

Penn State College of Information Sciences and Technology 2021-2025 Strategic Plan

Mission

The College of Information Sciences and Technology fosters an inclusive and diverse community engaged in innovative interdisciplinary education, research, and service to prepare leading professionals and scholars who leverage technology and critical thinking skills to solve the complex challenges of an information society.

Vision

The College of Information Sciences and Technology will be on the leading edge in advancing inclusive, ethical, and value-based discovery at the intersection of people, information, and technology while creatively addressing challenges to produce innovative solutions for a sustainable environment.

Penn State Values

Integrity
Respect
Responsibility
Discovery
Excellence
Community

College Values

Community
Open Communication
Diversity
Customer Service
Respect
Work/Life Balance

Steering Committee

The development of the plan was led by a group of IST faculty and staff. Members of the IST community participated in working groups to refine the mission and vision statements, and further guidance was provided by the Office of Planning, Assessment, and Institutional Research.

The Steering Committee included:

- **Jeffrey Bardzell**, associate dean, Undergraduate and Graduate Studies
- **Karen Brewster**, director, Administrative Operations and Faculty Affairs
- **Michelle Corby**, assistant dean, Academic Services
- **Jordan Ford**, director, Marketing and Communications
- **Dave Fusco**, director, Master's Programs
- **Jason Gines**, assistant dean, Inclusion and Diversity Engagement
- **Prasenjit Mitra**, associate dean, Research
- **Andrew Sears**, dean

GOAL 1 – Student Experience

Design a student-centered experience that is equitable and inclusive of all learners and that spans from initial contact through alumni programs.

Objective 1.1: Academic Services Supporting Student Success

Implement strong recruiting and onboarding experiences for all student in residence and online delivery formats that connect students with the IST community and values.

Action Item 1.1.1: In partnership with faculty and academic services staff, identify and develop degree-specific and engaging recruiting activities for all undergraduate and graduate programs that demonstrate the unique nature of the college’s degrees and learning community.

Implementation Tasks: Engage collaboration between faculty leadership, Learning Design, Academic Services Learning Support, and the Undergraduate Recruiting team to develop resources and activities for students.

Metrics: Development of supporting collateral by the end of year two for all degrees, with a plan in place for updating and controlling quality by year three.

Action Item 1.1.2: Identify and develop degree-specific support activities that provide clear pathways for academic achievement and career success for first-time first-year, change of campus, change of college, DUS, and transfer students.

Implementation Tasks: Working with Academic Services Learning Support, Career Solutions, Advising, Inclusion and Diversity Engagement, and faculty teams, identify learning gaps for all unique groups.

Metrics: Development of supplemental tutoring, workshops, and other programs targeted at each unique student population entering the college by year three. Assessment of programs and changes by year five.

Action Item 1.1.3: Develop student leadership skills and reinforce the college’s community values and academic expectations by connecting them to engagement opportunities during the recruiting process, the first-year experience, and other key points in the student development lifecycle.

Implementation Tasks: Develop an integrated professional development and student engagement plan to support and complement student learning.

Metrics: Recruiting process and student plan developed with milestones, competencies, and credentialing embedded in the student experience.

Action Item 1.1.4: Identify and develop course and program-specific support structures that promote course engagement and productive study tactics and set clear expectations for student-centered academic engagement, success, and degree completion.

Implementation Tasks: Orchestrate collaborative partnerships to support student connections and engagement. Engage collaboration between first-year seminar course committees and the Teaching, Learning, and Assessment unit to develop, revise, and

maintain first-year seminar modules on teamwork, library research, academic integrity, study skills, and career and internship preparation.

Metrics: Development and/or review of first-year modules by Fall 2023.

Action Item 1.1.5: Focus on advising strategies and procedures that provide clear information about the college's degrees and that support entrance to major requirements and on-time degree completion.

Implementation Tasks: Develop protocols to identify and support students who may struggle to meet entrance to major requirements. Implement a system of regular and timely reviews of academic progress for students to confirm timely degree completion.

