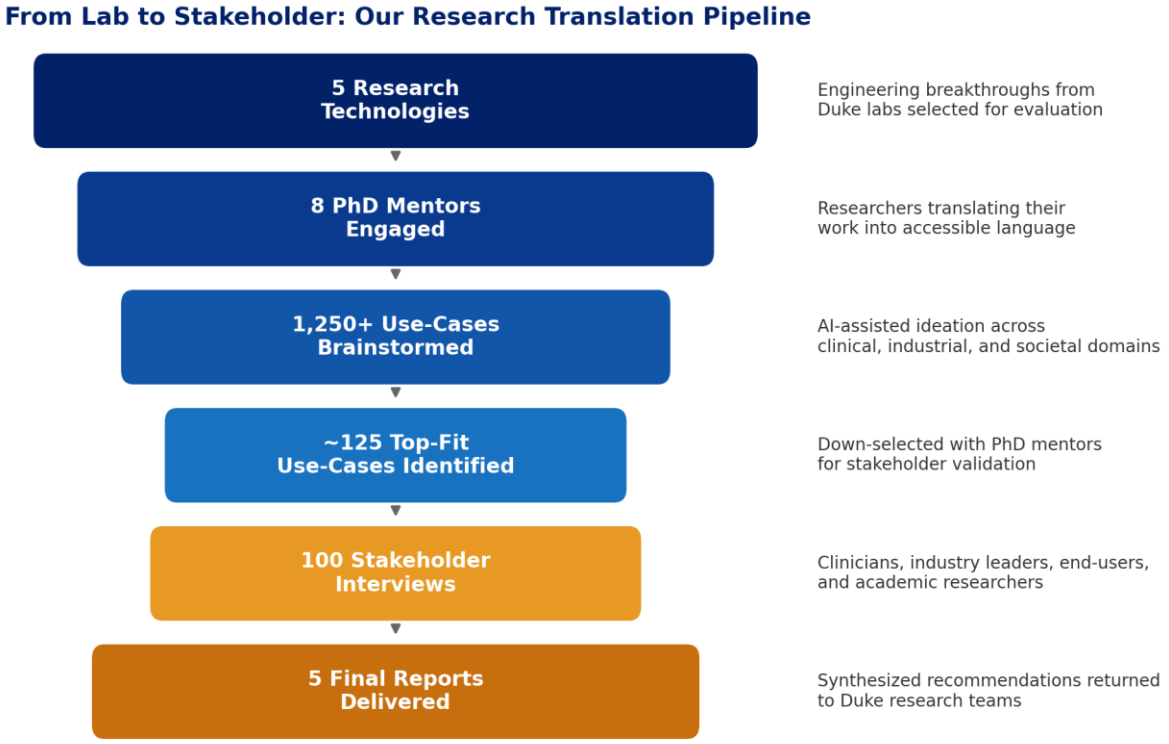
Advancing Research Translation with AI Stakeholder Insights



Across the 2025–2026 academic year, our team partnered with eight Duke PhD mentors to translate five engineering research technologies into stakeholder-validated impact opportunities.

By: Members of the Advancing Research Translation with AI Stakeholder Insights team

Duke University is a hub for groundbreaking research, and the question that animates our team is a deceptively simple one: how do we unlock the full societal impact of that research? The journey from a scientific breakthrough to a tool that meaningfully helps a patient, a farmer, a clinician, or a community is long, non-linear, and rarely intuitive. It depends not only on the strength of the underlying science but on a deep understanding of who could use the technology, what they actually need, and how it would fit into the realities of their work and lives. Engaging with end-users and stakeholders to build that understanding is rarely part of the traditional STEM PhD experience, even as PhD students themselves are increasingly drawn to entrepreneurship and real-world impact.

