Accelerating Federal Technology Transfer Through a Startup Challenge Licensing Mode

By

Steven M. Ferguson
National Institutes of Health
sf8h@nih.gov

Rosemarie Truman
Founder and CEO
Center for Advancing Innovation
Bethesda, MD
rht@caistartups.org

Cody J. Locke
Chief Innovation Officer
Center for Advancing Innovation
Bethesda, MD
cody@caistartups.org

ABSTRACT

United States taxpayers invest nearly $200 billion each year in research and development conducted at universities, federal laboratories, and hospitals to generate inventions with the potential to improve lives and transform industries. Historically, this public investment has produced world-changing technologies, including water filtration systems, insulin pumps, cochlear implants, charge-coupled devices, memory foam, and globally impactful companies. In select cases, federally developed technologies licensed through the National Institutes of Health (NIH) have advanced all the way to market, contributing to more than 50 FDA-approved drugs and vaccines, including recent approvals of first-in-class vaccines derived from NIH-licensed technologies. Yet despite these successes, fewer than 0.1 percent of federally funded inventions are ultimately commercialized, leaving most of the taxpayer-supported innovation dormant.

Beginning in 2012, the NIH partnered with the Center for Advancing Innovation to address this systemic commercialization gap by piloting a new, scalable approach to federal technology transfer grounded in structured venture creation rather than passive licensing alone. Over more than a decade of implementation across MedTech and life sciences, the NIH–CAI Startup Challenge Model demonstrated that actively forming and training entrepreneurial teams can materially expand the pool of qualified licensees and improve downstream commercialization outcomes. Drawing on documented results accumulated since 2012, this article analyzes the NIH–CAI model and argues that technology transfer offices can further increase the return on public R&D investment by proactively channeling startup licensees into advanced commercialization platforms such as CAI's.

The Persistent Commercialization Gap in MedTech

The National Institutes of Health invests nearly $50 billion annually in biomedical and health research, generating one of the world's deepest pipelines of federally funded biomedical inventions. These investments span therapeutics, diagnostics, medical devices, digital health platforms, and enabling technologies. Despite this scale, fewer than one percent of federally funded inventions ultimately reach the market as commercial products.

For technology transfer offices, this gap is not theoretical. It appears repeatedly when promising inventions are licensed to early-stage startups that later struggle with capital formation, regulatory planning, reimbursement strategy, or team execution. In many cases, the science remains sound while the company formed around it lacks the maturity required for the next stage of commercialization. Licensing alone is necessary, but it is rarely sufficient.

NIH's Early Recognition That Licensees Must Be Built

Beginning in 2012, NIH Office of Technology Transfer recognized that the principal bottleneck in federal technology transfer was not invention quality, but licensee capacity. Too few entrepreneurs possessed the multidisciplinary skills required to commercialize complex biomedical technologies.

To address this constraint, NIH partnered with the Center for Advancing Innovation to pilot a structured venture creation approach that emphasized entrepreneur recruitment, team formation, and commercialization training alongside traditional licensing. NIH served as CAI's first federal adopter, providing the validation and scale necessary to test the model across multiple technology domains.

Since that time, CAI has partnered with more than 150 research institutions, providing access to approximately 170,000 publicly funded inventions. CAI has trained more than 4,000 entrepreneurs, launched over 460 startups, and seen more than 200 winning teams raise over $3.2 billion in follow-on capital.

A Repeatable Technology Transfer Mechanism

The NIH–CAI Startup Challenge Model represents a repeatable technology transfer mechanism rather than a one-off program. Inventions are selected based on commercial potential, clinical relevance, and intellectual property position. CAI conducts open recruitment to attract scientists, clinicians, engineers, operators, and investors capable of forming new ventures around selected technologies.

Teams receive structured training in intellectual property strategy, regulatory pathways, reimbursement, financial modeling, and business development. Extensive mentorship is provided by NIH inventors, NIH technology transfer staff, industry executives, clinicians, and investors. The process culminates in startup formation and preparation for licensing, expanding the pool of qualified licensees available to federal laboratories.

Documented Outcomes Across NIH-Enabled Challenges

Across five NIH-partnered Startup Challenges — the Breast Cancer Startup Challenge, Neuro Startup Challenge, Nanotechnology Startup Challenge in Cancer, Freedom from Cancer Startup Challenge, and the Innovate Children's Health Challenges I and II (Figures 1-5) — CAI-supported teams advanced more than 100 NIH inventions, launched / scaled more than 220 startups, raised more than $2.3 billion in follow-on funding, and created more than 1,300 direct jobs.

Workforce Development and Entrepreneurial Outcomes

In addition to commercialization results, the Startup Challenge Model has functioned as a workforce development platform. Approximately 547 teams participated across NIH-enabled challenges, involving more than 2,160 active participants supported by approximately 570 volunteer subject matter experts.

More than 70 percent of CAI startups overall are woman-led or minority-led, including 52 woman-led and 67 minority-led winning startups across NIH-enabled challenges. These outcomes reflect entrepreneurial team formation practices aligned with the public mission of federal technology transfer.

The Future of Health Innovation Tournament Challenge

Building on more than a decade of experience, CAI has launched the Future of Health Innovation Tournament Challenge as a next-generation commercialization platform for health, MedTech, biotech, diagnostics, and digital health startups.

The program is structured as both a challenge and a tournament. Multiple teams will advance and receive recognition across successive rounds, while one team will ultimately emerge as the Grand Champion. This structure creates momentum, signaling, and accountability that extend beyond traditional accelerators.

Pathways to Participate

The Future of Health Innovation Tournament Challenge was designed to engage the full technology transfer ecosystem. Entrepreneurs may form new companies or join existing startups to strengthen commercialization readiness. Subject matter experts may recruit teams, mentor founders, advise startups, or serve as judges. Interns and venture builders may work directly with CAI to build in-house startups. Further details about this new ongoing program can be found at https://bit.ly/fhitc.

A Call to Action for Technology Transfer Offices

The NIH–CAI partnership demonstrated that structured venture creation substantially improves commercialization outcomes. Technology transfer offices are encouraged to refer startup licensees and near-license companies to the Future of Health Innovation Tournament Challenge as a complement to internal commercialization efforts. Doing so allows offices to improve downstream success rates without expanding internal staff.

Conclusion

NIH's partnership with the Center for Advancing Innovation reshaped how federal technology transfer licensees can function when venture creation is treated as infrastructure rather than an afterthought. Referring startup licensees into scalable platforms such as the Future of Health Innovation Tournament Challenge represents a practical evolution of modern technology transfer practice. ■

FIGURE 1 – Breast Cancer Startup Challenge

FIGURE 2 – The Neuro Startup Challenge

FIGURE 3 – Nano Startup Challenge in Cancer

FIGURE 4 – Freedom from Cancer Startup Challenge

FIGURE 5 – Innovate Children's Health Challenge