chapel Hill researchers and inventors on 158 invention disclosures, the submission of 94 new provisional patent applications, the awarding of 60 issued U.S. patents, and the execution of 40 licenses and options agreements. During this period, Carolina-affiliated entrepreneurial teams launched 12 new startups based on UNC-Chapel Hill intellectual property, while Carolina-based technologies generated $6.2 million in licensing revenue.

COMMERCIALIZATION ACTIVITY

Table 1: UNC-Chapel Hill Commercialization, FY23–25

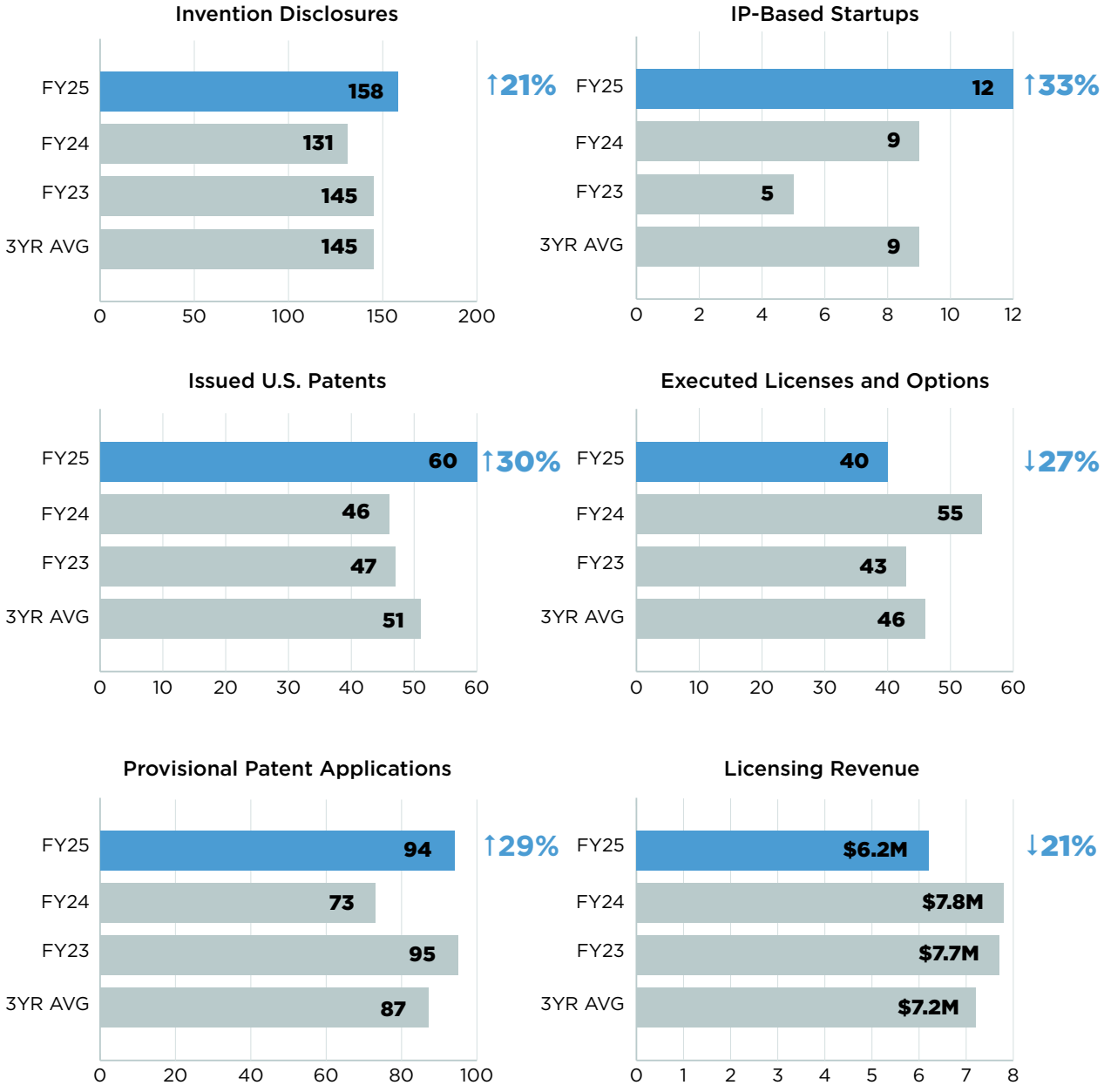
	FY23	FY24	FY25	Cumulative
Invention Disclosures	145	131	158	4,776
New Provisional Patent Applications	95	73	94	1,994
Issued U.S. Patents	47	46	60	1,426
Executed Licenses & Options	43	55	40	1,426
Licensing Revenue	$7.7M	$7.8M	$6.2M	$145.9M
IP-Based Startups Launched	5	9	12	197

MULTI-YEAR TRENDS AND COMPARISONS

FIGURE 2

UNC-Chapel Hill Commercialization:
FY25 vs. FY24, FY23 and Three-Year Average (FY23–25)

Percentage changes reflect increase or decrease in FY25 compared to FY24.



