Olin College of Engineering

STRATEGIC PLAN:

IMPACT-CENTERED EDUCATION

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Foreword

Looking Back, Looking Forward

As we look forward to the next decade for Olin College, we remind ourselves of our origins. The F.W. Olin Foundation's visionary gift was accompanied by the extraordinary vision outlined in the College's founding precepts:

> *"With respect to the Foundation's reasons for establishing the College, let it be said that the Foundation does not seek to establish a generic undergraduate engineering college—one that will simply offer programs similar to many others around the country. Olin College is intended to be different—not for the mere sake of being different—but to be an important and constant contributor to the advancement of engineering education in America and throughout the world and, through its graduates, to do good for humankind."*

These words serve as our North Star and articulate the unique reason for our existence: to contribute to the advancement of engineering education. They also highlight characteristics that we hold foundational: being different in service of the simultaneous imperatives to innovate, to make important and constant contributions, and to do good for humankind through our graduates.

Olin's first decades responded to the pressing challenges at the time of our founding. The National Science Foundation (NSF) and others argued that engineering education needed to incorporate more design, address teamwork and communication skills, shift from a "sit-and-listen" to an engaged and hands-on experience, and address the profession's gender gap. Over the last two decades Olin has not only addressed these precipitating challenges but contributed to a broader change throughout engineering education at large. Engineering education changes that were thought impossible in 1995 are now underway within institutions across the country, and Olin's innovations and contributions are recognized globally.

The problems of today differ from those that prompted Olin's founding three decades ago. A new set of issues press upon the NSF and other thought leaders focused on engineering education: we must broaden participation in engineering, and we must address the societal challenges that transcend disciplinary boundaries. Simultaneously, those in higher education broadly, as well as here at Olin, are contending with the real challenges related to the high cost of education.

Olin was founded to contribute into the future in an ongoing, relevant, and significant way. As we prepare for "important and constant" contributions ahead within the context of engineering education, we are driven to respond to these pressing challenges.

OUR VISION

Engineering for Everyone

This strategic plan is grounded in a vision for the future of engineering that is captured in three words: *Engineering for Everyone*.

Engineering for Everyone has two embedded meanings. First, it means *engineering education needs to be for everyone.* Today the NSF calls for broadening participation because engineering education systematically excludes large groups of people, to the detriment of individuals, societies, and economies. To address this challenge, engineering education needs to be welcoming to, and enable the success of, people from all backgrounds.

Engineering for Everyone also means that *engineering as a profession must serve everyone.* We need to go beyond a disciplinary perspective of engineering, and beyond the definition of engineering as "using science to solve technical problems." Engineers need to work across disciplinary boundaries to ask not only "How might we build it?," but also "Who is it for?," "Why are building it?," "Who else is impacted?" and "Should we build it at all?"—and to develop the disciplinary humility necessary to recognize the limits of engineering and to collaborate with experts in other fields. Engineering education must not only focus on producing good workers, but also on developing good people and good citizens.

The founding precepts articulate a compelling and exciting argument for why Olin exists. Our vision of Engineering for Everyone takes that argument forward, responding to today's grand challenges in engineering education and in the world.

OUR STRATEGY

Advancing Engineering for Everyone through Impact-centered Education

The vision of Engineering for Everyone is relevant and compelling. And it demands a new kind of engineer. One who embodies the following:

- PERSONAL IDENTITY & INCLINATION TO SERVE society and the planet, not just themselves and their employer.
- PROFESSIONAL & TECHNICAL SKILLS & ATTITUDES to solve problems by understanding people's needs, generating creative solutions, and thinking and acting entrepreneurially.
- SYSTEMS THINKERS who appreciate and understand perspectives other than their own, approach situations with humility, and are willing to question whether engineering is the right approach to a given situation.
- REPRESENT THE DIVERSITY OF TALENT in society, including the talent that has been historically excluded from engineering.

Unfortunately, engineering education today is largely failing to achieve these outcomes. Too often engineering education diminishes, rather than enhances, students' desire to serve others. Too many engineering graduates believe that other disciplines, and other cultural perspectives, are inferior to their own. And too many potential engineers are excluded from the profession.

Given this need to shift engineering education, our strategy focuses on advancing the vision of Engineering for Everyone by developing new educational approaches, and by working with others to create transformation outside of Olin. This strategy builds on our learnings and approach over our first twenty years but shifts the focus of our efforts to address current challenges. The strategy does *not* suggest that Olin should advance Engineering for Everyone by educating everyone. Rather, the strategy is premised on the idea that our leverage is not in numbers, but in the work that we do with people outside Olin, the educational changes we help to create, and the change agents and leaders who graduate from Olin.

There is enormous work to be done in defining, developing, and refining the kind of education that develops this new kind of engineer. But, based on our experience over the last two decades, we have a strong sense of what it might look like. In particular, we propose that engineering education needs to shift in the direction of *Impact-centered Education*: education that is focused on not only preparing students to have impact but also on engaging students in creating authentic impact and in making the world a better place. Core to this idea is the proposition that the best way to learn is (at least in part) to do, and the best way to develop an identity as someone who is committed to making the world a better place is to purposefully engage with making the world a better place.

"Impact-centered Education" stands in contrast to the ubiquitous "student-centered education." The ideas that gave birth to the phrase "student-centered education" (and that led to its inclusion in our founding precepts) remain valid: "student-centered" is a reaction to "faculty-centered education," a suggestion that learning should not simply be about the faculty member, but rather should be a partnership between instructors and students. But too often in higher education today, "student-centered" has become entirely focused on the individual to the exclusion of social good -- an approach that ultimately leads to self-centered outcomes, as well as skyrocketing costs across higher ed. Impact-centered Education decenters both the faculty member and the student, instead aligning both around purpose, meaning, and community through making impact—*together*.

