



# FISCHELL DEPARTMENT OF BIOENGINEERING

## STRATEGIC PLAN

2025 – 2030



January 2025

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# EXECUTIVE SUMMARY

## **ABOUT THIS STRATEGIC PLAN**

The Fischell Department of Bioengineering (BIOE) is dedicated to research and educational excellence that improves the lives of Marylanders and the nation. Established in 2006, the department has grown rapidly in size, stature, and impact. In 2023, as the department was completing its first five-year strategic plan (published in 2019), U.S. News & World Report (USNWR) reported that the undergraduate program had risen in the rankings to 8<sup>th</sup> among public universities and 21<sup>st</sup> overall. In 2024, the graduate program rose in the USNWR rankings to 12<sup>th</sup> among public institutions and 28<sup>th</sup> overall.

In November 2023, the department published an outcome report capturing the progress made on its strategic goals and targets from its strategic plan, highlighting the contributions that faculty and students made to the department and measuring growth in areas including rankings, research expenditures, and student employment outcomes.

Building on this success, this strategic plan outlines the department's strategy for the next five years. In its next phase of growth, BIOE will differentiate itself by harnessing the assets of the broader university, the proximity of government institutions, and the entrepreneurial capability of industry partners to accelerate the real-world impacts of its scholarship, research, and educational excellence.



## Mission

To empower our students, trainees, staff, and faculty to change the world by discovering knowledge and translating innovative bioengineering research that addresses societal grand challenges.



## Vision

To lead in education and research excellence so that we can improve the quality of life for the citizens of the world.

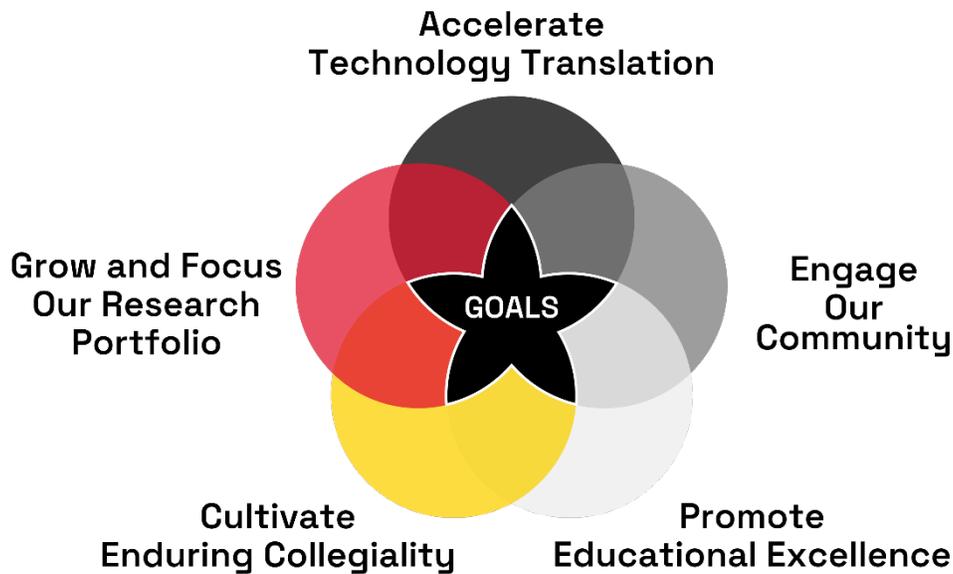
## Values

BIOE's values are at the core of its identity, culture, and success. These values inform how each member conducts their work and propels the department forward in achieving its mission and goals.

- **Integrity First:** Uphold and exemplify the highest standards of scientific and academic ethics; treat others with respect; pursue research for the common good.
- **Excellence Always:** Strive for the highest standards in research, scholarship, and education.
- **Scientific Entrepreneurship:** Seek out solutions, do work that helps others, and deliver scientific innovations to those who need it; harness research, industry, and the market to change the world.
- **Diversity of Thought:** Respect, include, and support others with different backgrounds, attributes, skills, and status; encourage diverse ideas to drive creativity, innovation, and translation.
- **Collaborative Innovation:** Nurture a collegial culture that promotes collaboration with academic colleagues and industry partners to create research synergies, inspire innovation, and accelerate translation.

