TOPIC: Proposal to Create a New School of Emerging Technologies at Towson
University

COMMITTEE: Education Policy

DATE OF COMMITTEE MEETING: June 1, 2011

SUMMARY: Towson University is proposing to create a new School of Emerging Technologies
(SET) in FY 2012. The SET will be located administratively within the Fisher College of Science
and Mathematics (FCSM), and it will interface, potentially, with all the other colleges at Towson
University. As stated in the proposed mission for the School, "The SET will develop and support
innovative, integrative, interdisciplinary programs at the baccalaureate through applied doctoral
levels in fields involving emerging technologies, and will seek to address workforce and
public/societal needs. The SET will forge educational partnerships with community colleges,
government agencies, and technology-based industries. The SET will also be an incubator for
interdisciplinary faculty/student research and other forms of scholarly and creative
collaborations on the study and application of emerging technologies that impact people's lives
at work, in the community, and at home."

In the future, the SET could evolve into a stand-alone school independent of the FCSM. This
would require a structural modification which would likely involve the relocation of faculty
members and the creation of new governance and management bodies such as a SET School
(or College) Council, departments, and an expanded director's (or dean's) office. The decision
to establish such a new structure for the SET would rest with the President and Provost, and
would be informed by data on the success and sustainability of SET programs, the number of
students served, the success of SET efforts in fostering external partnerships and in obtaining
extramural support from partners, agencies, and donors. The President and Provost will consult
with the Dean of the FCSM and the SET Director to establish a set of annual performance
benchmarks for maintaining support for the SET, and another set of benchmarks for determining
whether the SET should become independent from the FCSM. Should the SET fail to make
adequate progress in academic programming or scholarly productivity within three to five years,
the President and Provost are advised to discontinue the school.

Funding for the proposed School of Emerging Technologies will be from a reallocation of
existing resources.   The programs to be housed in the center have been in another unit and are
self-supporting. The proposed structure shifts these programs and the revenue base to provide
the resources necessary for the new school.

The proposal from Towson University addresses the requirements of the USM Board of
Regents "Policy on the Creation/Development by University System of Maryland Institutions of
Schools or Colleges" (III-7.05).

ALTERNATIVE(S): The Committee could reject the proposal or could ask for additional
information.

FISCAL IMPACT: The institution will fund the costs of the administrative structure for the new School and the one-time transition costs through reallocation of existing resources.

CHANCELLOR'S RECOMMENDATION: That the Committee on Education Policy recommend that the Board of Regents approve the proposal from Towson University to create a new School of Emerging Technologies.

COMMITTEE RECOMMENDATION: Approval.   DATE: June 1, 2011

BOARD ACTION: DATE:

SUBMITTED BY: Irwin L. Goldstein (301) 445-1992   irv@usmd.edu

The School of Emerging Technologies

Proposal

25 April 2011

A. Rationale and Need for the School of Emerging Technologies

The School of Emerging Technologies (SET) at Towson University (TU) will be established in FY 2012. The SET will be located administratively within the Fisher College of Science and Mathematics (FCSM) and it will interface, potentially, with all the other colleges at Towson University. *The SET will advance interdisciplinary and collaborative educational and research programs that address the development, application, implications and ramifications of emerging technologies*.

The SET will (1) promote interdisciplinary programs involving two or more academic areas, or involving TU personnel and external partners, that might otherwise have difficulty collaborating successfully; (2) provide resources such as administrative support, start-up "seed" funds, and space for such programs; and (3) highlight TU's interdisciplinary educational and research programs both within and outside of the institution.

Nothing quite like the School of Emerging Technologies exists at any University System of Maryland institution in the Baltimore metropolitan region. The closest similar efforts are at the University of Maryland at College Park, which boasts:

1. The Institute for Physical Science and Technology (IPST), which has 30 faculty members with most holding joint appointments in departments such as Physics, Mathematics, Chemistry, and Engineering. Their mission is to foster excellence in interdisciplinary research and education.

2. The Maryland Technology Enterprise Institute (MTEI), which offers programs, courses, workshops and competitions to help faculty, students, and regional entrepreneurs create successful ventures.

3. The Maryland Technology Advancement Program, which has a staff of seasoned veterans of startups and venture capital firms who provide assistance to entrepreneurs.

TU's School of Emerging Technologies will, like the IPST, *foster excellence in interdisciplinary education and research*. And, like the MTEI, through external partnerships, TU's SET may eventually *help create successful spin-off firms* through the Division of Economic and Community Outreach. But the SET will have its own very unique profile as a result of the unique expertise and areas of interest of TU faculty

members, and the unique relationships that TU develops with external partners in the Baltimore metropolitan region.

B. <u>Mission Statement and Description</u>

The SET will develop and support innovative, integrative, interdisciplinary programs at the baccalaureate through applied doctoral levels in fields involving emerging technologies, and will seek to address workforce and public/societal needs. The SET will forge educational partnerships with community colleges, government agencies, and technology-based industries. The SET will also be an incubator for interdisciplinary faculty/student research and other forms of scholarly and creative collaborations on the study and application of emerging technologies that impact people's lives at work, in the community, and at home.