The idea of Impact-centered Education is deeply connected to Olin's learnings over the past two decades. Key ideas include:

- REAL-WORLD IMPACT: A central curricular concept in Impact-centered Education is that every graduate has had multiple experiences that authentically focus on doing something that matters to someone outside of Olin and doing so in a way that is authentically focused on making an impact. This approach develops a graduate's identity as someone who can create value in the world and who has the responsibility to do so.
- TECHNICALLY RIGOROUS: Engineering graduates must ultimately be able to do the technical work of engineering, as well as be able to collaborate and communicate effectively. While the approach to developing these skills might change in an Impact-centered Education, they nonetheless must be addressed rigorously.
- INTENTIONALLY TRANSDISCIPLINARY: If students are to develop as systems thinkers, and if students are to appreciate different disciplinary lenses and connect and transcend individual disciplines, we must also attend to that from a curricular perspective—just as we have intentionally focused on design, teamwork, and a willingness to try something and learn from it. Indeed, we need close alignment and rigor across all aspects of the curriculum – not just the technical – if graduates are to effectively meet the real-world challenges presented by way of an Impact-centered Education.
- A DIVERSE COMMUNITY: Impact-centered education benefits from, and has benefits for, a diverse community. Research shows that diverse teams are more effective than non-diverse teams in making a positive impact in the world. A diverse community is critical for developing students' understanding and appreciation of perspectives other than their own. At the same time, there is evidence that educational experiences that are more directly connected to making the world a better place are more attractive, welcoming, and inclusive for students from diverse backgrounds.
- AN EVERYONE CULTURE: We know that a holistic education that develops students' identities, as well as their knowledge, requires not just a curriculum but also a community that is dedicated to learning and growth and that values and respects the perspectives of all community members—a culture in which everyone is a learner, and everyone is an educator.
- DOING MORE BY DOING LESS: A key part of Impact-centered Education is the extent to which it enables -- both at an individual level and at an institutional level – increased focus, efficiency, and impact. This applies at the level of an individual faculty member who might align external

impact work with work developing students, using a single set of activities to accomplish both goals. By the same token, at the institutional level, Impact-centered Education enables a more robust business model and suggests ways to align our mission of external educational directly with students' educational experiences at Olin.

This is a plan that builds on Olin's history and strengths: our emphasis on a human-centered approach to engineering; our early commitment to gender equity; our willingness to try something new, make mistakes, and learn from them; our position as a leading innovator in engineering education. It also is a plan that will require Olin to grow and learn. Making progress will require balancing hubris and humility, partnering with and learning from those who know more and have done more. And it will require activating and engaging all parts of the Olin community—from students to staff to faculty to friends to alumni.

Let's begin the work!

Our Vision

Engineering for Everyone.

Our Mission

Transforming engineering education toward a world in which engineering serves everyone.

Our Values

Engineering for impact: thriving for all.

At Olin, we are engineering for impact: we strive to create a community and contribute to a world in which all can thrive.

As we pursue our vision of Engineering for Everyone, we work intentionally to reinforce the values to which we aspire. We reflect on who we are now and who we want to be and strive to embody the ideals we embrace.

We commit to serving the Olin community and society at large by enacting our values of **equity and justice, trust, learning and growth, sustainability,** and **collaboration** for the benefit of others, especially those who are most in need.

As a community, we:

- Fight for **equity and justice**.
- Offer our **trust** and earn the **trust** of others through our words and actions.
- Continually strive to **learn**, to **grow**, and to **share** what we have learned.
- Protect and **sustain** our natural, built, and financial resources so that they might equitably benefit future generations.
- **Collaborate**; find meaning and joy in connection with others.

The Plan

Executive Summary

The plan is organized into four overarching goals, supported by objectives and actions. These were all developed via community engagement and discussions with individual departments. Some actions have begun; some build on and continue work that has been happening for years; some are only in the earliest planning stages, and some will be identified as we move forward. A strategic implementation group who reports to the president will monitor progress on these goals and objectives as we move forward.

Baked into this plan are underlying assumptions about what Olin aspires to be and do. The plan is built around Olin's commitment to ongoing innovation, to being an important and constant contributor – that we will strive to do innovative and important work that justifies and strengthens our reputation as a global leader in engineering education. The plan also assumes that we will continue to recruit fabulous students to be part of this endeavor, and that the education those students get during their time at Olin will prepare them – both technically and personally - to be exceptional engineering innovators and leaders. The idea of Engineering for Everyone, the concept of an Impact-centered Education, and the goals and objectives that constitute the plan will enable us to remain true to these assumptions.

Goal 1: A Sustainable Model

Business and operating models align with our values and both enable and leverage Impact-centered Education.

A sustainable model for Olin's operation is foundational to our plan. This will not happen overnight; rather it will require investment at the outset, and careful monitoring and course correction as we move forward. To begin, we must invest to develop new and expanded approaches to revenue generation—both philanthropic and earned—that integrate with and leverage Impact-centered Education. We will reconsider our approaches to financial aid, both to increase access and equity and to align with a shift from student-as-consumer to student-as-participant. We will invest in infrastructure and processes that enable us to operate efficiently and effectively. Finally, to make true and transformative long-term impact, we must consider long-term financial sustainability alongside other forms of sustainability (as defined by the UN's 2030 Agenda for Sustainable Development, summarized in the terms people, planet, prosperity, peace, partnership).

