The Engineering Profile for the University at Albany:

Report to the University Council

February 27, 2015

This report introduces the computer engineering program and innovative multidisciplinary engineering programs as the next steps in expanding the engineering profile of the University at Albany.

Background:

The creation of a computer engineering program in the College of Computing and Information was the first step in creating an engineering profile for the University. The computer engineering degree (CompE) is aligned with President Jones' call to expand degrees and research in high growth, high needs areas. During the spring of 2014 the CompE Working Group crafted a curriculum, consulted with education and industry partners and prepared a proposal for campus, SUNY and SED approval.

At the same time academic and administrative leaders met with consultants to explore the next steps in engineering for the University. Working off the Grand Challenges identified by the National Academy of Engineering the committees recommended creating niche engineering programs that could address the Grand Challenges and made the following connections:

Grand Challenge	University Best Fit:	Potential Engineering Degree Programs
Advance Health Informatics	Public Health, Computing and Information	Health Informatics, Informatics Systems
Engineering Better Medicine	Biology, Chemistry	Biomedical/Biological and Synthetic Biology
Reverse Engineer the Brain	Biology, Education	Biological
Engineer the tools of scientific discovery	Biology, Atmospherics Sciences	Instrumentation/Biomedical
Provide Access to Clean Water	Public Health, Chemistry, Atmospheric Sciences	Environmental/Atmospheric

Three multidisciplinary subcommittees were established to match University expertise to potential niche engineering programs in:

- Bio/Biomedical Engineering—including the development, structures, functions, modelling of cellular/molecular/other phenomena, and tools for the measurement/detection of same.
- (Health) Informatics/Information Engineering—including developing and using systems of secure and navigable information, particularly that which is needed for efficient and effective health care and its emerging contexts.
- Environmental Engineering—including understanding, measuring, modelling, managing, and modifying elements of atmosphere and environment.

Progress to date:

By Dec, 2014 the Computer Engineering Program had created a 120 credit B.S. degree in Computer Engineering with ABET requirements built-in, finalized the proposal after an external evaluation by two national leaders in computer engineering and ABET accreditation and had the proposal approved by the College of Computing and Information, the University Planning and Policy Council (UPPC) and the University Academic Committee (UAC). The application is pending Senate review and recommendation to the President. Upon signature of the President and the Provost the application will be forwarded to SUNY and once approve by SUNY forwarded to SED*. Two searches were underway for a Department Chair and three assistant professors to create a Department of Computer Engineering in the College of Computing and Information.

The multidisciplinary engineering programs began discussions about curriculum and specific programs. The committees each identified an engineering program to address one or more of the Grand Challenges.:

- Biological Engineering / Bioengineering
- Health Information and Health System Analytics Engineering
- Sustainable Engineering in Energy, Air and Water

The School of Business suggested both an undergraduate and graduate degree in financial engineering as additional options and is formulating a curriculum. Due to obstacles in naming conventions, work is needed to move the Environmental program forward. Health Information and Health System Analytics found the engineering title to be inappropriate, Bioengineering is working with partners to draft a curriculum focused on tissue synthesis.

Detailed information on both programs was presented to the Provost and the President in two substantive reports: the "CompE Report to the Provost" (6/2014) and the "Next Steps Engineering Report" (8/2014).

*Because the degree leads to a professional license, SED requires that the Office of the Professions Board of Engineers review and approve the program prior to their final review.

Projected Costs:

Engineering Science programs are costly.

The following tables provides a reasonable **estimate** of the cost for the creation of the programs, including the start-up costs for new hires in the program,

Computer Engineering Costs

	Costs for Startup and First Year Delivery	Research Start-Up Costs	Total
Computer Engineering	$1,273,312	$900,000	**$2,173,312**

Next Step Engineering Costs

	Costs for Startup and First Year Delivery	Research Start-Up Costs	Total
Biological	$2,310,922	$14,500,000	$16,810,922
Informatics	$1,574,444	$2,000,000	$3,574,444
Environmental	$1,347,333	$3,900,000	$5,247,333
Financial	$823,400	$100,000	$923,400
		Next-Step Total	**$26,556,100**

The projected cost of the entire profile as proposed is: **$28,729,412**

Considerations:

Today's engineer is not your parent's engineer. They face a highly competitive professional environment with work place demands that have developed to the point of being unrecognizable to the engineers of past generations.

The University's engineering profile must engage industry at all levels of development and implementation.   Connecting with prominent high-level industry leaders would clearly benefit the advancement of UAlbany's engineering profile.

A Presidential Advisory Board would provide an opportunity to inform the President on the next steps for engineering, connect the campus to industry collaborators and create a vision to establish a School/College of Engineering.

The programs will provide access to public higher education engineering degrees retaining students in our region to meet the demands of our local industries.

The programs can connect us with entrepreneurial investors who see the benefit of public higher education and a multidisciplinary approach towards engineering degrees to meet the Grand Challenges.

The best opportunity to establish the University's engineering presence is to create niche multidisciplinary programs that capitalize on our existing strengths and do not compete with regional institutions offering traditional engineering programs.

Recommendations:

- Create a Presidential Engineering Advisory Board to direct the development of the engineering profile at the University
- Hire a Founding Dean for a School/College of Engineering and Applied Sciences within the next two years
- Explore funding to support the development of niche engineering programs
- Fund a marketing analysis for the proposed multidisciplinary programs
- Expand the offerings in the Computer Engineering program to include graduate programs, electrical, electronics and software engineering
- Create a faculty hiring plan to serve the new engineering programs and provide faculty for those schools and colleges supporting the required coursework (Math and Sciences)
- Engage the State University of New York and the State Education Department in conversations to redefine engineering as an academic interdisciplinary field.

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