The mission of the SET is well-integrated with the mission of the FCSM:

> "Through *rigorous and high quality* undergraduate programs in a wide variety of scientific, computing and mathematical disciplines and graduate programs in *research-based, practice-based, applied and interdisciplinary fields, FCSM prepares its students to live and work productively in a scientific and technological world* and to pursue learning throughout their lives. Faculty members engage both their undergraduate and graduate students through interactive teaching, advising, basic and applied research, and collaborative activities internally and externally. They *form partnerships* both to serve the metropolitan community as well as to meet regional, national and international needs. The result is *dedicated, innovative, flexible*, and highly prepared individuals who excel in graduate school, professional school, and careers in industry, government and teaching [FCSM Mission Statement, FCSM Strategic Academic Plan, February 2011; italics added]."

Similarly, the mission of the SET will help fulfill the mission of Towson University:

> "Towson University, as the State's Metropolitan University, focuses on providing *highly developed educational experiences and community service* through a broad range of intellectual opportunities to a diverse student body at both the graduate and undergraduate levels. The academic programs and services offered through the university provide a core quality environment for students to acquire the intellectual and social preparation to achieve their potential as contributing leaders and citizens of the workforce and a complex global society. Faculty, students, and staff *serve the region through research and professional outreach that specifically responds to the state's socioeconomic and cultural needs and aspirations* [Towson University summary mission statement, www.towson.edu, accessed 24 March 2009, italics added]."

All three mission statements evoke a quality education that is relevant to a complex, technology-rich global society, and academic programs that reach out to the community.

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 insure 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.

Proposed Organization

The School of Emerging Technologies is designed to realize this vision and mission and to facilitate these goals. The Dean of the Fisher College of Science and Mathematics

(FCSM), with the approval of the Provost and President, will appoint a Founding Director and allocate space and operating resources. University faculty members will apply to be members of the Affiliate Faculty of the SET, but will retain their faculty status within their original units. There will be no faculty positions identified in the SET with the exception of the Director, who will report to the Dean of the FCSM and who will also be appointed as a faculty member in one or more academic departments within the FCSM.

Because it is inherently involved in interdisciplinary programming, the SET will operate in many ways like the interdisciplinary (and inter-college) Environmental Science and Studies program, with a director reporting to the Dean of FCSM and with an affiliate faculty. A faculty steering committee will assist the Director and will be involved in selecting projects and proposals to be supported, in creating new programs, and in other key activities of the SET. The size and membership of the faculty steering committee will be such that there is broad representation from the different departments that are contributing to the goals of the SET.

The Director may also convene an Advisory Board with representation from partners outside of the university.

Approximate Costs and Other Resource Needs

The SET will be assigned the following space and resources:

1. Director's office
2. Support staff office (with reception space and an office machine area)
3. Conference room, perhaps with video conferencing capability
4. Flexible assignable research space (approx. 1500-1800 sq. ft.) with the necessary supporting infrastructure (PCs, phones, internet connections, printers, etc.) to house individual SET programs for specified time periods. New programs in the SET will be eligible for assigned research space, the amount and length of time depending on the needs of the program. Frequent periodic review by the Director and the advisory board will determine when and how the assignable space should be re-allocated.

Costs to launch the SET will include a Director's and Administrative Assistant's salaries (ca. $200k, including benefits), and an operating budget sufficient to run the office and maintain the infrastructure of the assignable research area. The establishment of new educational and research programs within the SET will require seed funding, which could come from external sources (e.g., grants, contracts, collaborative agreements) or internal sources. Therefore, the internal operating budget should be large enough to provide some faculty summer salaries and to support some graduate assistantships. New programs in the SET will also require additional library resources in support of the new areas. The gross annual costs in this model would be about $400k.

External funding for SET programs will be expected. With three faculty research teams working on SET projects, each likely to write external proposals in their second year, the goal will be for the level of external funding by the end of year five to have reached $1M.

Statement of Work for the Founding Director

The Founding Director's responsibilities will be to:

1. Organize faculty and student groups from multiple colleges around possible emerging technology themes and promote the creation of new programs.
2. Identify educational program areas appropriate for development with external partners; identify suitable partners; develop programs that benefit both the school and the external partner.
3. Organize a faculty steering committee.
4. Organize, appoint members to, and chair an external advisory board.
5. Work with the SET steering and advisory bodies in identifying and prioritizing SET program areas.
6. Prepare a strategic plan that incorporates a business plan and/or project plan.
7. Initiate marketing and fundraising efforts.
8. Engage students, recruit students into SET programs.
9. Establish articulations with community colleges whose graduates may be served by SET programs.
10. Interface with Towson's Economic and Community Outreach division, especially if any SET programs become candidates for launching a commercial enterprise.
11. Contribute to K-12 outreach activities where SET programming can be leveraged to encourage students to succeed in technical fields.
12. Manage SET research space and other resources.
13. Contribute to FCSM Dean's Council (all department chairs and directors who report directly to the Dean).

Possible Program Areas for a School of Emerging Technologies

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.