Goal 2: An Impact-Centered Curriculum

An impact-centered curriculum that prepares and inclines graduates to serve people, society, and the planet.

We envision an "impact-centered curriculum" that builds on Olin's strengths of innovation, entrepreneurship, interdisciplinarity, and project-based learning, extending these ideas with a greater focus on preparing graduates who have the necessary creativity, humility, perspective, skills, and personal identity to realize the founding precepts' call to "do good in the world." Our vision of an impact-centered curriculum includes a deepened focus on real-world experiences that are aimed at creating impact—educational experiences that produce outcomes that matter to people outside of Olin and that embody the vision of "engineering serving everyone." This kind of real-world engagement is coupled with a transdisciplinary approach that goes beyond interdisciplinarity to intentionally develop skills and mindsets needed to bridge and transcend disciplines, such as systems thinking, an appreciation of different perspectives, and the humility to recognize that engineering is not always the right solution. Such a curriculum will require external partnerships as well as shifts in how faculty approach their own impact.

Goal 3: An Aligned Community

Community and culture align with the pursuit of Impact-centered Education.

Recognizing an impact-centered education requires far more than just an impact-centered curriculum, we also must attend to the whole of student experience, as well as to what kind of place Olin is and how Olin functions. We will work toward becoming a diverse community—students and employees. We will more deeply integrate our approach to the student experience from the dorm to the classroom to the world. We will work intentionally to create structures and policies that align with our values and that build a shared sense of purpose and belonging. As a community, we will develop the necessary knowledge, skills, and organizational structures to pursue the vision of Impact-centered Education.

Goal 4: An Engine for Change

Policies, procedures, and structures enable ongoing learning, improvement, and transformation both internally and externally.

Creating an Impact-centered Education and advancing our mission of broader educational transformation both require that we create curricular and operational structures that enable ongoing experimentation and learning and that facilitate our connection to and collaboration with others who aspire to transform engineering education. We must be able to conduct educational experiments intentionally, and to capture and synthesize learnings, both so that we can feed Olin's

experimentation and so that we can effectively translate our insights and share with others. Driving change will also require building relationships, and an approach to experimentation and learning that will be transparent, collaborative, and humble.

Goal 1: A Sustainable Model

Business and operating models align with our values and both enable and leverage Impact-centered Education.

Objective 1.1: Increased revenue in support of our cause and our vision of Impact-centered Education.

We will build a new fundraising approach designed around Olin's cause of Engineering for Everyone and our impact-centered educational approach. We will develop a culture of shared responsibility and philanthropy throughout the organization. We will develop approaches to earned revenue that align with the idea of Impact-centered Education and that enable meaningful relational partnerships with external organizations.

Objective 1.2: An approach to financial aid that enables a shift in the student relationship while maintaining financial sustainability.

Impact-centered Education implies a move away from the student-as-consumer model of higher education toward a student-as-participant model. We will explore different approaches to financial aid that align with this model and emphasize increased access and equity.

Objective 1.3: Infrastructure, policies, and practices that enable efficient and effective work

If Olin is to take on new challenges, we must address the need to do the "basics" better. We must recognize and support the vital operational roles that enable us to pursue impact. This requires that we invest in infrastructure, professional development of managers, and development of streamlined and effective approaches to our work.

Objective 1.4: An organization structured for sustainability

We will center sustainability (as defined by the UN's 2030 Agenda for Sustainable Development) in the structure and operations of the college, in order to enact the changes we wish to see in the world, align with our educational goals, and support our ability to make long-term impact.

Goal 2: An Impact-Centered Curriculum

An impact-centered curriculum that prepares and inclines graduates to serve people, society, and the planet.

Objective 2.1: Alignment on prioritized impact areas for Olin.

We will identify and pursue a small number of impact areas to enable greater collaboration and greater impact. Impact areas will be chosen to build on Olin's strengths, will align with our vision of Engineering for Everyone and our mission, and will be feasible areas for engagement and impact. We will create policies and structures that enable and support faculty and staff impact within these areas.

Objective 2.2: Transdisciplinary educational experiences that prepare students to approach impact thoughtfully.

We will re-think the question of what is fundamental to an engineering undergraduate education, shifting our curricular approach toward an explicitly transdisciplinary frame. We will create new learning experiences that introduce students to different disciplinary lenses and help them bridge and transcend those disciplines, that prepare students for systems thinking, that help students appreciate that engineering is not always the solution, and that develop the capacity to collaborate across differences.

Objective 2.3: Expanded opportunities for impact-oriented, real-world experiences in the curriculum.

We will create experiences for students to learn by doing real work that matters to real people, in alignment with the concept of “engineering serving everyone.” Faculty, staff, and external collaborators will act not only as guides, but also as mentors and senior coworkers as we work together to create impact. These real-world experiences will focus on creating meaningful impact and will occupy a substantially larger curricular footprint than they do today.

Objective 2.4: An understanding of key curricular changes to realize Impact-centered Education.

We will analyze our existing curriculum and accreditation choices through the lens of Impact-centered Education and determine what changes to the curriculum, offered degree programs, and/ or accreditation approaches are strategically necessary to implement our vision.

Objective 2.5: Impact-aligned partnerships and collaborations.

We will develop the necessary infrastructure and policies to enable and support a greater fraction of real-world experiences in the curriculum and different kinds of student, faculty, and staff engagement with that work. We will identify, build relationships with, learn from, and collaborate with external organizations and communities that are engaging in real-world impact, and that are aligned with our identified impact areas.

Goal 3: An Aligned Community

Community and culture align with the pursuit of Impact-centered Education.