Metrics: Have a tracking system in place to detail how many students enter a major, get exceptions to enter a major, or leave a major due to entrance to major requirements. Provide four in-person or virtual workshops a year to clarify degree expectations and to get in front of decision points for students so they have the correct information to help themselves make good decisions regarding their degree.

Action Item 1.1.6: Articulate a career readiness competency plan for student career success, including encouraging multiple internship experiences (one for 495 credit) and strengthening co-curricular opportunities.

Implementation Tasks:

- Develop and market a professional development plan to students and faculty.
- Collaborate with faculty and faculty development to incorporate professional development competencies into curriculum.
- Plan includes micro-credentials that tie into the traditional curriculum by year five of plan.
- Develop additional relationships with companies that map to new degree programs to provide additional internship and other professional development experience for all students.

Metrics:

- Have a marketable professional development plan by year two of the strategic plan.
- 50% of students have multiple internships (one for credit) by year five of plan.
- Grow the Corporate Associates Program by 50% (15 to 23) by the end of year five.
- Refinement of the Corporate Associates Program to develop stronger and more engaging relationships with corporate partners that span across all parts of the curriculum.

Action Item 1.1.7: Support the integration of experiential and authentic learning opportunities, including education abroad, industry-sponsored class assignments, and undergraduate research throughout the college's programs.

Implementation Tasks: Work with faculty partners to develop integrated student engagement programs that the college's staff can support and embed options in newly developed professional development and student engagement plans.

Metrics: At least 50% of IST students engage in at least two experiential and authentic learning opportunities by the time they graduate.

Action Item 1.1.8: Develop academic services operations and technology architecture to support students in a delivery-agnostic educational environment that encourages degree completion.

Implementation Tasks: Working with and using the objectives of the Penn State 2025 committees, develop friction-free student business practices and support connections to each of the college's courses for students whenever possible.

Metrics: One Penn State 2025 metrics fully mobilized in IST by 2025.

Action Item 1.1.9: Support the development and alumni relations office in fostering strong alumni connections with students throughout the student lifecycle from prospect through to graduation.

Implementation Tasks: Engage with alumni volunteers to develop virtual and in-person programming that engages students and alumni throughout the academic journey and that supports the student engagement plan.

Metrics: Develop three to five new connections between students and alumni at key points in the student lifecycle.

GOAL 2 – Inclusion Environment

Create and sustain an inclusive, equitable, diverse, and supportive environment for all faculty, staff and students.

Objective 2.1: Inclusive Teaching, Learning, and Work Environment

Redefine, build, and boost an inclusive teaching, learning, and work environment for faculty, staff, and students. Align efforts with the University’s planning goal related to inclusion, equity, and diversity to “foster a culture of respect and inclusion that values the experiences and perspectives of faculty, staff, and students.”

- **Faculty:** Increase in inclusive course design and teaching techniques, equitable evaluation, and equity-minded student engagement, as measured by pre- and post-test surveys for INCLUSIVE ADDIE workshops, and a yearly survey for students on sense of belonging across IST courses.
- **Staff:** Integration of strategic planning goals for enhancing diversity, equity, and inclusion in every staff unit in addition to individual professional development, as measured by a yearly staff survey on DEI goals and engagement with DEI professional development opportunities.
- **Students:** Increase in students’ sense of overall belonging in the college, as measured by a yearly survey that addresses student experience in all aspects of the college.

Action Item 2.1.1: Recruit, support, and advance faculty, staff, and students from underrepresented groups.

Implementation Tasks: Develop and implement separate recruiting and supervisory strategies and metrics for undergraduate and graduate students, staff, teaching and tenure-track faculty that are built into structural practices of the college.

- **Faculty:** Create a cross-discipline committee to review job announcements and mitigate bias in the recruiting and hiring process.
- **Staff:** In conjunction with IST Human Resources representatives, develop a committee to review hiring practices using the toolkit provided on the DEI Resources site.
- **Graduate Students:** Remove the GRE requirement and other testing barriers to engage in a holistic review for Ph.D. and master’s students.
- **Undergraduate Students:** Expand outreach initiatives with regional recruitment centers, increase outreach to URM students for scholarship awarding through the online portal, and increase focus on onboarding students informed by recent research.