Note: Three-year average reflects the average of FY23, FY24 and FY25.

UNC-CHAPEL HILL LICENSES

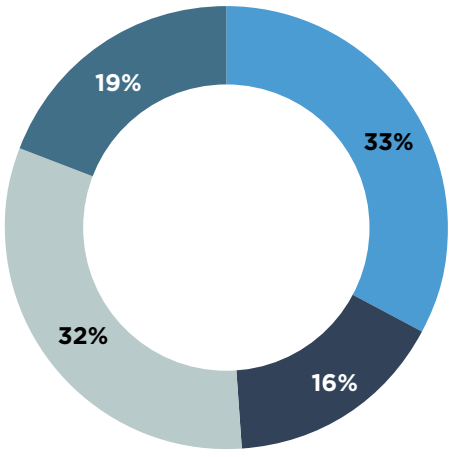
Congruent with Carolina's research pipeline that is focused heavily on biomedical endeavors, the majority of Carolina's licenses are in the life sciences sector. A look at FY20-25 data shows how UNC-Chapel Hill's intellectual property was licensed.

Several UNC-Chapel Hill technologies licensed to companies achieved notable milestones in the market during FY25, improving the lives of patients suffering from serious diseases.

- **Pulmonary arterial hypertension (PAH) and pulmonary hypertension associated with interstitial lung disease (PH-ILD).** In June 2025, UNC-affiliated pharmaceutical company Liquidia scheduled the first commercial shipment of its lead product Yutrepia, an inhalation powder therapeutic. Yutrepia treats patients diagnosed with PAH, a progressive disease in which the arteries in the lungs narrow, increasing blood pressure in the arteries and straining the heart. It also treats PH-ILD, which is marked by high blood pressure in the lungs caused by stiffening and scarring in lung tissue.
- **CLN1 disease (Batten disease).** For the first time, a patient with CLN1 disease (Batten disease) was administered the investigational gene therapy candidate TSHA-118, which is based on a technology invented at UNC-Chapel Hill. Batten disease is an inherited and fatal neurodegenerative disease that primarily affects infants, toddlers and children.
- **SLC13A5 Epilepsy.** Given the challenges many companies face securing funding to advance ultra-rare gene therapies, OTC partners strategically with nonprofits and patient foundations to help move these therapies to the clinic. For example, during FY25, OTC partnered with the Tess Foundation to advance a UNC gene therapy for SLC13A5 Epilepsy, a rare genetic disorder that causes severe seizures starting in infancy, along with developmental delays and movement problems.

FIGURE 3

UNC-Chapel Hill Licenses, FY20-25



Exclusive License: University agrees to grant rights to only one licensee in a defined field or market segment.

Non-Exclusive License: University retains the right to license the same technology to multiple parties.