Objective 3.1: A more diverse and inclusive Olin community.

Recognizing that engineering has historically excluded underrepresented minorities, that appreciation of diverse perspectives is critical for the kind of education we envision, and that diversity is a key component of effective and creative teams, we will work to further diversify both the Olin student population and the Olin employee population—not only bringing in people from diverse backgrounds but also enabling and supporting their success. We will intentionally create a sense of belonging for everyone at the college and create structures and processes that emphasize equity and inclusion in our operations.

Objective 3.2: A system to support for students' holistic development.

Recognizing that this kind of student development we value relies on far more than the curriculum, we will continue to develop an educational context, programs, and structures that support students' personal development, social and emotional learning, resilience, and mental and physical well-being. We will take steps to more deeply integrate the entirety of the student experience to realize our vision of impact-centered education.

Objective 3.3: A more purposeful and supportive workplace.

We will intentionally create a sense of belonging for everyone at the college. We will create structures and processes that emphasize equity and inclusion in our operations. We will foster a culture of shared responsibility, accountability and stewardship, courageous and effective discourse, and mutual understanding and respect. We will support the continued learning and growth of all employees as we build the capacities and mindsets necessary to create a truly inclusive and supportive Olin.

Objective 3.4: An employee community with a growing sense of connection to and capacity for supporting Impact-centered Education.

We will develop current employees, strategically hire new employees, and build partnerships with other institutions to develop communal knowledge and skills around transdisciplinary education; strategies for effective impact; diversity, equity, and inclusion; environmental citizenship; ethical frameworks and civic engagement; and the organizational needs of an Impact-centered Education and institution. We will create policies and programs that support employee professional

development and that enable greater engagement with and connection to the educational experience for all members of the Olin community.

Objective 3.5: Messaging that attracts new community members and partners to our mission, values, and work.

We will develop compelling and concise ways to communicate our vision of Engineering for Everyone, our mission of transformation, and our work toward embodying the ideas of Engineering for Everyone in our organization and our Impact-centered Education. We will strive to reflect our values and our work in our messaging and recruiting so that we continue to build a community working together in support of Engineering for Everyone.

Goal 4: An Engine for Change

Policies, procedures, and structures enable ongoing learning, improvement, and transformation both internally and externally.

Objective 4.1: A curricular infrastructure and change strategy that enable curricular experiments and transitions.

We will undertake an intentional, staged, multi-year, process to allow us to create significant curricular change while still meeting our commitments to students. This is likely to include changes to the curricular framework as well as changes to the curriculum.

Objective 4.2: Students who engage as collaborative partners in educational experimentation and educational change.

We will collaborate with students as we undertake educational experiments by clearly communicating our intentions and transparently sharing and developing insights. Similarly, we will intentionally provide students with opportunities to collaborate on educational change outside of Olin.

Objective 4.3: Structures and resources that support experimentation, synthesis, translation, and sharing of educational learnings.

We will intentionally devote resources and time, not just to doing experiments, but also to ensuring that educational experiments are appropriately observed, to doing the necessary synthesis work and translation work that allows people other than the experimenter(s) to benefit, and to sharing these translated insights both within Olin and outside of Olin—thus enabling change both inside and outside the institution.

Objective 4.4: Networks to advance Engineering for Everyone.

We will identify, connect, and collaborate with like-minded educators and organizations so that we can learn from each other. We will work as a convener and a connector to build a network of individuals and institutions who share our commitment to Engineering for Everyone.

Process and Timeline

APPROACH

Olin College's 2022-2027 Strategic Plan reflects a highly iterative planning process that engaged extensive input from Olin community members, including faculty, staff, students, the Board of Trustees, the Academic Life Leadership Team, and the College Council. The process was facilitated by a Strategic Advisory Team of faculty and staff who worked in close collaboration with those ultimately responsible for producing the final plan: Olin College's President, Provost, and leadership team.

TIMELINE

2018		
	May 2018	Academic Life retreat exploring Olin's Possible Futures
2019		
	May 2019	Community Retreat on Presidential Search, creation of *Presidential Prospectus*
2020		
	July 2020	Dr. Gilda Barabino joins Olin College as its Second President
	Sept.I 2020	President Barabino shares *Framework for Strategic Visioning and Doing*
2021		
	January 2021	President Barabino shares *A Vision for Olin* with the Olin Community
	August 2021	Olin Board of Trustees receive prototype *Strategic Plan*
	Dec. 2021	President's Strategic Advisory Team announced
2022		
	January 2022	Strategy Team synthesizes relevant historical work from Olin community
	February 2022	Board of Trustees, Faculty, and Staff receive draft *Strategic Plan*
	March 2022	Faculty and Staff feedback on Vision, Mission, and Strategic Initiatives
		President Barabino approves draft Values statement
	April 2022	College Council feedback on Strategic Goals and Objectives
		Student feedback on Mission and Vision at *Stay Late and Create* event
		Faculty and Staff feedback on updated draft *Strategic Plan*
		Board of Trustees feedback on penultimate draft *Strategic Plan*
		Board of Trustees receive final draft of *Strategic Plan*
	May	Board of Trustees votes on *Strategic Plan* at quarterly meeting

PEOPLE

Strategic Advisory Team

Lawrence Neeley, Strategic Advisory Team Lead and Associate Professor of Design and Entrepreneurship
Kristin Casasanto, Director of Post-Graduate Planning
Sam Michalka, Assistant Professor of Computational Neuroscience & Engineering
Susan Mihailidis, Associate Dean for Academic Affairs
Claire Rodgers, Associate Energy Engineer
Tim Ferguson Sauder, Professor of the Practice in Design
Alison Wood, Assistant Professor of Environmental Engineering

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Olin Academic Life Leadership Team

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Joanne Pratt, Associate Dean; Associate Professor of Biological Sciences
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Mark Somerville, Provost; Professor of Electrical Engineering and Physics
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C. Jason Woodard, Dean of External Programs and Partnerships; Associate Professor of Engineering and Entrepreneurship

Appendix: Impact Areas

If we are to shift in the direction of Impact-centered Education, we will benefit from focusing on strategic areas for impact, so that we can appropriately allocate resources and align effort. Such a focused approach will enable greater collaboration, more intentional approaches to generating philanthropic and earned revenue, and ultimately better advance our mission.