Metrics: Number of underrepresented faculty, staff, and students as defined by the college and Penn State. In the first year of planning, each committee will define successful metrics by benchmarking with appropriate institutions, such as Big 10 universities and similar iSchools. Once each committee has provided benchmarks, each committee will produce a yearly report on specific efforts to meet established goals for recruitment and retention.

Action Item 2.1.2: Use established frameworks found in culturally relevant pedagogical literature to modify the undergraduate and graduate curricula to reflect integrated critical and constructive thinking about the complexities of inclusion, diversity, and equity within the context of each discipline.

Implementation Tasks: Program Coordinators in charge of the curricula for the disciplinary areas will work with the Associate Dean for Undergraduate and Graduate Studies and the Assistant Dean of Inclusion and Diversity Engagement to embrace culturally relevant pedagogy that seamlessly integrates inclusion, diversity, and equity-minded content.

- **Faculty:** For academic year 2021-2022, conduct a full curricular review across disciplinary areas to assess the inclusion of diverse scholastic voices, learning objectives, and integrated topic areas.
- **Faculty Governance:** Program coordinators will report findings to the Associate Dean for Undergraduate and Graduate Research. Professors in Charge will work with their disciplinary areas to socialize the infusion of diversity, equity, and inclusion across courses.
- **Professional Development:** The Learning Design team will conduct two INCLUSIVE ADDIE trainings a year to assist faculty with how to re-design their course with diversity, equity, and inclusion principles in mind.

Metrics: Increase diversity, equity, and inclusion representation in each program area that reflects culturally relevant pedagogy.

Action Item 2.1.3: Foster a climate of acceptance, advocacy, continuous improvement, and learning for faculty, staff, and students.

Implementation Tasks: Develop assessment tools that capture student, staff, and faculty views on diversity, equity, and inclusion in the college's climate. Use collected data to develop programming to address identified issues.

- **Faculty:** Conduct yearly surveys/focus groups that measure: 1) readiness/preparedness to engage diversity, equity, and inclusion education in their respective courses; 2) efficacy of culturally relevant pedagogy; and 3) confidence to address students from diverse backgrounds.
- **Staff:** Conduct a yearly survey of all DEI professional development opportunities available to staff. Summarize survey findings on all professional development and DEI educational offerings across each academic year in the college.
- **Graduate Students:** Create onboarding experiencing with preassessment and administer a post assessment at the end of the year to better understand levels of inclusion and belonging of Ph.D. and master's students.
- **Undergraduate Students:** Conduct end of semester surveys to capture real-time data on inclusion and belonging of our students.

Metrics: Utilizing existing data from the University Climate Survey as a baseline, compare survey data across constituent groups in the college seeking incremental improvement over the strategic plan time period. This data (when enough is available) will be disaggregated to create DEI action planning, programming, and professional development for groups where appropriate.

Action Item 2.1.4: Increase philanthropic funding to support scholarship and learning opportunities related to diversity, equity, and inclusion for faculty, staff, and students.

Implementation Tasks: Expand existing funding programs that target support for IST-defined underrepresented groups. Develop and deepen relationships with alumni and corporate entities seeking to support diversity, equity, and inclusion.

Metrics: Amount of philanthropic funds available to support scholarships and learning opportunities related to diversity, equity, and inclusion.

Action Item 2.1.5: Better understand and improve student performance and success within IST curricula across racial, ethnic, and gender demographics by engaging with the Penn State Equity Pedagogy Network.

Implementation Tasks: Work with faculty council, associate deans, and professors in charge to identify faculty who will be engaged with the Equity Pedagogy Network (EPN). Selected faculty will attend a workshop in Fall 21 to be oriented to the process of EPN for the college.

Metrics: Identify key prerequisite courses, analyze outcomes across sections, and track retention data across the strategic plan time period.

- 2021-22: Identify key prerequisite and other area courses to transform with the EPN.
- 2022-23: Utilize the EPN tracking model to see if interventions produced more equitable outcomes for student success.
- 2023-24: Conduct a yearly assessment to track student success.
- 2024-25: Produce a multi-year analysis of student success.