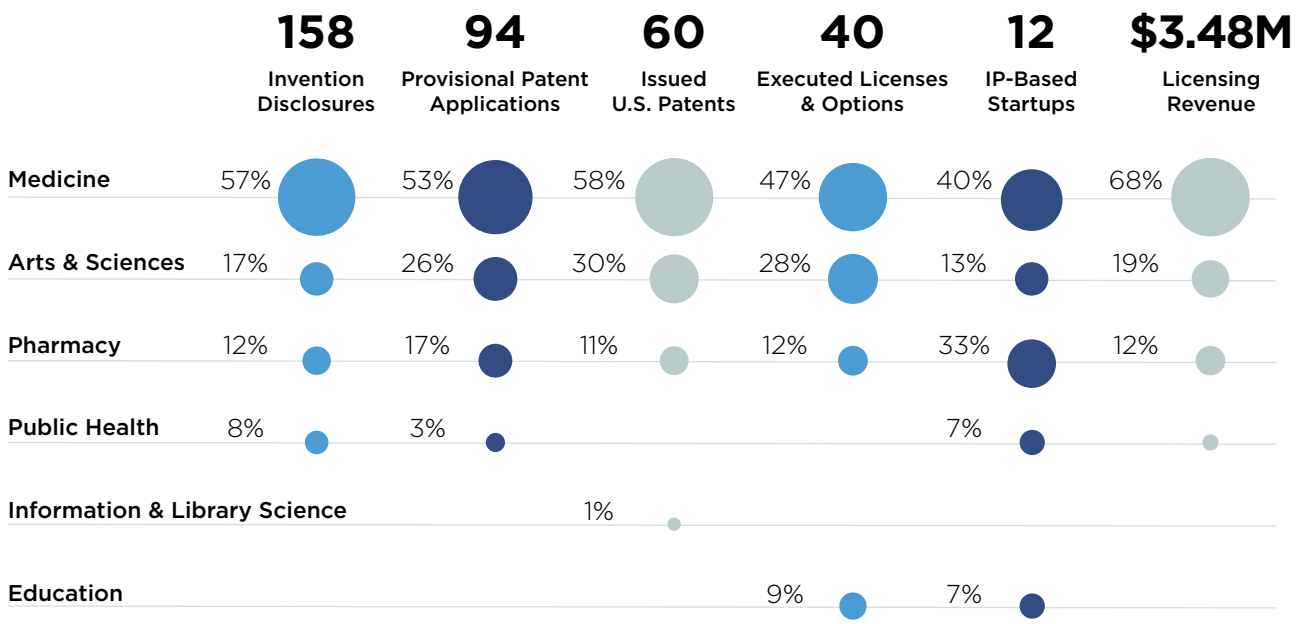
Non-Exclusive Tangible Property: University grants one or more parties the right to use a physical research tool or material—such as a reagent, cell line, animal model, plasmid, or prototype—without granting exclusive control over it.

Options: Short-term agreement that gives a company the right (but not the obligation) to negotiate a license for a university-owned invention at a later date.

COMMERCIALIZATION ACTIVITY BY ACADEMIC UNIT

FIGURE 4

Commercialization: Most Active UNC-Chapel Hill Units (FY25)



Note: Not all units with commercialization activity appear. Graph shows four most active units per category only. Chart reflects licensing revenue distributed to departments in FY25, not total revenue earned by the University.



Kathryn Barth, PhD, Research Scientist at ForagR Medicines, works in the KickStart Accelerator. ForagR Medicines is one of 12 new UNC IP-based startups founded in FY25 and uses the power of in-cell RNA genomics to target undruggable proteins via their mRNAs.

MOVING RESEARCH-BASED PRODUCTS TO MARKET

Since 2006, Carolina inventors have worked with OTC to bring 42 research-based products to market. These products range from gene therapies, biosensors, and diagnostics to medical devices, cell culture systems, and imaging technologies. They serve many purposes and patient populations — such as treating diseases like spinal muscular atrophy, breast cancer, HPV-related and cervical cancer, PAH, hemophilia, and progeria. These products also enable medical advancements in 3D dental imaging, portable mass spectrometry, cellular visualization, surgical simulation, and hazardous chemical safety.

FIGURE 5

Products on Market: UNC-Chapel Hill, 2006–2025

42

UNC Research-Based Products on the Market Since 2006

2006

Aim™
Medical visualization software
Inner Optic

2007

Stasilon®
Blood-clotting bandage
Entegrion (Beeken)

SPECT
Medical image reconstruction software
GE Health Care

2009

MultiPlan®
Treatment planning system
Accuray *

2011

SKETA
Water analysis reagent
BioGX

A Su Salud
Health care language program
Pearson

2012

MXR®
Microfluidic chip
Redbud Labs

CM6 Software
Cognitive measurement
CorticalMetrics

2013

Prosignia
Breast cancer assay
Bioclassifier (Veracyte)

Simulator
Surgical simulation
Intuitive Surgical

ChemoGLO Wipe Kit®
Hazard wipes
ChemoGLO

2014

B-CLEAR®
Biliary efflux
BioIVT *

Counter Tools
Public health services
Counter Tools

2015

Interactive Human Anatomy
3D anatomy platform
Elsevier

IXINITY®
Coagulation factor IX (recombinant) *

CellRaft®
Cell culture Cell Microsystems

2016

ZipChip
CE-MS
908 Devices

Gly-102, 103
Synthetic heparins
Glycan

XCITE 100
Brain stimulator device
Pulvinar Neuro

2017

MX908
Portable MS
908 Devices

AIM System
Cochlear implants
Advanced Cochlear

ReceptivaDx
Infertility diagnostic
Cicero Diagnostics

2018

Oyster Catcher™
Substrate
Sandbar Oyster Company

Tilt Light Sheet Imaging System
Microscope device
Mizar

RepliGut®
Cellular system
Altis Biosystems

Vega™
Ultrasound
Sonovol (Revvity)