We imagine that, at any given time, there might be on the order of five different impact areas that are emphasized, in the sense that these areas have multiple faculty and staff engaged in the area and show up in substantive ways in the real-world impact portions of the curriculum. Impact areas thus become part of the narrative about what we—collectively—are doing in the world.

Defining impact areas does not exclude the possibility of work outside of these areas; indeed, it is desirable that the impact areas should shift over time to reflect both external opportunities and internal strengths and interests.

Criteria for Impact Areas

In determining impact areas, we must consider a few factors.

- Impact areas should be chosen with attention to the expertise and interests of Olin's faculty and staff, or with associated new hires to develop that capacity. It is not necessary that everyone who is working on an impact area begins with expertise in that area, but an impact area that does not have internal champions is unlikely to be successful.
- Impact areas should support Olin's vision of Engineering for Everyone—with respect to the idea of transforming engineering education, and/or with respect to the idea of engineering serving everyone.
- Impact areas should be feasible from a technical, facilities, student, and financial perspective. Work that exclusively requires doctoral-level training, or that demands multimillion-dollar dedicated facilities and equipment, is unlikely to be appropriate in an Olin environment.
- Impact areas should create opportunities for fundraising and/or earned revenue. Finding external support for this work will be critical for enabling more impact.

Proposed Impact Areas

Based on these criteria, we propose seven *possible* impact areas that Olin might pursue over the next years:

Address Climate Change

Climate change is clearly of extremely high importance, and it is also a topic of very high interest to students, faculty, and staff. Impact on climate change can happen both at the level of the institution (e.g., pursuing a climate commitment) as well as at a much broader level. Climate issues are intimately related to the vision of engineering serving everyone and are of high interest to many people outside of Olin, including potential funders. As an impact area, this might manifest as students, faculty, and staff working together to create a climate action plan for Olin, or it might manifest as a team working on alternative energy technologies.

Transform Engineering Education

Our mission to transform engineering education provides a natural area for Impact-centered Education. We have expertise within our community in this domain, and we have seen examples in the past of how powerful student engagement can be in educational research and educational change. We further believe that there is philanthropic potential associated with this work, particularly in the context of advancing Engineering for Everyone within engineering education. Inspiration for what this might look like as an impact area includes the Educational Design Studio experience from several years ago, the work done in the EduSpace, and the student engagement with the INSPER program.

Bioengineering

Bioengineering represents a critical and strategic growth area for Olin. Ensuring global health and wellbeing for humans and the planet poses some of the greatest challenges facing society. In the age of increasing complex problems requiring team-based transdisciplinary approaches, as a convergent interdisciplinary field by nature, bioengineering is poised to deliver solutions for the future. Pursuit of bioengineering as an impact area will require investment and capacity building, but Olin's approach to engineering education is well suited for the development of translational curriculum that includes immersive clinical experiences, biodesign, translation to products and technologies and approaches to address health inequities. Our location in the Boston area provides ample opportunities for partners from industry, hospitals and agencies who can be engaged in curricular design and work experiences. And there is growing demand among our students along with a pressing need for bioengineering related discoveries.

Engineering in Industry

Through SCOPE and through faculty-led research, we have substantial experience in creating impact within engineering practice in industry. Engaging in this domain helps to prepare students to engage as change makers within engineering practice, connects Olin to the contexts in which many engineers end up working, and requires that students confront the kinds of real-world ethical issues that emerge in industry. Through SCOPE we already understand what funding might look like in this domain. As

an impact area we might imagine this looking like a more immersive SCOPE, recent XLP experiments, and/or deeper student engagement in faculty research labs.

Pathways to Engineering

There is significant interest and experience within the Olin faculty around diversifying STEM. While we as a community have much to learn in this area, there are also substantial opportunities to make collaborative impact. There is also significant philanthropic interest in this domain. Inspirational examples include the work of the EASE lab, engagement with the ChangeMakers Academy, and a long history of Olin students engaging with K12 students.

Serve Underserved Communities / Public Interest Technology

Members of the Olin community have a long track record of doing work with underserved communities through experiences like ADE, TAD, and E4H. Over recent years this body of work has also expanded to include public interest technology, a term that describes working with community organizations, government agencies, and policymakers to apply technology expertise to advance the public good. It is easy to imagine how we might expand opportunities for impact—and associated external support—in these domains.

Tech Entrepreneurship

Our location and relationship with Babson, our track record with alumni who have gone on to found companies, and student engagement around Catalyst and the Entrepreneurial Engineering Capstone all suggest tech entrepreneurship as a promising domain for impact. Resources to support work in this domain might include both philanthropy as well as possible investment from sources like the Parcel B fund.

Appendix: Business Model Implications

Our core interest in Impact-centered Education—the idea that the best way for students to learn to be impactful is to engage them in creating impact—lies in the potential that it has for simultaneously *developing students* with a philanthropic and service-oriented mindset and skills, and directly *creating a positive impact* in the world. At the same time, Impact-centered Education also presents unique opportunities from a business model perspective.