Action Item 2.1.6: Create and develop community-building events for IST faculty, staff, and students that position all employees to lead with respect and tolerance in workplace interactions and everyday practices.

Implementation Tasks: Develop collaborative initiatives between student-facing offices and the Inclusion Diversity Action Council that serve the entire IST community. Integrate core practices into systems of evaluation that give IST staff and faculty clear guidance on workplace expectations that create and sustain a welcoming and inclusive environment.

Metrics: Have representation from academic service and operational units, teaching faculty, research faculty, graduate and undergraduate students on the Inclusion and Diversity Action Council and Staff Advisory Committee. Conduct an annual college-level survey that features questions that identify areas of growth and challenge.

Objective 2.2: Cultural Consciousness

Build and bolster a culturally conscious and competent work environment for faculty, staff, and students.

Action Item 2.2.1: Increase cultural awareness, knowledge, and skills for faculty, staff, and students. Pool resources and expand offerings for underrepresented constituents by connecting with corporate entities, universities, and civic organizations committed to diversity, equity, and inclusion efforts.

Implementation Tasks: Use various modalities, such as courses, Inclusion and Diversity Action Council programming, and lecture series to deliver diversity, equity, and inclusion content that raises the collective awareness of the IST community. Work collaboratively across units to create a cohesive plan for reaching out to and engaging external entities on behalf of IST students.

Metrics: Conduct surveys on all diversity, equity, and inclusion workshops and learning opportunities for faculty, staff, and students. Increase diversity, equity, and inclusion-related content and training activities included in IST courses; engagement with external partners; and research and professional development opportunities for underrepresented constituents.

- **Faculty:** Acknowledge and reward DEI focus in teaching, research, and service by actively recognizing these efforts in evaluation mechanisms, including annual reviews and the promotion and tenure process. Increase nominations for awards for faculty actively engaged in work that is broadening participation in IST areas.
- **Staff:** Within supervisory structures, formally acknowledge staff with DEI goals and demonstrated professional development in their yearly plans. Increase nominations for staff awards.
- **Graduate Students:** Create a recognition mechanism for graduate students who demonstrate a DEI focus in their research or teaching.
- **Undergraduate Students:** Create a recognition mechanism for undergraduate students who demonstrate a DEI focus in their courses (e.g. group projects, research), service to the college or University, or external community.

Action Item 2.2.2: Generate and aggregate quantitative and qualitative research related to equity to make incremental and measurable progress toward the visibility of our diversity, equity, and inclusion efforts.

Implementation Tasks: In collaboration with the Associate Dean for Research, create a space for all current publications and research that have a DEI focus. Develop a site for all available research opportunities in the college that will intentionally pursue diverse undergraduate scholars to meet our strategic priority of broadening participation in the technology field.

Metrics: Increase the number of publications and grants that have an explicit focus on DEI in the respective disciplinary areas. Starting in academic year 2021-2022, see an increase in the number of underrepresented scholars who apply for research opportunities in the college.

Action Item 2.2.3: Develop a system for being more intentional and conscious of bias during the hiring and evaluation process. Increase the diversity of the applicant and candidate pools and build in diversity, equity, and inclusion as standard measures that are recognized and rewarded across evaluative practices.

Implementation Tasks: Research, collect, and regularly update best practices for recruiting, hiring, and evaluation, and communicate these standards with all involved in these processes.

Metrics: In conjunction with Human Resources, track diversity metrics for faculty and

staff applicant and candidate pools. Conduct and assess yearly bias training on equitable and holistic practices for hiring teams.

Action Item 2.2.4: Led by the strategic planning committee, continue discussions focused on interdisciplinary collaborations between deans and other college leaders to speak to structural diversity issues.

Implementation Tasks: Develop and implement best practices on conducting unit meetings that directly address diversity, equity, and inclusion issues both within the immediate team and across the college.

Metrics: Conduct an internal audit of unit agendas to ensure DEI issues are being covered in meetings.

Action Item 2.2.5: Strongly recommend that each faculty and staff member integrate at least one goal related to diversity, equity, and inclusion into their goal planning for the upcoming academic year.