2019

Zolgensma®
Gene therapy SMA
AskBio
(Avexis/Novartis) *

Pro-10™
Manufacturing cell line
AskBio (Viralgen)

Information Flow
Health mgt. system
Communify

AAMP™
Microbubbles
Triangle Biotechnology

REBEL
Bioprocessing analyzer
908 Devices

2020

Zokinvy®
Progeria
Eiger (via NIH)

TRUPATH
Biosensor platform
Multiple

2021

Portray®
Dental tomosynthesis
XinVisio (Surround)

NavDx®
HPV + cancer
Naveris

2023

PurIST℠
Diagnostic
GeneCentric

InflammaScreen™
Screen for anti-inflammatory leads
Altis Biosystems

2024

APERS
Autism
Brookes Publishing

SRSS-IE Universal Behavior Screener
Screening platform to identify and address student behavior needs
Branching Minds

Naxtract/NA1
Sample prep automation
Redbud Labs

2025

Yutrepia™
PAH
Liquidia

Zelsuvmi™
Topical medication
Ligand Pharma

** Off patent*

IP-BASED STARTUP BRIEFS

Twelve new startups based on UNC-Chapel Hill intellectual property launched in FY25. Carolina supports these companies with access to funding, workspaces, coaching, mentorship and entrepreneurial training. These ventures bring research-based innovations to market, helping people live healthier, more productive lives.

UNC-CHAPEL HILL IP-BASED STARTUPS, FY25

- **ForagR Medicines.** RNA-centric, in-cell framework that harnesses chemical genomics to stop diseases at their source.
- **Goldie Health.** Digital platform that helps agencies identify individuals at risk of opioid overdose and connect them with personalized care.
- **Tripill Biotechnology.** Targeted radionuclide therapeutic agents for cancer treatment.
- **MaiaZura.** Immersive virtual reality training for health care professionals.
- **Sorbenta.** Novel sorbent materials that remove persistent "forever chemicals" like PFAS from water.
- **Transneural Therapeutics.** Novel treatments for neuropsychiatric disorders, including Major Depressive Disorder and Post-Traumatic Stress Disorder.
- **Adaptyx Biosciences.** Wearable sensors that continuously measure panels of molecules in real time.
- **PinPrint.** Microneedle patch technology that enables painless drug delivery.
- **InoKare Therapeutics.** Developing small-molecule inhibitors of IP6K to treat obesity and obesity-related disorders.
- **ProactPulse.** Software platform that helps K-12 schools identify and support at-risk students.
- **Glyco Discoveries.** New therapeutic compounds based on glycan structures, with a focus on anti-inflammatory drugs.
- **Persistence Therapeutics.** Sponge-like implant that produces CAR-T cells inside the patient's body, potentially reducing the cost and time of cancer therapy.

NATIONAL ACADEMY OF INVENTORS

UNC-CHAPEL HILL CHAPTER

In December 2024, UNC-Chapel Hill established its first-ever chapter of the National Academy of Inventors (NAI), marking a milestone in the University's commitment to innovation. The new UNC-Chapel Hill NAI chapter recognizes inventors across campus, while fostering a culture of mentorship and education. Members are expected to actively support innovation education and serve as mentors for students, postdocs, and early-career faculty — shaping the next generation of inventors.

Led by Innovate Carolina and championed by Dedric Carter, PhD, MBA, Vice Chancellor for Innovation, Entrepreneurship and Economic Development and Chief Innovation Officer, the UNC-Chapel Hill NAI chapter is both a recognition platform and a call to action. It unites Carolina's inventors to advance the institution's role in economic development, translational research and public benefit.

INAUGURAL 2024 INDUCTEES

- **Gregory P. Copenhaver, PhD**, Chancellor's Eminent Professor of Convergent Science; Director, Institute for Convergent Science; Professor of Biology; NAI Senior Member.
- **Paul A. Dayton, PhD**, William R. Kenan Jr. Distinguished Professor and Department Chair, Lampe Joint Department of Biomedical Engineering, UNC-Chapel Hill and NC State University; NAI Senior Member.
- **Alexander V. Kabanov, PhD, DrSci**, Mescal Swaim Ferguson Distinguished Professor, Eshelman School of Pharmacy; NAI Fellow.
- **Brian Kuhlman, PhD**, Oliver Smithies Investigator and Professor of Biochemistry and Biophysics, School of Medicine.
- **Yueh Z. Lee, MD, PhD**, Professor of Radiology and Vice Chair of Translational Research, School of Medicine.
- **Matthew R. Penny**, Associate Professor of Practice, Lampe Joint Department of Biomedical Engineering, UNC-Chapel Hill and NC State University; Associate Director, MS MedTech Program.