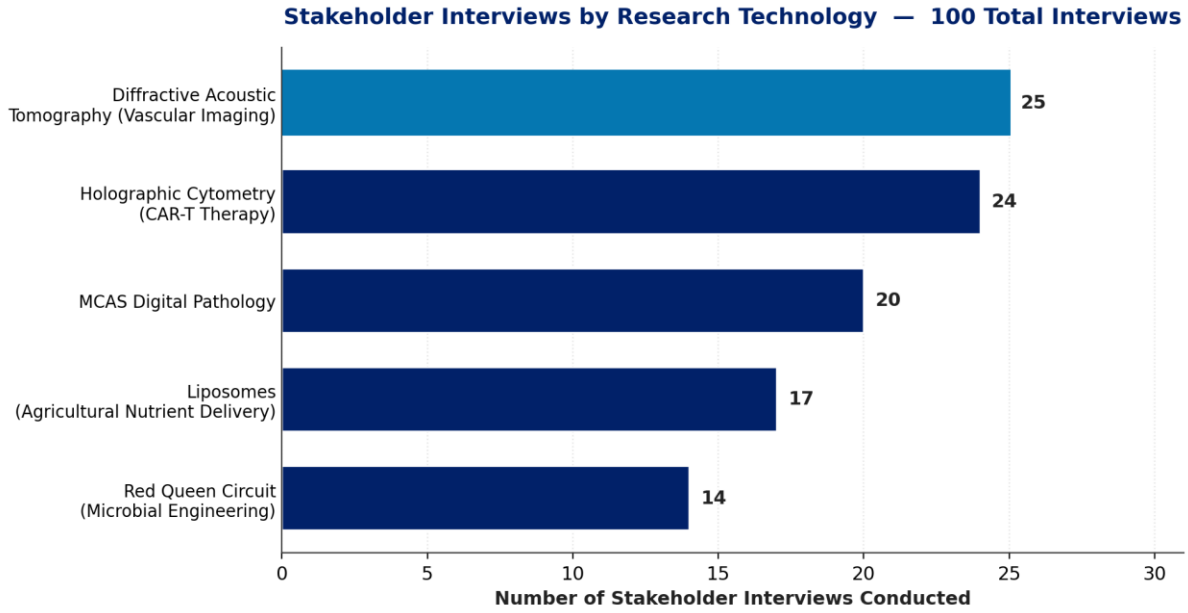
Our Bass Connections team was created to help close that gap. Working alongside Duke PhD students and faculty, our interdisciplinary student team uses emerging AI tools to broaden the imagination of what cutting-edge research could become, and then validates those possibilities through structured customer-discovery interviews with the people the technology is meant to serve. The goal is simple: give Duke researchers the stakeholder evidence they need to point their science at the problems that matter most, and unlock more of the societal impact that this research is capable of creating.

Our Approach

We worked with five distinct research technologies spanning medical imaging, digital pathology, cellular therapy, biomanufacturing, and agriculture. For each technology, an interdisciplinary student sub-team moved

through a four-stage process designed to systematically translate a piece of cutting-edge science into stakeholder-grounded recommendations:

- **Technology Understanding.** Students conducted literature reviews and structured interviews with PhD mentors to produce concise, jargon-free technology summaries that any non-expert could understand.
- **AI-Assisted Use-Case Generation.** Using Duke's ChatGPT Enterprise environment and custom GPTs, students brainstormed an exhaustive set of potential applications across clinical, industrial, and consumer settings—generating more than 250 use-cases per technology.
- **Use-Case Down-Selection.** Working with PhD mentors, teams down-selected to three to five top-fit use-cases per technology, prioritizing alignment between technical capability and stakeholder need.
- **Stakeholder Validation & Reporting.** For each priority use-case, students conducted semi-structured interviews with clinicians, industry leaders, end-users, and academic researchers, then synthesized the evidence into a final report delivered back to the research team.



Across the year, our five sub-teams collectively conducted 100 stakeholder interviews—ranging from clinicians performing PICC placements to small-scale farmers, R&D leaders in pharma, and pathologists evaluating tissue samples.