## Goals

Our five overarching goals and our emphasis around each for the next five years are described below:



- 1) **Grow and Focus Our Research Portfolio:** Grow and diversify funding support, collaboration, and partnerships, while identifying scientific domains of excellence on which to focus.
- 2) **Accelerate Technology Translation:** Foster partnerships and processes to accelerate translation while emphasizing problem-focused research that addresses real-world challenges.
- 3) **Engage Our Community:** Strengthen our community impact, expand internal and external communications efforts to highlight successes, and enhance our reputation locally, nationally, and internationally.
- 4) **Promote Educational Excellence:** Attract top-tier students passionate about research and provide curriculum, programs, and mentorship that prepare all students for career success, including scientific and entrepreneurial achievement.
- 5) **Cultivate Enduring Collegiality:** Continually strengthen and evolve our collegial culture to enable synergies that inspire and foster scientific collaboration and teamwork.

Each goal has initiatives, and each initiative has associated activities that describe more detailed tactics. As this strategic plan is a living document, these initiatives and activities will be refined over time.

# INITIATIVES, ACTIVITIES, AND METRICS



# GOAL 1



## Grow and Focus Our Research Portfolio

Grow and diversify funding support, collaboration, and partnerships, while identifying scientific domains of excellence on which to focus.

## INITIATIVES AND ACTIVITIES

**As funding, partnerships, and the department grow, pursue focused research areas to maximize impact and differentiate the department in domains of excellence**

- ▶ Use a consensus approach to define areas of focus with substantial opportunity for translation and real-world impact
- ▶ Pursue and develop faculty, trainees, students, and funding to support areas of focus
- ▶ Create research centers of excellence to align with focus areas

**Expand multidisciplinary research opportunities through collaboration with the broader UMD ecosystem, the state of Maryland, and industry partners**

- ▶ Partner with the medical school, clinical departments, the R Adams Cowley Shock Trauma Center, and industry members to identify meaningful problems and bioengineering solutions
- ▶ Collaborate with the state of Maryland to support life science start-ups
- ▶ Partner with the University of Maryland Baltimore (UMB) to pursue large seed grants and to share equipment and space
- ▶ Incentivize and recognize successful interdisciplinary collaboration with other departments and with industry partners
- ▶ Provide more outreach and programming to help students find laboratories and explore PhDs at partnered institutions like UMB, the U.S. Food and Drug Administration (FDA), and the National Institutes of Health (NIH)

**Increase and diversify funding streams across government and industry**

- ▶ Develop a relationship management strategy beyond current government partners to include the U.S. Department of Defense (Telemedicine and Advanced Technology Research Center [TATRC], the Defense Advanced Research Projects Agency [DARPA], U.S. Army Futures Command, Defense Innovation Unit); U.S. Department of Health and Human Services (Center for the Biomedical Advanced Research and Development Authority [BARDA], Advanced Research Projects Agency for Health [ARPA-H]); and other agencies to better understand needs, priorities, and funding opportunities

- ▶ Expand industry relationships and partnerships; leverage the advisory board and tailor its composition for maximum impact
- ▶ Support faculty in their pursuit of securing center and training grants
- ▶ Provide more resources for technical writing, document design, and grant preparation

**Attract and retain high-caliber faculty, trainees, and students who are passionate about research and making real-world impact**

- ▶ Expand internal and external communications efforts to create community, recognize achievement, and enhance reputation
- ▶ Enhance the educational experience at BIOE so all students have opportunities for success
- ▶ Nurture a collegial and collaborative culture where students can freely share ideas, seek help, and work together on research and projects

**METRICS**

*Principal metrics are bolded.*

- ▶ **# of tenure-track department faculty members**
- ▶ **% tenure-track faculty members with active NIH or equivalent projects**
- ▶ # of research themes created and resulting center grant applications per year
- ▶ % faculty with active intra- and extra-departmental collaborations
- ▶ # of grants from new sources per year

**2030 Targets**

**30**  
 >75%  
 1  
 >90%  
 2–3



## GOAL 2



# Accelerate Technology Translation

Foster partnerships and processes to accelerate translation while emphasizing problem-focused research that addresses real-world challenges.

## INITIATIVES AND ACTIVITIES

### Expand and deepen industry, government, and UMD partnerships with an emphasis on translation and entrepreneurial ventures

- ▶ Create an internal shark-tank-like competition with industry judges that is funded from a donor-supported internal venture fund
- ▶ Develop design challenges or other industry-sponsored competitions to give students hands-on experience
- ▶ Increase partnerships with and connections to regulatory experts (e.g., FDA) to accelerate product development and licensing
- ▶ Expand student and faculty exposure by organizing site visits to biotech firms, research labs, and device manufacturers
- ▶ Sponsor more career fairs and networking events to bring industry representatives to campus

