School of Emerging Technologies

Call for Proposals for Seed Funding 2025-2027

Table of Contents

Introduction

Technology is changing how we look at the world. All areas have been affected- science, liberal arts, humanities, the health professions, communications, business and the fine arts have all experienced significant technology induced change. These changes are blurring and erasing traditional disciplinary boundaries and creating new interdisciplinary areas of study. Work in these emerging areas requires interdisciplinary teams that bring very different skill sets to the same problem. However, interdisciplinary collaboration is filled with difficulties, especially in its early stages. Finding the right people and the right external support structure is often much harder when one moves outside of the traditional disciplinary boundaries. To that end, the SET will support teams of interdisciplinary faculty in the early phases of collaborative projects. Three kinds of projects are of particular interest:

- Projects that facilitate interdisciplinary research and creative collaborations that focus on the study and application of emerging and emergent technologies in addressing public, social and individual needs, including quality-of-life enhancements.
- Projects that offer innovative and transformative theoretical perspectives toward understanding societal, ethical, and potentially beneficial implications of emerging and emergent technology
- Projects that foster the development of new innovative, interdisciplinary courses and degree and non-degree programs in fields involving emerging technologies. These projects could address the anticipated technical workforce needs of the region and/or integrate the study of social/cultural, environmental and ethical issues as well as specific technologies.

The purpose of this funding is to support faculty at the very first stages of a collaborative effort and/or faculty with nascent collaborations that are ready to grow into a larger effort. The seed money is meant to enable these collaborations to blossom into larger, self-sustaining projects capable of competing for external support. Such collaborations could be both internal and external.

Projects should be in the area of emerging technologies. We take an expansive view of emerging technologies, and the Appendix contains both a list of previously funded projects as well as an illustrative list of promising project areas.

A key area of interdisciplinary research is being solicitated sustainability. Sustainability – what does it mean? How can it be achieved? Sustainability is a critical topic in the current global socio-economic and environmental situation. Sustainability lends itself very easily to interdisciplinary investigations. For example, environmental challenges have social, political and public health implications, all of which can be examined through a broad lens of sustainability objectives. Technology can also be an important resource from both a computational sense and also user applications. This year we would welcome new proposals in this area.

Projects should cross traditional disciplinary boundaries and need to be collaborative. These collaborations can take the form of faculty teams from different colleges or departments within Towson or can take the form of Towson faculty collaborating with experts from other educational institutions, government or corporations. The SET may be able to assist faculty by identifying potential external or internal collaborators; be sure to contact the SET well before any due dates.

Timeline

Information about the RFP submission deadline and information sessions can be found on the SET Seed Funding webpage.

Budget

Funds can be used to provide start-up funds for equipment or supplies, or to provide support for undergraduate or graduate research assistants for the summer, the academic year, or both. Funds can be used to support faculty summer salary, but no more than $8,000 can be spent on any individual faculty member's summer support with no more than $4,000 available in any single summer. Due to limited resources, funds cannot be used for sub-contracts to another institution.

Funding requests should be in the range of $30,000 and should not exceed $35,000; however, projects will only be funded if sufficient funds are available; larger funding requests will need to provide a more compelling justification for funding than smaller requests.

The university's budget for 2025-2027 has not been completely determined and the amount of money available to support these projects will be determined by the university's budgetary approval process.

If your project is selected for seed funding, the SET Program Coordinator, Michelle Bowman (mbowman@towson.edu), will be your point of contact for disbursement of your awarded funds for all project costs, including but not limited to faculty payment, equipment and supply purchases, and student employee hiring.

Required Proposal Elements

1. Approval Signatures (DocuSign)
    - *a.* Includes project title, signatures of each faculty member, together with their chairperson(s) and dean(s). (*Note: Colleges have internal rules and timelines for approval of proposals for submission. Investigators should be aware of such rules/policies before submission)*
    - *b.* Chairperson and dean signatures for co-principal investigators external to Towson University are not required
2. Project Proposal (.docx)
    - a. Project Description
        - i. No more than 8 pages, single spaced 12-point font with 1" margins.
        - ii. It should clearly describe the proposed research project, the significance of the inter-disciplinary approach, and its relationship to emerging technologies.
        - iii. It should highlight the intellectual merit of the research
        - iv. It should describe the research approach and evaluation/assessment plan
        - v. It should explain the roles of the different members of the project team.
        - vi. It should clearly lay out the rationale for the budget (see bullet point 3 below)
    - b. Broader Impact
        - i. The project should clearly state the relevant broader societal, technological, and educational impact of the project

c. Potential External Funding Sources
    i. It should clearly explain how the project will continue beyond the initially supported period, including a plan describing how the project will become self-supported through external funding.
d. List of References
    i. All proposals must be supported by references to appropriate peer reviewed literature (this is not included in the 8 pages).