Implementation Tasks: Create clear guidance for how diversity, equity, and inclusion goals can be seamlessly integrated into the overall work portfolio of staff and faculty.

Metrics: Percentage of faculty and staff with diversity, equity, and inclusion goals for the upcoming academic year. Percentage of faculty who address diversity, equity, and inclusion efforts in their yearly self-evaluations. Increase the reporting of activities by faculty in year-end evaluations and promotion and tenure materials for faculty. Increase in DEI goal setting and professional development activities for staff.

GOAL 3 – Engaged Faculty

Empower an engaged faculty.

Objective 3.1: Improve Internal Curricular Processes

Improve curricular quality by improving curriculum-related processes and better integrating social concerns.

Action Item 3.1.1: Clarify roles of individual faculty, course committees, program coordinators, professors in charge, and directors.

Implementation Tasks: Working with stakeholders, iterate on and clarify the roles and procedures of how faculty governance is designed to work within IST. Document and disseminate rights and responsibilities for individual faculty members, course committees, program coordinators, and professors in charge. Identify and address practices that are operationally inefficient and/or where the boundaries between faculty and staff responsibilities are blurred.

Metrics:

- By December 2021, re-specify faculty leadership roles. By May 2022, revisit faculty constitution for any updates to be made to faculty governance guidance, including documenting and disseminating rights and responsibilities for individual faculty members, course committees, program coordinators, and professors in charge.
- By December 2022, determine processes related to the curriculum to be specified, made more efficient, and/or clarified in terms of faculty and staff support roles, such as processes pertaining to design and revision of World Campus courses.
- By May 2023, create, edit, and confirm outlines and diagram workflows for curriculum processes, including faculty, course committee, faculty leadership, Academic Services Operations, and Learning Design roles.

Action Item 3.1.2: Streamline and support efforts to standardize core courses in the curricula.

Implementation Tasks: Identify a target set of courses for standardization. Working with the appropriate course committees and other stakeholders, design all aspects of the course, including learning objectives, readings, assignments, lectures, and activities. Support this process with expertise from Learning Design and standard faculty incentives.

Metrics:

- By August 2021, identify 1-2 courses per major as “restricted” courses, in which instructors would be restricted in their teaching by the boundaries set forth by the course committee for 80% of the course that is to remain “common” across all sections. Inform course committees of the charge and determine the lead instructor who will work with Learning Design to create a common course template.

- By August 2022, create, review, and edit at least six course templates for approval by the course committee and the Program Coordinator.
- By December 2022, complete the approval process. By May 2023, gather formative assessment data from instructors on the roll-out of restricted course templates. By June 2023, write assessment plans for the 2023-2024 academic year to evaluate learning in restricted courses.

Action Item 3.1.3: Improve faculty engagement throughout academic programs.

Implementation Tasks: Identify and/or incentivize more faculty to engage in student recruiting, study abroad, undergrad research, and industry-sponsored class assignments.

Metrics:

- By May 2022, determine incentives to offer to faculty for engaging in academic programs outside of traditional classroom teaching.
- By May 2022, measure current faculty involvement in student recruiting, study abroad, undergrad research, and industry-sponsored class assignment; and set appropriate interim performance targets for the following 2-3 years.
- By May 2025, reach target of N% of faculty engaged in academic programs outside of traditional classroom teaching.

Action Item 3.1.4: Train and mentor faculty to support contributions to academic programs and to faculty governance.

Implementation Tasks: Redesign faculty onboarding/orientation to explain roles and procedures. Hold periodic (re-)training and/or town halls about faculty governance in faculty meetings and teaching-oriented panels. Train faculty mentors to train their junior colleagues in matters of faculty governance.

Metrics:

- By August 2021, integrate into faculty onboarding/orientation information about faculty and faculty leadership roles and procedures.
- By August 2022 and based on the clarification of roles and procedures for faculty governance addressed in 3.1.1, establish mechanisms – such as town halls, faculty meetings, teaching-oriented panels -- for communicating newly redefined and/or reaffirmed roles and procedures related to faculty governance.
- By August 2022, develop a guide for senior faculty mentors of junior faculty, which covers not only how to be successful at research, teaching, and other core job roles, but also how to participate in service, including leadership roles, appropriate for their career stage.