Philanthropic Potential

Impact-centered Education offers three different ways to approach philanthropic funding. First, because students, faculty, and staff are directly engaging in work that makes the world better—e.g., working with a community to reduce indoor air pollution—donors might be interested in *funding impact work***.** This type of philanthropic revenue is more often associated with mission-driven nonprofits (e.g., City Year); the impact-centered approach offers a way for donors to support good work in the world by supporting Olin. This might be manifested through, for example, endowing "impact chairs" in particular areas (e.g., an endowed Impact Chair in Public Interest Technology, or Climate Change), or through direct support of an "impact fund" that could be used to underwrite real-world efforts. Impact-centered Education also provides attractive philanthropic potential with respect to *funding students*. The focus on more civically oriented graduates who are inclined and prepared to "do good" is attractive; funders might want to enable students to pursue this type of education. Finally, we think there is a philanthropic case around *funding the transformation*. A funder might buy into and want to support the notion that engineering education, and education more broadly, should shift toward Engineering for Everyone and a focus on impact over a focus on the individual—and Olin's educational transformation mission offers a compelling opportunity to support that shift.

Earned Revenue and Grants

Impact-centered Education also has the potential to increase earned revenue and grants. Impact-centered Education includes a significantly larger "real-world" *curricular footprint* than our current curriculum. In addition, impact-centered Education also implies a shift in the how *faculty and staff engage* around impact creation, from a "coach" mode to more of a "senior co-worker and mentor" mode, and from a mode in which teaching is distinct from external impact to a mode in which teaching and external impact have more overlap. Taken together, these components suggest that it would be possible to create significantly more value for third parties such as outside funding agencies and companies than our current model enables—as a consequence, it seems likely that we could increase revenue from programs such as SCOPE, and from externally funded work such as NSF grants.

The Need to Invest

Taking advantage of those opportunities will take both time and investment. While we have started to put these pieces in place—e.g., creating the Office for External Programs and Partnerships, and taking a more cross-functional approach to fundraising—additional steps are clearly necessary, such as creating infrastructure analogous to but likely larger than the SCOPE infrastructure, making curricular changes, supporting system changes, and hiring personnel such as a major gift officer. Furthermore, even if we were to put these changes into place today, it seems clear that the timescale for seeing significant net revenue generation in these areas should be measured in years.

Appendix: Planned Actions

For each of the identified objectives we have identified a set of likely actions and associated outcomes to advance us toward our goals. These actions draw from community engagement and conversations with external stakeholders—but they are also still very much a work-in-progress, and they will be subject to ongoing revision as we advance the plan. Note that in some cases, actions serve more than one objective.

PLANNED ACTIONS FOR

Goal 1: A Sustainable Model

Objective 1.1: Increased revenue in support of our cause and our vision of Impact-centered Education.

1. Engage with professional non-profit consultants to develop an aligned fundraising effort for Impact-centered Education that takes advantage of learning in other sectors.
2. Hire a philanthropy professional to work in close collaboration with leadership to develop and implement intentional and impactful philanthropic strategies.
3. Work collaboratively across the institution to create a culture of philanthropy in students, faculty, and staff.
4. Secure gifts for direct support of impact areas (for example, endowed professorships and increased mission-aligned, externally funded course projects).
5. Develop industry-specific messaging and mechanisms to secure and develop revenue-generating, value-aligned, industry collaborations to support our impact areas.
6. Determine business and technology systems and processes required to optimize a fundraising and revenue-generation infrastructure and culture.

Objective 1.2: An approach to financial aid that enables a shift in the student relationship while maintaining financial sustainability.

1. Convene a cross-functional team to examine existing models and develop a funding model that aligns with our mission and vision and that includes meeting demonstrated needs.
2. Investigate the impacts of switching from a half-tuition model to alternative models that better align with our goals and resources.
3. Develop and pursue charitable gifts for need-based “impact scholarships” and “partner 2.0” scholarships.
4. Develop structures and policies that permit “learn and earn” experiences (awarding of academic credit combined with some form of financial compensation).

Objective 1.3 Infrastructure, policies, and practices that enable efficient and effective work.

1. Evaluate current and future space usage on campus to develop a space use plan that supports the new Impact-centered Education and includes necessary resources and capital expenditures.
2. Identify and implement the software and technologies we need to modernize and streamline our processes, as well as enable our shift towards Impact-centered Education and aligned community.
3. Evaluate existing policies and procedures to simplify where possible, to develop new policies where necessary, and to enable more consistent and efficient approaches to work.
4. Train managers around onboarding, professional development, and feedback.
5. Develop shared priorities among leadership to inform individual and collective decisions about what work to continue, what work we can do more efficiently, and what work to stop doing.

Objective 1.4: An organization structured for sustainability (as defined by the UN’s 2030 Agenda for Sustainable Development)).

1. Develop and implement mechanisms to monitor and improve the Olin work environment.
2. Identify opportunities for cost savings across the college to reduce our endowment draw.
3. Launch the creation of a Climate Action Plan and Campus as a Living Lab as projects in the impact area of climate change. Engage students and outside experts in evaluating and designing our physical campus infrastructure in a way that mitigates climate impact and addresses deferred maintenance.

4. Utilize our 2022 AASHE STARS sustainability benchmarking report to identify areas where our planning processes, decision making processes, and operations can become more sustainable.