3. Budget and Budget Narrative
    a. This should describe how the funds will be used and provide appropriate justification. If equipment or supplies are to be purchased, then the narrative should provide an itemized list.
    b. If the project is receiving funding from another source, or if the proposers are applying for funding from another source, then the proposal should provide complete details. This should include the total project budget, the component to be provided by the SET, and a justification why the contribution from SET is essential to the project's success.
    c. In addition to the budget narrative included in the Project Proposal (.docx), the application should provide the budget using the budget template (.xlsx) available on the SET website.
4. Curriculum Vitae
    a. Curriculum Vitae for each faculty member or external principal on the project. Faculty should include their history of external grant proposals.
5. Potential Reviewers
    a. Proposers should provide names and contact information for five potential reviewers for their proposal. These reviewers can be internal or external. These should ideally be an academic with relevant qualifications and expertise and should be free of potential conflicts of interest. If the context project demands it, the investigators can suggest Industrial experts who have no conflicts of interest. Proposed reviewers cannot have collaborated with the personnel on the proposed project within the past three years on a paper or a grant proposal. Proposed reviewers cannot have served as an advisor or a student of any of the personnel on the proposal.

The project proposal should be submitted using the form provided on the SET website.

The Review Process

The SET Director and the SET Faculty Advisory Committee will select two anonymous reviewers for each proposal. These reviewers will be content experts in the area of the proposal. The reviewers may be faculty from Towson, faculty from other institutions, or experts from industry or government. Reviewers will be free from potential conflicts of interest. No one will be selected as a reviewer who has collaborated with the personnel on the proposed project within the past three years on a paper or a grant proposal. Reviewers will not have served as an advisor or a student of any of the personnel on the proposal.

Reviewers will be asked to evaluate the proposal on each of the following criteria:

- Are the proposed activities interdisciplinary and related to emerging technologies?
- What is the intellectual merit of the proposed activities?
- What is the broader impact of the proposed activities?

- Is the budget appropriate for the project and does it make the best use of available resources?
- What is the potential for the proposed activities to become self-supported through external funding?

There is also an expectation that the intellectual merit of proposals designed to improve teaching includes awareness of the relevant research literature and has planned for empirical evaluations of the pedagogical intervention.

After reviewing the reports of the reviewers, and recommendations from the SET Faculty Steering Committee, the SET Director will make the final funding decisions based on available resources.

Submitting the Proposal

Proposals should be submitted using the form provided on the SET Website by the posted deadline.

The Reporting Process

Awardees will be asked to submit an interim and a final report that summarizes the accomplishments of the project team. Further details of the reporting requirements will be provided with the acceptance letter for funded projects.

Questions

Proposers are encouraged to discuss their ideas with the Director of the School of Emerging Technologies, Suranjan Chakraborty (schakraborty@towson.edu).