Objective 3.2: Develop and expand interdisciplinary curricular content to more directly address societal needs.

Provide agile, creative, and focused educational support mechanisms to assist faculty in their roles helping students to achieve their educational goals.

Action Item 3.2.1: Support modifications to the undergraduate and graduate curricula to reflect integrated critical and constructive thinking about the complexities of inclusion, diversity, and equity within the context of each discipline, as addressed in 2.1.2.

Implementation Tasks: Revamp full-time faculty onboarding. Charge the Office of Graduate and Undergraduate studies with supporting appropriate modifications to the undergraduate and graduate curricula through instructional design, instructional support, and implementation.

Metrics:

- Beginning Fall 2021, at least 90% of incoming full-time faculty will receive “cultural awareness” DEI training during orientation. All IST majors will feature one writing assignment in a -W course in which diversity is a non-trivial consideration.
- By Spring 2022, At least 15% of undergraduate and master's student capstone courses across all majors will centrally focus on a diversity, climate/disaster, or ethics-emphasized topic.

Action Item 3.2.2: Design and/or update existing curricula to better prepare students to engage with environmental, climate, and crisis informatics and computing within limits as IST professionals.

Implementation Tasks: Identify faculty whose research and teaching interests connect to issues such as environmental informatics, environmental justice, disaster informatics, and sustainable IT. Create a committee of those faculty to make recommendations about how to integrate environmental considerations (broadly construed) into any of the college's programs, which could range from suggested readings and assignment suggestions to new courses.

Metrics:

- By Fall 2022, offer two new topics courses—one each at the graduate and undergraduate levels—on climate/crisis informatics, with the intention of eventually converting them into permanent courses with their own numbers.
- By Spring 2022, ensure at least 15% of undergraduate and master’s capstone courses across all majors will centrally focus on a diversity, climate/disaster, or ethics-emphasized topic.

Action Item 3.2.3: Expand the curriculum to more systematically embed an ethical emphasis throughout the curriculum.

Implementation Tasks: Integrate research strengths in ethics throughout the curriculum, by area: ethics of security and privacy (cybersecurity); ethical AI and misinformation (data science); participatory design, usable privacy (human-computer interaction); and misinformation, digital divide, and IT policy (social and organizational informatics). Update capstones by degree to encourage and support ethics-oriented informatics capstones.

Metrics:

- In Fall 2021, establish an undergraduate program subcommittee whose charge will be to identify opportunities to amplify ethics-related considerations throughout the curriculum.

- In Fall 2022, one undergraduate degree will pilot changes proposed by the subcommittee.
- By Spring 2022, at least 15% of undergraduate and master's capstone courses across all majors will centrally focus on a diversity, climate/disaster, or ethics-emphasized topic.
- By Fall 2024, at least four majors will have implemented ethics-related considerations more systematically in the curriculum.

GOAL 4 – Elevated Research

Elevate Penn State to a position of international excellence in informatics research while addressing pressing societal issues.

Objective 4.1: Fundamental and Applied Research

Pursue fundamental and applied research that leads to the enhancement of the human condition, creative discoveries, and cutting-edge innovation related to information and informatics in all areas of human endeavor.

Action Item 4.1.1: Initiate and successfully complete high-impact research projects in areas aligning with the University’s strategic plan and the highest national and international priorities. Use college and University seed funds to initiate such projects and external funds to fully realize them.

Metrics: Similar to the promotion and tenure process, holistic impact factors, such as effects of the college’s research on society, industry, and government, and publications in top-tier venues and citation, will be considered.

Action Item 4.1.2: Initiate and complete innovative transdisciplinary research in the college’s core areas (data sciences and artificial intelligence, human-computer interaction, security and privacy, and social and organizational informatics) and cross-cutting research themes (health informatics, social justice, sustainability, ethics, and others) identified to meet the varying and evolving needs of the international informatics community.

Implementation Tasks: Leverage existing relationships within and beyond Penn State to advance research priorities.