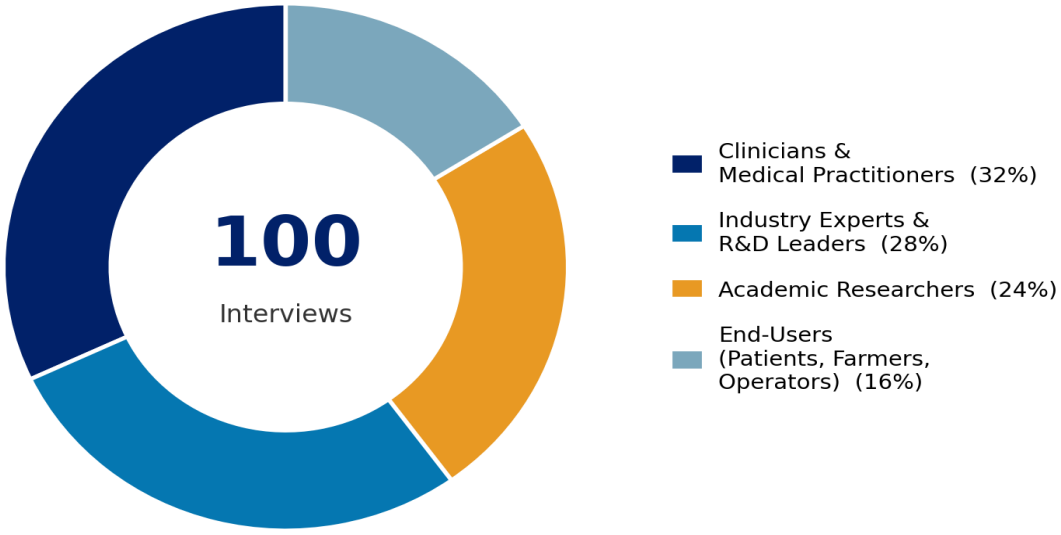
What We Learned

Each sub-team produced a final report capturing what stakeholders told us about whether and how the underlying technology could create real-world value. A few highlights:

- **Diffractive Acoustic Tomography for Vascular Imaging.** The Duke research team is developing a novel imaging tool that combines ultrasound and photoacoustic imaging to produce real-time 3D images of blood vessels. Twenty-five interviews with vascular access nurses, anesthesiologists, and clinical educators surfaced strong demand for a portable, single-system replacement for the current ultrasound-plus-X-ray workflow used to place peripherally inserted central catheters—especially in settings where staff training and equipment cost are major barriers.

- **Holographic Cytometry for CAR-T Therapy.** Twenty-four interviews with clinical and industrial researchers identified CAR-T cell therapy characterization as a high-value entry point for this label-free imaging platform, where stakeholders described unmet needs around rapid, non-destructive cell quality assessment that current fluorescence-based methods cannot meet.
- **MCAS Digital Pathology.** The Multi-Camera Array Scanner digitizes biological samples four times faster than current whole-slide scanners while producing 3D, AI-analyzable images. Stakeholder interviews with pathologists and lab directors clarified the resolution, magnification, and workflow-integration thresholds the technology must meet to be adopted in clinical pathology.
- **Liposomes for Agricultural Nutrient Delivery.** Seventeen interviews with farmers, agricultural scientists, fertilizer specialists, and crop consultants evaluated whether liposome-encapsulated nutrient delivery could meaningfully improve on conventional fertilization. Findings clarified the economic and behavioral conditions under which the technology could plausibly disrupt existing practice.
- **Red Queen Circuit for Microbial Engineering.** Approximately 14 customer-discovery interviews with biomanufacturing R&D teams and process engineers evaluated the commercial potential of a genetic system that accelerates microbial evolution. The interview data ultimately drove a strategic pivot in how the research team frames the technology's commercial path.

Who We Talked To: Stakeholder Composition Across All Interviews



Our 100 interviews spanned the full ecosystem around each technology—clinicians and end-users who would use the technology day-to-day, industry leaders who would commercialize it, and academic researchers who could build on it.

Outputs and Impact

Deliverables for the research teams.

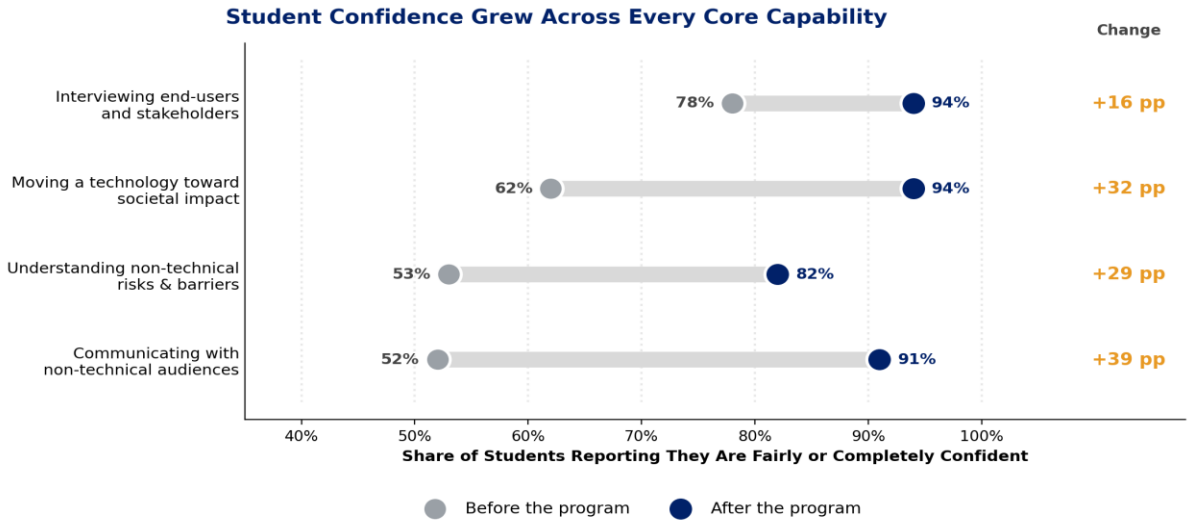
Our team's work produced five technology-specific final reports, one per research technology, that were delivered directly to the PhD mentors and faculty principal investigators. Each report contains an evaluation of