Appendix 1: Examples of Previously Funded Projects

- BaltimoreAtlas: An ultra-high-resolution land cover and land use classification for the Greater Baltimore Metropolitan Area, Xin Huang (Computer & Information Sciences), Carter Wang (Geography & Envrionmental Planning)
- Improving Discovery and Use of Open Textbooks with an AI-powered Chatbot, Hong Li (Cook Library), Xiaocan Lucy Wang (Brown University Library), Rick Davis (Cook Library), Bill Helman (Cook Library), Xin Huang (Computer & Information Sciences)
- NeuroAuth: EOG-based User Authentication for smart eyewear devices by using Deep Learning Model, Qingqing Li (Computer & Information Sciences)
- Medical Cyber-Physical System for Chronological Lung Diseases Monitoring, Wassila Lalouani (Computer & Information Sciences)
- Spatial Analysis of Medieval Deserted Settlement using UAV-Collected Photogrammetry: The HELM Project, Victoria McAlister (History)
- Disruption against online racialized sexual violence in teenage female students in TU and Baltimore: A research and interactive training intervention program, Pallavi Guha (Mass Communication), Ziying Tang (Computer and Information Sciences)
- To Adopt or Resist: Using Digital Contact Tracing Apps to Combat the COVID-19 Pandemic, Juan Liu (Mass Communication)
- Development of an interdisciplinary course to enhance students' supercomputing education with multidisciplinary research experience, Jia-An Yan (Physics, Astronomy and Geosciences), Shuhua Ma (Chemistry), Jing Tian (Mathematics), Lin Deng (Computer and Information Sciences), David Hearn (Biology)
- Developing an Interdisciplinary Immersive Fulldoome Media Lab, Lynn Tomlinson (Electronic Media and Film), Christian Ready (Physics, Astronomy and Geosciences)
- An Artificial (AI)-based Protocol for Detecting Auditory Processing Deficits, Saradha Ananthakrishnan (Speech-Language Pathology & Audiology), 2023-2025
- Creating a dataset to support Evidence-Based Practices for individuals with autism through machine learning, Jinjuan Feng (Computer & Information Sciences), Ziying Tang (Computer & Information Sciences), 2023-2025
- Development of an Interprofessional Simulation Training for Occupational Therapy and Speech-Language Pathology Graduate Students, Danika Pfeiffer (Speech-Language Pathology & Audiology), Ashley Lankford (Speech-Language Pathology & Audiology), 2023-2025
- Atomic Force Microscopy Studies of the Mechanical Properties of Genetically Modified Fungi: Initial Steps toward Sustainable, Eco-Friendly Materials, David Schaefer (Physics, Astronomy and Geosciences), 2023-2025
- Distributed Compression for Many Sources, Marius Zimand (Computer & Information Sciences), 2023-2025
- Disruption against online racialized sexual violence in teenage female students in TU and Baltimore: A research and interactive training intervention program, Pallavi Guha (Mass Communication), Ziying Tang (Computer and Information Sciences), 2022-2024.
- To Adopt or Resist: Using Digital Contact Tracing Apps to Combat the COVID-19 Pandemic, Juan Liu (Mass Communication), 2022-2024.
- Development of an interdisciplinary course to enhance students' supercomputing education with multidisciplinary research experience, Jia-An Yan (Physics, Astronomy and Geosciences), Shuhua Ma (Chemistry), Jing Tian (Mathematics), Lin Deng (Computer and Information Sciences), David Hearn (Biology), 2022-2024.

- Developing an Interdisciplinary Immersive Fulldome Media Lab, Lynn Tomlinson (Electronic Media and Film), Christian Ready (Physics, Astronomy and Geosciences), 2022-2024.
- TU Performance Analytics Camp, Stella Tomasi (Business Analytics and Technology Management), Justin Lima (Football Athletics), Lisa Custer (Kinesiology), 2021-2022.
- DSSAC: The Data Science and Sports Analytics Camp, Mahnaz (Kim) Moallem (Educational Technology & Literacy), 2021-2022.
- Science of Solitude, Amanda Jozkowski (Occupational Therapy and Occupational Science), 2021-2022.
- Weight Loss Program for Adults with Low Vision, Gerald Jerome (Kinesiology), Adam Conover (Computer and Information Sciences), 2021-2022.
- Redesigning the US Consumer Recycle Experience, Kim Hopkins (Art + Design, Art History, Art Education), Sungchul Hong (Computer and Information Sciences), 2021-2022.
- Photonic Hypercrystal in the Visible Frequency Range, V. Smolyaninova (Physics, Astronomy and Geosciences), M. Davadas, Ellen Hondrogiannis (Chemistry), 2020-2022.
- Muscle Oxygen Consumption, Physical Function and Health Related Quality of Life in Older Adults, Rian Landers-Ramos (Kinesiology), Hyunjeong Park (Nursing), 2020-2021.
- Influence of auditory and visual attention on higher order cognition, Laura Hicken (Music), Jared McGinley, Blaire Weidler (Psychology), 2020-2022.
- Digital Stoops Along Networked Streets: Youth, Community Technology and the future in Baltimore, Samuel Collins, Matthew Durington (Sociology, Anthropology and Criminal Justice), Suranjan Chakraborty (Computer and Information Sciences), Jennifer Ballengee (English), 2020-2021.
- Developing Makerspace Activities to Help Improve Preservice Teachers' Technology Integration Competency, Liyan Song, Suzanne Obenshain (Educational Technology and Literacy) Doug Elmendorf (Baltimore County Public School System), 2019-2020.
- Career effects of health shocks during the Great Recession, Juergen Jung (Economics), 2019-2020.
- Critical GIS for Social and Environmental Justice, Nicole Fabricant (Sociology, Anthropology and Criminal Justice), Paporn Thebpanya (Geography and Environmental Planning), 2019-2020.
- Expert Elementary teachers' small group discussion strategies in post-investigation science and post-testing engineering discussions with Avatars, Pamela Lottero-Perdue (Physics, Astronomy, Geoscience), Laila Richman (Special Education), 2018-2020.
- The Association Between Lower Extremity Biomechanics and Injury in Collegiate Athletes: A Markerless Motion-Capture System Based Study, Peter Lisman (Kinesiology), Nathan Wilder (Athletics), 2018-2020.
- Optimizing pediatric emergency department care for patients with an ASD and their families, Jennifer Kouo (Special Education), Ziying Tang (Computer and Information Sciences), 2018-2020.
- Developing an AR and mobile game based mathematical learning approach for 8th grade students, Chris Cornwell (Math), Lin Deng (Computer and Information Sciences), Jing Tian (Math), Victoria Phillips (Math), 2018-2020.
- Bifunctional Catalysts for Hydrogen Release from a Storage Material with Promise for the Transportation Sector, Tim Brunker (Chemistry), Thomas Rhoades (Economics), Shuhua Ma (Chemistry), 2017-2019.