C. <u>Faculty, staff, technology, space and library resources now in place</u>

As described in section (B), there will be no faculty positions identified in the SET. With the exception of the Director and the SET administrative assistant, all faculty resources envisaged as supporting the SET already exist at TU. Any current faculty member may seek recognition as a member of the SET Affiliate Faculty. On-campus space, technology resources and library resources are adequate to launch the SET in 2011. The SET will occupy a portion of the space in the 7800 York Road building that was vacated by the move of the Center for Geographic Information Sciences.

D. <u>Five-year plan</u>

Initially, the SET will not have departments. Its only staff will be the Director, a tenured faculty member who will report to the Dean of the FCSM, and the Administrative Assistant. Academic programming for the first five years may consist of, for example:

1. Specific academic programs that, owing to their technological, applied, or interdisciplinary nature, represent a good "fit" for the SET.

2. Specific programs in interdisciplinary education and research that result in academic achievements by students (such as undergraduate research projects, honors theses, graduate research projects, masters' theses, and doctoral dissertations) under the guidance of and with the collaboration of interdisciplinary faculty teams.

3. Educational programs developed with external partners that have emerging technology needs and that benefit both the university and the partner.

4. Specific technology-based program articulations with community colleges whose graduates may be served by SET programs.

5. Contributions to K-12 outreach activities where SET programming can be leveraged to encourage students to succeed in technical fields.

In the future, the SET could evolve into a stand-alone school independent of the FCSM. This would require a structural modification which would likely involve the relocation of

faculty members and the creation of new governance and management bodies such as a SET School (or College) Council, departments, and an expanded director's (or dean's) office. The decision to establish such a new structure for the SET would rest with the President and Provost, and would be informed by data on the success and sustainability of SET programs, the number of students served, the success of SET efforts in fostering external partnerships and in obtaining extramural support from partners, agencies, and donors. The President and Provost will consult with the Dean of the FCSM and the SET Director to establish a set of annual performance benchmarks for maintaining support for the SET, and another set of benchmarks for determining whether the SET should become independent from the FCSM.

Should the SET fail to make adequate progress in academic programming or scholarly productivity within three to five years, the President and Provost are advised to discontinue the school.

E. Five-year budget

Costs to launch the SET will include a Director's and Administrative Assistant's salaries and an operating budget sufficient to run the office and maintain the infrastructure of the assignable research area. The establishment of new educational and research programs within the SET will require seed funding using internal sources at the outset. External sources (e.g., grants, contracts, collaborative agreements) will also be sought to support new and ongoing programs. Therefore, the internal operating budget should be large enough to provide the required seed funding, which will include faculty summer salaries and graduate assistantships. New programs in the SET will also require additional library resources in support of the new areas.

Budget line	Year 1	Year 2	Year 3	Year 4	Year 5
Salaries and benefits[1]	200,000	204,000	208,080	212,242	216,489
Telecommunications	4,000	4,000	4,000	4,000	4,000
Travel	4,000	4,000	4,000	4,000	4,000
Photocopy	1,200	1,200	1,200	1,200	1,200
Director's office operating	5,000	5,000	5,000	5,000	5,000
Seed funds – faculty summer salaries[2]	42,000	42,000	42,000	42,000	42,000
Start-up funds – equipment and supplies	60,000	60,000	60,000	60,000	60,000
RA, academic year (@ $15,656)[3]	46,968	46,968	46,968	46,968	46,968
RA, summer (@ $4,314)[3]	12,942	12,942	12,942	12,942	12,942
Library resources	15,000	15,000	15,000	15,000	15,000
TOTAL	$391,110	$395,110	$399,190	$403,352	$407,599

Notes:
1. For the Founding Director, an administrative assistant, plus benefits; with 2% annual increase.
2. Seed funds will support three independent SET projects at any given time. For example, each interdisciplinary project could involve two faculty members from different disciplines, and a graduate student. Each faculty member will receive a summer stipend of $7,000 (equivalent to two courses); six faculty members will receive stipends each year.
3. Three RAs ($8,000 stipend + $7,656 tuition = $15,656 per RA) each academic year. Summer RAs ($2,400 stipend + $1,914 tuition = $4,314 per RA) each summer.

F. Changes to existing college and university units

Establishment of the SET should not affect any existing college or university units.

G. Changes to the constitution of the FCSM College Council

The SET requires no representation on the council, similar to the situation of the other interdisciplinary programs in the FCSM - Environmental Science and Molecular Biology, Biochemistry and Bioinformatics [MBBB].

H. Feedback

Feedback regarding this proposal has been solicited from the following groups.

> Faculty and staff affected by the proposal: the university-wide SET Task Force, which has faculty and staff members from across the university; and the University Senate.

> Students affected by the proposal: the University Senate and the FCSM College Council, both of which have undergraduate and graduate student representatives.

> Chairs affected by the proposal: the FCSM Chairs' Council.

> Deans affected by the proposal: the Deans' Council.

> College Councils affected by the proposal: the FCSM College Council.

Each group has or will make a recommendation to the Provost.

Approved by a vote of the University Senate on May 2, 2011.