the priority use-cases, the full stakeholder evidence base, and concrete recommendations for how the research team might shape ongoing development to better meet end-user needs.

Beyond the reports themselves, the project leaves behind a structured customer-discovery dataset of 100 interviews and a use-case database of more than 1,250 candidate applications, both of which remain available to Duke researchers as they decide how to advance their work toward societal impact.

Student learning and growth.

The most lasting outputs of the project are arguably the students themselves. Across the program's three cohorts to date—Fall 2024, Spring 2025, and Fall 2025—we collected matched pre- and post-program surveys measuring student confidence on the four core capabilities the project is designed to build. The data tell a consistent story: students arrived already comfortable interviewing stakeholders, and the program substantially strengthened that capability while delivering even larger gains in the harder, more abstract skills of moving a technology toward societal impact, reasoning about non-technical commercialization risks, and communicating with audiences outside one's technical field.



Pre-survey responses from 44–45 students; post-survey responses from 32 students across the program's Fall 2024, Spring 2025, and Fall 2025 cohorts.

Share of students reporting they are fairly or completely confident on each capability, before and after the program. Pre-survey n = 44–45; post-survey n = 32. Among the 26 students with matched pre/post responses, mean confidence rose by roughly half a point on a five-point scale across every capability, with the largest gain (+0.81) in communicating with non-technical audiences.

The headline shift is in communication: only 52% of students felt fairly or completely confident speaking with non-technical audiences at the start of the program, and 91% felt that way by the end—a 39-percentage-point increase. Confidence in moving a technology toward societal impact saw a comparable jump (62% → 94%). Open-response data add texture to those numbers. Students consistently described three areas of growth: comfort engaging with senior experts in unfamiliar fields, fluency in customer-discovery and qualitative-research methods, and a critical, working understanding of how to use AI tools as a research partner rather than a black box.

> *"This semester, I learned how to translate raw interview data into meaningful commercialization insights, which was completely new to me. I gained practical skills conducting stakeholder interviews,*

> *identifying patterns across qualitative data, and evaluating whether a technology has real market fit. I also learned how to build and refine a Custom GPT, which helped me understand how AI tools can support early-stage research and decision-making." —**Bass Connections team member, post-program survey***
>
> *"This semester helped me grow in how I communicate with professionals and interpret technical information. I feel more confident navigating conversations in a field I knew almost nothing about before." —**Bass Connections team member, post-program survey***
>
> *"This semester was genuinely rewarding, and I feel lucky to have worked with a team that communicated well and supported each other. The clear expectations and consistent check-ins helped us stay on track, and I really appreciated the balance between independence and guidance—we had space to take ownership of the project while always knowing support was available when needed." —**Bass Connections team member, post-program survey***
>
> *"I appreciate being given the opportunity to explore this use case of AI and the things I've gotten to work on as a result—meeting my team and other new people, the AI health summit, my own AI web tool, and the various custom GPTs." —**Bass Connections team member, post-program survey***

Impact on the next cohort and beyond.

Several students explicitly noted that the project changed how they understand the path from research to real-world impact—and what their own role in it could be. As one team member put it, the work made clear "how important it is to interview and communicate with members of an industry when working on a project … not only to ensure that the technology is feasible, but also to understand that what we work on is actually necessary and can make a substantial impact." That mindset shift, scaled across cohorts, is the deeper output of the project: a growing community of Duke students who can move comfortably between cutting-edge research and the stakeholders it is meant to serve, and who carry that capability into industry, graduate study, and the next generation of Duke ventures.