- Designing and Implementing a Connected Learning MOOC to Support Writing Teachers' Professional Learning, Sarah Lohnes Watulak (Educational technology and Literacy), Vicki McQuitty (Elementary education), 2017-2019.
- Fostering Awareness and Resiliency on Topics of Mental Health and Wellbeing in College Students: A Joint Initiative between Academic Affairs and Student Affairs, Karen Eskow (Family studies and community development), Leigh Carter (Counseling Center), Donna Cox (Health Science), Lisa Beasley (Family studies and community development), Jonathan Mattanah (Psychology), Lilian Odera (Counseling center), Karen Oppenheimer (Disability Support Services), 2017-2019.
- Investigating the Reading Process Using EMMA, Christina Pelatti (SPPA), Maria Liwanag, Prisca Martens (Elementary education), & Ray Martens (Art), 2016-2018.
- Improving health aging through assessment of energy expenditure and physical activity with a mobile metabolic system, Nicolas Knuth (KINES). 2016-2017.
- Geospatial Investigation of Community Navigation and Well-being for Older Adults, Kendra Heatwole Shank (OCTH), Virginia Thompson (GEOG), 2015-2017.
- "Moving" Sleep to the Forefront of Exercise Science, Devon Dobrosielski (KINES), Tamara Douglas-Burton (Interprofessional Health Studies), 2015-2016.
- The development of an interdisciplinary bridge course in Healthcare Systems Design and Implementation, Niya Werts (Health Science), Subrata Acharya (COSC). 2015-2016.
- ArmStrokes: Mobile phone-based rehabilitation games and support system for stroke survivors, Katherine Ziying Tang (COSC), Sonia Lawson (Occupational Therapy and Occupational Science), Jinjuan Heidi Feng (COSC), 2014-2016.
- Effects of Climate on Human Capital Development in Peruvian Children: A Geospatial Investigation, James Manley (Economics), Paporn Thebpanya (Geography), 2014-2016.
- Big Data Mining and Modeling to Develop Effective Strategies for Consumer Co-Design Online Social Networks Initiatives, Phillipe Duverger (Marketing), Nam Nguyen (COSC), 2014-2016.
- Pesticides in Kenya: Field Mapping and Laboratory Studies, Clare Muhoro (Chemistry), Jeremy Monn (CGIS), 2013.
- Permanent Outdoor Kinetic Light Instruments, Jenn Figg (Art), 2013-2014.
- Clinical Teacher Preparation for 21st Centuries Literacies, Barbara Laster (Educational Technology & Literacy), 2013.
- Voice Writing Center for Radio Captioning, Ellyn Sheffield (Psychology), 2012-2014.