### Support students, trainees, and faculty with launching industry start-ups

- ▶ Partner with the Robert H. Smith School of Business to explore the potential for co-sponsored entrepreneurial ventures
- ▶ Provide technology development training to increase invention disclosures among students, trainees, and faculty
- ▶ Work with well-established UMD units (i.e., UM Ventures, Mtech, xFoundry@UMD) to provide training on translation and support translation efforts

### Expand translation and regulatory knowledge across the department

- ▶ Support continuous knowledge development on regulatory practices
- ▶ Offer new courses on regulatory science (e.g., GMP and ISO requirements, clinical development)
- ▶ Invite regulatory experts to give lectures
- ▶ Identify experts to consult on translation, regulatory concerns, and clinical trials for departmental technologies

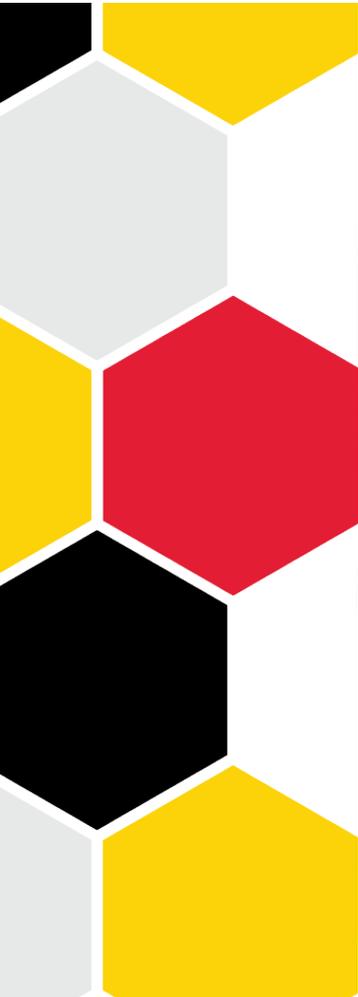
## METRICS

*Principal metrics are bolded.*

- ▶ **# of invention disclosures submitted per year**
- ▶ # of industry, regulatory, and venture events hosted by the department per year
- ▶ # of industry, regulatory, and venture visits to the department per year
- ▶ # of faculty, trainee, and student visits to industry and regulatory bodies per year
- ▶ # of licenses executed and start-ups created per year

### 2030 Targets

<b>15</b>
1
4
4
1





## GOAL 3

# Engage Our Community

Strengthen our community impact, expand internal and external communications efforts to highlight successes, and enhance our reputation locally, nationally, and internationally.

## INITIATIVES AND ACTIVITIES

### Expand department presence and recognition in local, state, national, and international bioengineering communities

- ▶ Build a portfolio of research projects to position faculty members for state, national, and international awards
- ▶ Support faculty efforts to create research centers of excellence

### Celebrate and communicate bioengineering successes

- ▶ Invest in and then develop a formal communications, marketing, and branding strategy that is both internally and externally focused
- ▶ Grow internal communications through newsletters, social media, and community news outlets to build awareness and recognition
- ▶ Expand external communications through national and international channels
- ▶ Continue to evaluate the reward structure at the department to ensure that everyone has the opportunity to get recognition for their work

### Increase engagement with local and state communities

- ▶ Strengthen existing local partnerships and build infrastructure for forming new partnerships
- ▶ Invite community members to engage with and to speak at the department
- ▶ Bring interactive lessons to K-12 schools that teach STEM concepts

## METRICS

*Principal metrics are bolded.*

	<b>2030 Targets</b>
▶ <b># of high-impact papers per year</b>	<b>10</b>
▶ <b># of national and international awards given to faculty per year</b>	<b>5</b>
▶ # of trainees placed in faculty positions per year	3
▶ # of stories placed in external media	4
▶ # of external and internal newsletters sent out to community partners	6
▶ # of local and state engagement activities per year	3



## GOAL 4

# Promote Educational Excellence

Attract top-tier students passionate about research and provide curriculum, programs, and mentorship that prepare all students for career success, including scientific and entrepreneurial achievement.