- **R. Jude Samulski, PhD**, Professor of Pharmacology, School of Medicine; NAI Fellow.
- **Mark H. Schoenfisch, PhD**, Peter A. Ornstein Distinguished Professor, Department of Chemistry; School of Medicine and Eshelman School of Pharmacy.
- **Koji Sode, PhD**, William R. Kenan Jr. Distinguished Professor, Lampe Joint Department of Biomedical Engineering, UNC-Chapel Hill and NC State University; NAI Fellow.
- **Xiaodong Wang, PhD**, Professor and Director of Medicinal Chemistry, Center for Integrative Chemical Biology and Drug Discovery, Eshelman School of Pharmacy.
- **Otto Z. Zhou, PhD**, David Godschalk Distinguished Professor, Department of Physics and Astronomy.

HONORARY INDUCTEES

- **Dedric A. Carter, PhD, MBA**, Vice Chancellor for Innovation, Entrepreneurship and Economic Development and Chief Innovation Officer; NAI Invention Ambassador.
- **Jon Collins, PhD**, Office of the Vice Chancellor for Research; Chief Scientific Officer, Pinnacle Hill.



Inaugural inductees of the UNC-Chapel Hill Chapter of the National Academy of Inventors gather at the Innovate Carolina Junction in December 2024 for the induction celebration.

NAI FELLOWS

The University has produced nine NAI Fellows, including distinguished current and former faculty. These individuals are recognized for inventions that have had profound impacts on society and economic growth. Their years of induction are noted in parentheses.

- **R. Jude Samulski, PhD**, Professor of Pharmacology, School of Medicine (2025).
- **Anthony J. Hickey, PhD**, Professor Emeritus, Eshelman School of Pharmacy; Adjunct Professor, Lampe Joint Department of Biomedical Engineering (2022).
- **John Ramsey, PhD**, Minnie N. Goldby Distinguished Professor, Department of Applied Physical Science (2019).*
- **Koji Sode, PhD**, William R. Kenan Jr. Distinguished Professor, Lampe Joint Department of Biomedical Engineering (2018).
- **Alexander Kabanov, PhD**, DrSci, Mescal Swaim Ferguson Distinguished Professor, Eshelman School of Pharmacy (2017).*
- **Harold Kohn, PhD**, Professor Emeritus, Eshelman School of Pharmacy (2016).
- **Nancy Albritton, MD, PhD**, Frank and Julie Jungers Endowed Dean, College of Engineering, University of Washington (2014).
- **Joseph DeSimone**, Sanjiv Sam Gambhir Professor of Translational Medicine and Chemical Engineering, Stanford University (2013).
- **Oliver Smithies**, DPhil, Weatherspoon Eminent Distinguished Professor of Pathology and Laboratory Medicine, School of Medicine; Nobel Laureate (2012).

* *Lifetime Fellow*

The University also added to its list of NAI Senior Members: Greg Copenhaver was inducted in 2024, followed by Brian Kuhlman, Yueh Lee, and Xiaodong Wang in 2025. These individuals exemplify translational research success, having contributed to patents, licensing, and commercialization.



Xiaodong Wang (left), PhD, Professor and Director of Medicinal Chemistry at the Center for Integrative Chemical Biology and Drug Discovery at the Eshelman School of Pharmacy, talks with Jackie Quay (right), Director of Licensing and Innovation Support at Innovate Carolina's Office of Technology Commercialization. Wang was one of 11 inaugural inductees to UNC-Chapel Hill's chapter of the National Academy of Inventors, which formally launched in December 2024.

NAI RANKING

UNC-Chapel Hill also achieved a record-setting leap in NAI's Top 100 Worldwide Universities list. In 2025, UNC-Chapel Hill rose to No. 62, a 32-spot climb — the University's largest single-year jump since the rankings began. This marks 11 consecutive years on the list and reflects the University's intensified focus on moving research from "patents to patients" and "lab to life." UNC-Chapel Hill ranks No. 39 on NAI's corresponding Top 100 U.S. Universities list.

NAI
National Academy of Inventors

+32 SPOTS

Largest Single-Year Rise in NAI Top 100 Global Rankings in UNC-Chapel Hill History



UNC-Chapel Hill inventors who were issued U.S. patents during 2024 gather at the 2025 Celebration of Inventorship to receive patent plaques in recognition of their contributions to commercialization. Innovate Carolina's Office of Technology Commercialization hosts the annual celebration.