Appendix 2: Emerging Technologies Potential Topic Areas

We take an expansive view of what constitutes an emerging technology. Potential topic areas include

- *Construction Management and Technology*: integrating project management with construction technology, especially newer innovations such as "green" technologies associated with Leadership in Energy and Environmental Design (LEED) certification, and Building Information Management Systems (BIMS).
- *Biotechnology, bioinformatics*: are just two examples of life sciences fields that present opportunities to launch interdisciplinary research programs, which can interface with our Molecular Biology, Biochemistry and Bioinformatics (MB3) academic program.
- *Geo-Spatial Technologies*: refer to technologies used for capturing, storing, retrieving, manipulating, analyzing, and displaying information about features or phenomena that occur on the earth's surface. These technologies include geographic information systems (GIS), remote sensing, and global positioning systems (GPS). Geographic information science is the rapidly growing multidisciplinary science behind the development and application of these technologies.
- *Nanotechnology*: deals with the control of matter on the sub-micron scale as well as the fabrication of devices on this same length scale. It is a highly multidisciplinary field, drawing from many disciplines including chemistry, applied physics, and materials science.
- *Health Informatics*: deals with the collection, storage, and use of health care information, including the use of devices that collect and store personal health data (e.g., heart rate, blood pressure) and allow for appropriate usage by medical personnel.
- *Assistive Technologies*: use software and/or hardware to improve accessibility for individuals with perceptual, cognitive, and motor impairments and/or differences.
- *Interactive Living Design*: combines faculty expertise to design living spaces for diverse needs. This could involve architectural design, computer interface, visual design and other factors. Smart living spaces are designed to be livable for individuals who have mobility limitations.
- *Environmental Design*: develops physical environments, both interior and exterior, to meet functional needs focused on humans' interface with their environment. ED ranges from the microcosm of designing small objects for everyday use, to landscape architecture, engineering, industrial design, interior design and fashion design. The essential aim of environmental design is to produce places, products and services in a way that reduces the use of non-renewable resources, minimizes environmental impact, and relates people with the natural environment.
- *Ethics and Human Enhancement Technologies*: is devoted to the study of the social implications of scientific and technological progress and the impact of emerging technologies on individuals and societies. Soon, artificial intelligence, nanotechnology, genetic engineering and cognitive science may allow human beings to transcend the limitations of the human body. Life spans may extend well beyond a century, human senses and cognition may be enhanced, and humans may have greater control over their emotions and memory. Human bodies and brains could be merged with computers. These future scenarios raise many ethical challenges that will require an educated citizenry prepared to confront them.
- *Gaming development*: involves the study of mathematical game theory and artificial intelligence (AI) techniques. In a multiple-agent and competitive environment, one uses heuristics, pruning techniques and AI search algorithms to seek optimal strategies, to describe rational and intelligent behavior, and to make serious decisions in situations as diverse as bankruptcy proceedings, product pricing, national defense, health care and emergency preparedness.
- *RFID technologies*: are increasingly critical to the efficient operation of large, complex enterprises. While the use of radio-frequency identification hardware is already widespread, new and more

efficient and effective software applications may be developed for different industries. Furthermore, the adoption of RFID technology is currently limited to high-value items, so research into lowering the unit cost through RFID chip development or software solutions could be revolutionary.

- *Technologies for Sustainability:* technology can play a vital role in both understanding and developing strategies for a sustainable human society. This can involve technology as a computing resource for understanding sustainability related models in climate, ecology, or public health research. It can also be a medium for enabling, evaluating, and disseminating sustainability interventions in the society. Research that involves technological resources for sustainability objectives is timely and extremely important as humanity confronts critical questions for the future.

This list should be considered illustrative rather than exhaustive, and we encourage proposals in other emerging technologies areas.

Appendix 3: Goals of the School of Emerging Technologies

1. Support and enhance existing courses and academic degree programs throughout the university that relate to emerging technologies and their social, environmental and ethical implications.
2. Foster the development of new innovative, interdisciplinary courses and degree and non-degree programs in fields involving emerging technologies – programs that address the anticipated technical workforce needs of the region and integrate the study of social/cultural, environmental and ethical issues as well as specific technologies.
3. Produce college graduates and postgraduates with marketable skills and potential for career growth in technology-driven fields.
4. Stimulate and facilitate interdisciplinary research and creative collaborations that focus on the study and application of emerging technologies in addressing public and individual needs, including quality-of-life enhancements.
5. Collaborate with entities in the region in identifying key technological areas of focus that would benefit from university involvement in designing and developing innovative processes and products.
6. Establish strong partnerships with area community colleges to ensure seamless transitions for students desiring a four-year degree that focuses on an area of technology.
7. Establish K-12 outreach initiatives to encourage more students at the pre-college level to pursue technology-based careers.
8. Collaborate with private and governmental partners in the region to address the professional development needs of their current technical workforce.
9. Serve as a catalyst to make technology and issues related to technology integral parts of the undergraduate educational experience spanning both general education and major course offerings.
10. Promote understanding among all Towson students of the ethical implications of current and future technologies and identify and address ethical issues confronting technology professionals.