## INITIATIVES AND ACTIVITIES

Create partnerships and programs to expose students to real-world challenges, and then spotlight applications of bioengineering research that address those challenges

- ▶ Create a partnership with the Robert H. Smith School of Business focused on bioengineering entrepreneurship and start-up basics
- ▶ Provide open lectures on health care priorities to inform students of real-world clinical challenges
- ▶ Offer more career seminars with non-academic speakers such as C-suite executives, venture capitalists, science policy experts, communications analysts, and non-profit representatives
- ▶ Create new electives in the BIOE tracks: Biotechnology & Therapeutics Engineering, Biomechanics & Biomaterials, and Biomedical Instrumentation

Provide students with experiential learning opportunities so they can build relevant skillsets for succeeding in the workforce

- ▶ Reevaluate what skills are needed for job placement and career success
- ▶ Offer BIOE computer science and data science courses that reflect the trends of industry earlier in the curriculum
- ▶ Raise awareness among both undergraduate and graduate students on available partnerships and fellowships
- ▶ Assess and improve student resources for innovative research, impactful industry and academic internships, and job placement
- ▶ Incentivize development and implementation of skill-based courses in the bioengineering curriculum

Adapt teaching and advising practices to be more inclusive of a wide range of students (e.g., first generation college, underrepresented, neurodiverse) to improve student success

- ▶ Survey the student body to identify the skills gaps of new students
- ▶ Provide support to faculty on how to implement alternative learning approaches
- ▶ Equip advisors with training on how to support diverse student needs

## Provide graduate students with clear guidance and the tools needed to excel

- ▶ Improve the graduate student experience by streamlining qualifying exams and ensuring that principal investigator / student pairings are compatible
- ▶ Develop materials to prepare graduate students for the Research Aptitude Examination
- ▶ Encourage graduate students to take a writing class to prepare them for writing their thesis
- ▶ Grow support structures for PhD students conducting research at laboratories outside of College Park
- ▶ Require principal investigators to supervise graduate students to complete mentor training, ensuring graduate students and principal investigators identify and document shared expectations for the mentorship

## METRICS

*Principal metrics are bolded.*

- ▶ **% undergraduate students placed in industry or academia upon graduation**
- ▶ **# of PhD students enrolled each year**
- ▶ # of PhD applicants per year
- ▶ Six-year PhD graduation rate
- ▶ # of graduate fellowships awarded per year
- ▶ # of faculty mentorship / advising training events per year