Metrics: While any and all evidence of impact will be considered, some easily measurable metrics may include the total funding expended to pursue these projects, the number of partners who work in the field with whom we pursue research, the number of students and faculty-hours spent working in or with external partners in the field, progress and contribution towards any human endeavor, among others.

Objective 4.2: International Leadership

Advance the pursuit of knowledge by successfully completing high-impact scholarly research and achieve international leadership in the field of informatics.

Action Item 4.2.1: Establish IST faculty as leading experts in their fields by successfully publishing and disseminating research to gain visibility for the individuals and the college at par or better than top international research universities and organizations.

Metrics: Number of international awards, journal editorships, conference PC chairs, workshop chairs, tutorial chairs, keynote talks, panel membership, among others.

Action Item 4.2.2: Establish and advance sub-fields of inquiry that will be important for progress, including but not limited to artificial intelligence, security and privacy, social and organizational informatics, medical informatics, human-centered computing, sustainability informatics, and ethics.

Metrics: Number of grants, publications, citations, and awards in these areas.

Objective 4.3: Societal Impact

Impact society, industry, government, and other organizations by pursuing research on contemporary issues affecting society and its use of information and information technology. Position faculty to be leaders in using IT to help with societal problems of national and global priority. Give faculty academic freedom to design the best technology possible, study human-computer issues, security issues, and societal issues associated with information, technology and society.

Action Item 4.3.1: Establish and advance partnerships and collaborations across industry, government entities, and NGOs in large- and small-scale projects of critical importance to society.

Metrics: Increase in funding and number of awards with collaborations beyond the college for projects with direct social impact.

Action Item 4.3.2: Leverage faculty expertise and leadership to inform and impact product design, policy-making, and other activities in external organizations. Sustain technology transfer activities.

Metrics: Number of patent applications filed. Number of instances where innovations resulting from research in the college leads to new products or features in deployed solutions.

Objective 4.4: Interdisciplinary Collaboration

Increase and expand the college's transdisciplinary nature by engaging with various colleges and institutes within and beyond Penn State.

Action Item 4.4.1: Expand connections with various Penn State colleges and campuses to engage them in interdisciplinary research wherever possible.

Metrics: Number of sponsored research projects and co-authored papers with collaborators from other departments and campuses.

Action Item 4.4.2: Expand regional, national, and international research and education partnerships.

Metrics: Collaborations with external partners as measured by sponsored research, co-authored papers, student internships, and international student exchanges.

Action Item 4.4.3: Expand the number of disciplines and sub-disciplines that engage the college's research.

Metrics: Number of disciplines and sub-disciplines and the number of projects in each external discipline supported by the college; amount of funding as a percent of funding related to interdisciplinary projects, proportion of graduate students working in interdisciplinary projects.

Objective 4.5: Integrated Research

Integrate teaching, research, and outreach to enable achieving excellence in each aspect while leveraging the college's strengths across all areas. Ensure the college's focus on integrated research by not only teaching students but also through the generation of knowledge and its dissemination and the generation of knowledge while disseminating.

Action Item 4.5.1: Integrate innovative research and teaching methods resulting in improved education and training of students both with respect to subject matter knowledge as well as research. Train students to provide them a solid foundation to pursue cutting-edge research and train them using knowledge produced by our cutting-edge research.

Metrics: Evidence of holistic integration, such as teaching supporting research and research supporting teaching.

Objective 4.6: Research Outreach

Impact society via research outreach. Build and sustain resources to share the impact of the college's work in teaching, research, and outreach to a variety of audiences. Engage the college's marketing and communications team to work with Outreach and Strategic Communication teams across the University to amplify the college's research portfolio.

Action Item 4.6.1: Increase the reach of college-initiated communications regarding teaching, research, and outreach.

Metrics: Number of national and international media references to college-initiated communications.

Action Item 4.6.2: Pursue K-12 outreach.

Metrics: Interactions between our scholars and K-12 to train the next generation of scholars and educate and engage them in our discipline.

Action Item 4.6.3: Pursue industry and government outreach.

Metrics: Interactions between the college's scholars and industry and governmental entities to pursue joint research endeavors.