PLANNED ACTIONS FOR

Goal 2: An Impact-Centered Curriculum

Objective 2.1: Alignment on prioritized impact areas for Olin

1. Select impact areas that align with Olin's strengths, support Olin's vision of Engineering for Everyone, feasibly provide opportunities for real impact, and have strong potential fundraising.
2. Understand and map faculty and staff desired affiliation with direct impact work to enable a plan forward that builds on strengths and interests of employees.
3. Redefine (individual and/or general) faculty responsibilities to collectively build an impact-centered curriculum, engage in meaningful work in selected impact areas, and meet our curricular commitments to the current student body.
4. Draw on staff real-world expertise and knowledge to create opportunities for collaborations between staff and faculty towards Impact-centered Education.
5. Create endowed "impact chairs" or "impact projects" to enable and incentivize work (see 4.1).
6. Determine organizational structure, supporting operational systems, and resource requirements (financial and non-financial) for each impact area to best enable impact and build upon the expertise and interests of employees, hiring where necessary to grow capacity.

Objective 2.2: Transdisciplinary educational experiences that prepare students to approach impact thoughtfully.

1. Convene external curricular advisory board, drawing on relevant external expertise from both inside and outside the academy.
2. Research, develop, and adopt a list of key foundational transdisciplinary outcomes with associated rubrics/examples.
3. Create and run additional educational prototypes aimed at developing foundational transdisciplinary outcomes. Use these experiments to capture key learnings and insights to inform the development of other experiences.

Objective 2.3: Expanded opportunities for impact-oriented, real-world experiences in the curriculum.

1. Synthesize learning from SCOPE, ADE, EEC, STEP, XLPs, and other programs to create institutional frameworks for successful impact-oriented learning experiences.

2. Create and run additional educational prototypes in the real-world impact domain. Use these experiments to capture key learnings and insights to inform the development of other experiences.
3. Openly recognize the challenges in attempting real-world impact while learning and developing methods to understand the experiences of and provide appropriate support for students, especially those historically underrepresented in engineering.

Objective 2.4: An understanding of key curricular changes to realize Impact-centered Education.

1. Create and adopt a curricular framework that identifies new transdisciplinary requirements, includes a substantive footprint for impact-oriented, real-world experiences, and removes appropriate components of existing requirements and course offering (see also 3.1).
2. Research and summarize tradeoffs associated with changes in degree programs and ABET accreditation.
3. Decide on necessary changes to implement in our curriculum, policies, and offerings.
4. Develop and implement multi-year transition plan to enable us to meet commitments to students.

Objective 2.5: Impact-aligned partnerships and collaborations.

1. Review, streamline, and revise policies to enable partnerships.
2. Build an integrated approach to external partnerships through the Office of External Programs and Partnerships.
3. Pursue academic partnerships aligned with impact areas and Impact-centered Education (possible examples: HBCU partnership aligned with Pathways to STEM, a Babson partnership around Tech Entrepreneurship and the Institute for Social Innovation).
4. Develop non-profit and community group partnerships aligned with impact areas.
5. Develop and deepen industrial partnerships aligned with impact areas.

PLANNED ACTIONS FOR

Goal 3: An Aligned Community

Objective 3.1: A more diverse and inclusive Olin community.

1. Design, improve, and implement avenues and programs to recruit, retain, and support a more diverse employee body.
2. Invest in partnerships with organizations that identify underrepresented minoritized students and support their enrollment in institutions of higher education, such as QuestBridge, Posse, College Horizons, etc.
3. Develop and implement ongoing community-wide education around diversity, equity and inclusion.
4. Through membership with the AAAS initiative SEA Change and programs offered by other organizations, engage the entire community in an intentional, coordinated effort to systematically become a diverse, equitable, and inclusive institution.
5. Review and revise curriculum and pedagogy to align with current educational research on inclusion and student success, including understanding current and potential equity gaps.

Objective 3.2: A system of support for students' holistic development.

1. Deepen connections, collaboration, and shared understanding of the contributions of different areas across Academic Life to ensure an aligned integrated approach to student development.
2. Assess staffing and resources in Student Affairs and Resources to identify opportunities to further strengthen our support current students.
3. Strengthen leadership within the student body to enable more peer-to-peer support. Take existing student leadership opportunities and elevate them, using effective training, support, and compensation, to create a collaborative network of faculty/staff/student support of students' holistic development.
4. Assess and plan for how the needs of the future "impact-centered student" might differ from the needs of the current student body.

Objective 3.3: A more purposeful and supportive workplace.

1. Develop and implement ongoing community-wide education around diversity, equity and inclusion.

2. Develop and implement ongoing community-wide education around constructive feedback and respectful communication.
3. Create programs and policies that enable and value staff professional development (e.g., staff professional development funding; support for staff engagement in the curriculum; collaborative assessments between faculty, staff, and students of operational and financial implications of new programs; and incorporation of professional development and learning in a continuous performance review process).
4. Create programming and structures to enable all employees to feel visible and confident that their work is valued across the institution.

Objective 3.4: An employee community with a growing sense of connection to and capacity for supporting Impact-centered Education.

1. Create and run faculty and staff development workshops to develop a shared understanding of transdisciplinary and Impact-centered Education and to help employees build connection to the strategy.
2. Create opportunities that enable community-wide engagement in impact areas.
3. Revise job descriptions and processes, as appropriate, to foster a sustainable organization and an Impact-centered Education.
4. Identify efficiencies in operational roles to create capacity for impact-related work.

Objective 3.5: Messaging that attracts new community members and partners to our mission, values, and work.