### 2030 Targets

>90%

35

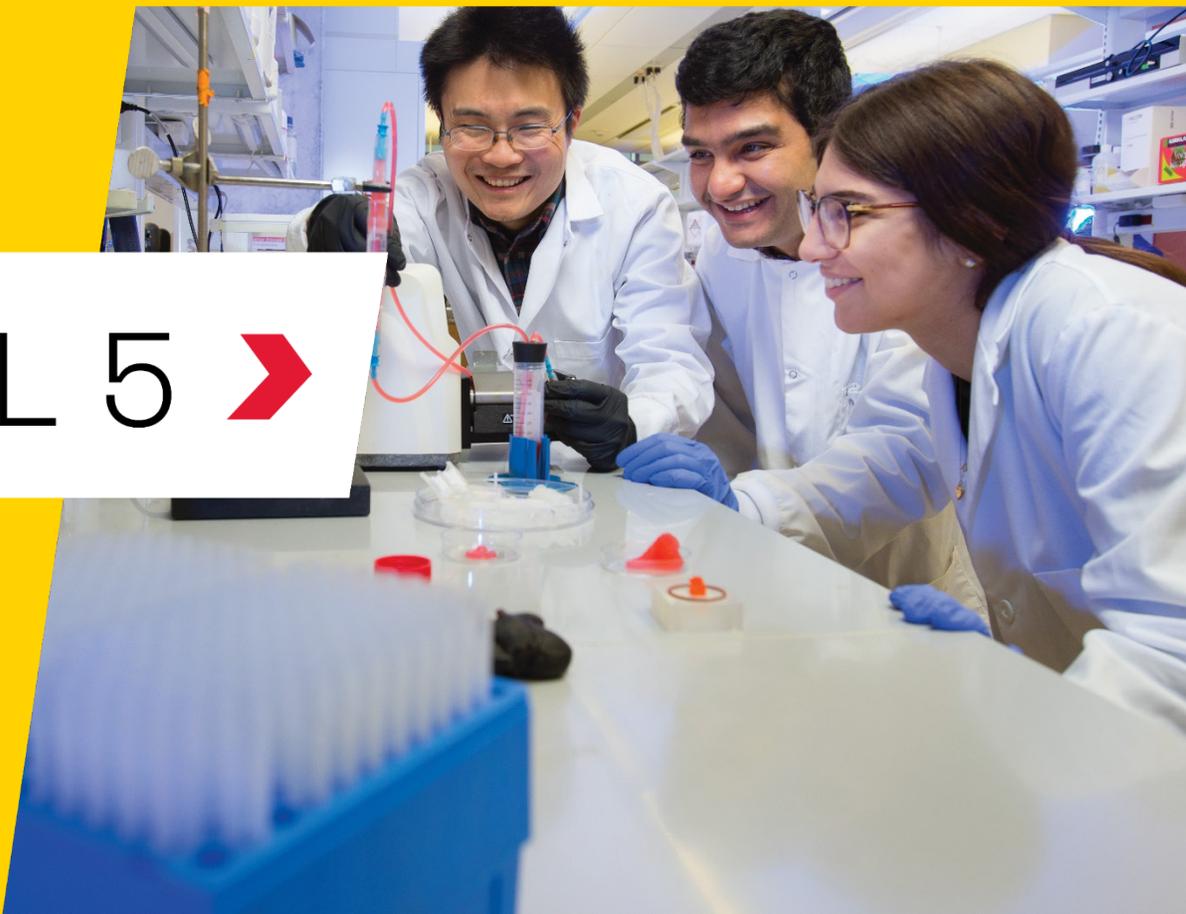
400

85%

35

4



A photograph of three scientists in a laboratory setting. They are wearing white lab coats and are gathered around a lab bench, looking at something on the bench with interest and smiles. The lab bench has various pieces of equipment, including a pipette, a petri dish, and some containers. The background shows shelves with lab supplies.

## GOAL 5

# Cultivate Enduring Collegiality

Continually strengthen and evolve our collegial culture to enable synergies that inspire and foster scientific collaboration and teamwork.

## **INITIATIVES AND ACTIVITIES**

### **Assess BIOE climate and incentivize activities that foster target culture**

- ▶ Periodically survey faculty, staff, trainees, and students to evaluate the BIOE culture climate and identify areas of focus to better align with department values
- ▶ Provide faculty and staff with financial and career incentives for advancing collaborative activities and projects that foster a more positive departmental culture

### **Support the career growth of BIOE faculty, trainees, students, and staff**

- ▶ Regularly share detailed feedback and conduct detailed reviews with faculty and staff via individual development plans or other professional development resources
- ▶ Increase recognition of faculty achievement by improving awareness of external award opportunities
- ▶ Provide staff with resources on how to achieve success across multiple growth pathways
- ▶ Support trainees and students as they are transitioning into or out of fellowships

### **Continue our commitment to diversity and inclusion**

- ▶ Continually assess departmental support for trainees and students to ensure their professional and personal growth
- ▶ Be a college leader in recognizing and addressing diversity and inclusion issues

### **Foster an interconnected, supportive community of faculty, trainees, students, and staff**

- ▶ Encourage regular and informal interactions between students, faculty, trainees, and staff
- ▶ Host departmental happy hours or family events every semester
- ▶ Harness the communications strategy (Goal 3) to promote cultural objectives
- ▶ Acknowledge institutional changes and how they may impact the department's staff and day-to-day operations
- ▶ Prioritize faculty mentorship of students to help students navigate academia and determine their career path

- ▶ Emphasize collaboration as a strength of the department to promote positive student experiences in learning, laboratory work, and career preparation
- ▶ Encourage resource sharing and collaboration (e.g., equipment, spaces) to maintain the current collegial work environment as the department grows and hits space constraints

## METRICS

*Principal metrics are bolded.*

### 2030 Targets

▶ <b># of social events for faculty, staff, trainees, and students each semester</b>	3
▶ <b># of workshops, career networking, and well-being events each semester</b>	3
▶ # of climate surveys executed each year	2
▶ # of staff career growth opportunities per year	6
▶ % participation at each semester event	75%



# NEXT STEPS TO 2030

We are committed to advancing the frontiers of bioengineering education and innovative biomedical research and translation. Over our history, we have strategically focused on integrating cutting-edge technologies into our curriculum and research initiatives and worked to strengthen our partnerships with industry, government, community organizations, and our peer institutions. Our students and graduates have made significant contributions to healthcare and sustainable biomanufacturing amid the rapid growth and expansion of the science.

Looking ahead to 2030 and beyond, our strategic plan emphasizes continued expansion of our research capabilities and enhancement of our educational programs. We aim to build on our strong foundation to explore potential areas of topical focus for our research and expand our reach through new partnerships. In particular, we are launching a new initiative with the University of Maryland School of Medicine to build a second home for the department in Baltimore. However, no matter what the future holds for our department, we will remain firm in our dedication to provide equal opportunities for all current and future bioengineers to succeed here, and to build the next generation of bioengineering leaders who will transform healthcare and improve the quality of life for all.

Our commitment to excellence and innovation will continue to drive our efforts as we navigate the changing bioengineering landscape.