1. Develop shared language and clear communication about our mission and curriculum to share with various stakeholders (e.g., prospective students and families, potential donors and partners, prospective employees, other educators, etc.) by utilizing collaborative internal and external resources.
2. Conduct focus group testing with high school students and families and high school counselors around mission, vision, and messaging to create concise, compelling, and effective recruitment language for website, publications, and recruitment events.
3. Equip and enable employees to take Olin's new messaging to conferences, seminars, networking events, and gatherings where we collaboratively engage in ongoing efforts to identify impact partners and resources.

4. Build our brand of Impact-centered Education and Engineering for Everyone by encouraging and coaching more community members to share their stories of learning and impact and by engaging with multiple mediums to reach a wide audience.

PLANNED ACTIONS FOR

Goal 4: An Engine for Change

Objective 4.1: A curricular infrastructure and change strategy that enable curricular experiments and transitions.

1. Develop a curricular framework that, while consistent with current course offerings, permits experimentation that integrates with student progress and requires low institutional overhead.
2. Revise our graduation requirements and shift our student records system to enable and support the development, implementation, and tracking of new educational experiences. This will be done using a phased plan that allows us to meet our obligations to current students while allowing us to transition to our new educational model.
3. Integrate identification and implementation of a new SIS system with curricular experimentation needs.
4. Develop a multi-year transition plan to a new curricular structure that includes supporting business and technology systems, resources, and funding needs.

Objective 4.2: Students who engage as collaborative partners in educational experimentation and educational change.

1. Incorporate emphasis on educational experimentation in student recruitment and onboarding.
2. Convene cross-functional teams with students, faculty, and staff to identify ways to create communication channels around curricular and system changes.
3. Develop student skills in constructive feedback and communication.
4. Identify and develop partnerships with other academic institutions also leading educational change efforts.
5. Create student exchange opportunities or summer engagement programs at partner academic institutions.

Objective 4.3: Structures and resources that support experimentation, synthesis, translation, and sharing of educational learnings.

1. Create and launch a new Center for Educational Experimentation, Measurement, Synthesis, and Translation that serves to support and collaborate on curricular experiments, capture

insights from those experiments, and translate and package insights for both internal and external course designers.

2. Integrate the work of the Center with both Strategic Communication and Institutional Research.

Objective 4.4: Networks to advance Engineering for Everyone.

1. Run an initial Engineering for Everyone convening event in spring 2023, as a first step toward developing a network around Engineering for Everyone.
2. Create student exchange opportunities or summer engagement programs at partner academic institutions.
3. Increase depth and breadth of engagement with relevant existing networks (e.g., KEEN, PIT-UN).

Glossary

Transdisciplinarity

While there are many different interpretations of transdisciplinarity, our use of the term is consistent with Jahn's description of transdisciplinary research, which "[Integrates] different scientific and extra-scientific insights" and "[contributes] to both societal and scientific progress." (Jahn et al. 2012)

We think of transdisciplinary education as education that "moves beyond just teaching *across* disciplines using common themes, topics, or issues that thread through different courses [and] requires collaboration *between* disciplines to create a cohesive curriculum in which students *collaborate* to solve multifaceted problems, [as well as] innovation, cooperation, and intentionality." (Smothers 2020)

Sustainability

We use the UN's description of sustainability from the 2030 Agenda for Sustainable Development, which "recognizes that eradicating poverty in all its forms and dimensions, combatting inequality within and among countries, preserving the planet, creating sustained, inclusive and sustainable economic growth and fostering social inclusion are linked to each other and are interdependent." (UN 2022)

Impact

In the context of this plan, "impact" refers to work that has significant and lasting effects for external stakeholders. As a term, impact is value-free, but the plan's emphasis is on impact that advances Engineering for everyone, and that aligns with Olin's values.

Background Material

Civic Engagement

The National Task Force on Civic Learning and Democratic Engagement, ***A Crucible Moment: College Learning and Democracy's Future*** (Washington, DC: Association of American Colleges and Universities, 2012) <https://www.aacu.org/sites/default/files/files/crucible/Crucible_508F.pdf>

This report is an explicit accounting and call for action to address the civic mission of universities, which really should be the starting point for how we think about Olin's civic mission within engineering education. These findings were supported by a report from the U.S. Department of Education calling for ways to support civic learning in higher education across the country: **Advancing Civic Learning and Engagement in Democracy**, U.S. DEPARTMENT OF EDUCATION, A Road Map and Call to Action, January 2012, https://www.ed.gov/sites/default/files/road-map-call-to-action.pdf

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Kreber, Carolin. 2016. ***Educating for Civic-Mindedness***. New York: Routledge.

Argues for how we should nurture authentic professional identities through transformative higher education by emphasizing civic and democratic learning as core to professions like engineering, and includes specific connections to service and engaged learning approaches

American Academy of Arts and Sciences. 2020. ***Our Common Purpose: Reinventing American Democracy for the 21st Century***. Cambridge, MA: American Academy of Arts and Sciences. https://www.amacad.org/ourcommonpurpose/report.

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United Nations Department of Economic and Social Affairs, 2022."Transforming our world: the 2030 Agenda for Sustainable Development", https://sdgs.un.org/2030agenda). Retrieved April 2022.

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An analysis of the value of service learning in developing "attitudes toward self, attitudes toward school and learning, civic engagement, social skills, and academic performance."

Natarajarathinam, Malini, Shaoping Qiu, and Wei Lu. 2021. "**Community Engagement in Engineering Education: A Systematic Literature Review**." Journal of Engineering Education 110 (4): 1049–77. https://doi.org/10.1002/jee.20424.

A literature review on community engagement / service learning in engineering.

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Klotz,L., et al. 2014. "**Sustainability as a Route to Broadening Participation in Engineering"** Journal of Engineering Education 103(1), 137-153

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