

DEVELOPMENTS, IDEAS & UPDATES

Bridging Boundaries Between Schools Through Senior Design Projects

*B&T Students Developing Cross-Functional Skills Working with
Engineering and Science Students*

*By Bernard Skown,
Distinguished Service Professor*

"The Business and Technology Program teaches students what they need to know and how to apply it to core business problems. They learn how to think broadly, analytically, and technically within a global strategic environment. They develop in themselves those life-long skills so critical to success in the business world – teamwork, leadership and an ability to communicate their ideas to others. In short, they see the business world from the inside throughout their years at Stevens."

*- Louis A. Laucirica,
Associate Dean /Director of
Undergraduate Studies*

A long-standing Stevens tradition, the senior design project, has always played a center-stage role as a defining moment in the education of the Stevens undergraduate engineering and science student. With the establishment of the Stevens undergraduate Business and Technology Program (B&T), this hallmark experience has now been further enhanced by including B&T students on senior design teams.

As Stevens's highly successful B&T Program now nears completion of its 7th year of existence, new crossroads are continually being reached and crossed. One such crossroad is the cross-fertilization of B&T students with their classmates from the Schaefer School of Engineering and the Imperatore School of Sciences and Arts collaborating on senior design projects. This integration of students from diverse academic backgrounds working together toward a common project goal is

an accomplishment that few other colleges and universities have been able to match. Which underscores the uniqueness and value of the Stevens educational experience, preparing our students for the real-world environment when they join the workforce on a full-time basis following graduation.

A fundamental mission of Stevens is the education of students skilled to succeed in their various career paths because of their well-rounded knowledge, resourcefulness, problem solving skills, and integrity. This all comes together in the student's capstone senior design project, the culmination of the undergraduate experience where knowledge gained in the classroom is applied to a major design project.

Working together with the Engineering School, the Howe School recognizes the value of having the senior projects be sponsored by industry and has the goal of having the majority of senior projects sponsored or defined and mentored in collaboration with an industrial partner. This provides meaningful projects to the sponsor, and it imbues a professional orientation in the student team as they work toward providing the sponsor with deliverables in a manner that simulates the environment in which they will shortly be operating. At the same time the project is crafted to meet the educational goals of the capstone design course, which runs the full senior year.

Suitable projects might include feasibility studies; design or redesign problems that are longer term and/or lower priority than the sponsor can tackle with their available personnel. Other projects might focus on



Community Blood Services of New Jersey - Pictured from left to right: J. Perez, Prof. A. Curtis, N. Mabunay, Eva Yates (Blood Center), S. Quinn, Dr. D. Todd (Blood Center CEO)

Continued on next page

community affairs, where a team of business and engineering students can address a significant problem facing that organization. This addresses the timing of Senior Design, which in both start time and project duration is not on the compressed scale of industrial activities. The goal would be to benefit the sponsor on a long-term basis rather than link the project to an immediate need. A Stevens faculty advisor is assigned to guide the students in fulfilling the project requirements. Typically the sponsor will also provide an advisor.

When joining the workforce upon graduation, whether they are engineering, technology, or business students, Stevens graduates often find themselves working jointly with other company departments on cross-functional assignments as key team members. It is with this in mind that the Business and Technology students must complete a required course in both their fall and spring semester of their senior year, Business Consulting in Engineering Design I and II. Since its inception, B&T students now have worked on a wide variety of senior design projects.

The B&T Program now has had three classes fully completing these course requirements, with the fourth class nearing completion, this year, on their respective senior design projects. The types of projects that students have become involved with will vary reflecting the interest of the student and his/her intellectual curiosity. Highlighted in this article are a few representative projects from many that serve as an example of student work.

How It Works!

As they approach senior year, the B&T student is responsible to network within Stevens to identify an engineering project team with whom to collaborate. Students also are assisted by faculty who help in locating and identifying suitable projects.

Senior B&T students will join an engineering design team to assist that team's efforts. Typically, the B&T student's role is to evaluate the economic feasibility of the project and assess its commercial viability. In the fall semester, this includes:

1. Gaining an understanding of the project as defined by his/her engineering teammates
2. Preparing a market overview of your

Continued on next page

Office of Emergency Management, City of New York

Over the past two academic years, several teams of B&T students, together with a team of electrical engineers, have been addressing some of the issues facing New York City's emergency management center. The students were charged with the task of evaluating and recommending improvements to OEM's Watch Command and Fleet Operations in the areas of process/procedure improvement, organization and staffing, data information flow, networking infrastructure, and fleet utilization. At the conclusion of the student presentations, OEM Commissioner Bruno commented that "the work you've done analyzing Watch Command is crucial to us. You did a great job and exactly what we wanted you to do. You've given us a wake-up call and told us where the problems are

Students: *Alexander Semidey, Ali Afzal, Carlos Vinasco, Ed Bordet, Ian Gorham, Jennifer Palumbo, Jessica Pruzinsky, Jiby Jacob, Karen Donnelly, Kathy Wu, Malanka Misilo, Mary Claire D'Elia, Pam Dorsett, Rajarshi Nandy, Srikant Gupta, Stephanie LeBlanc, Alex Richards, Christian Pontier, Christopher Celentano, Heather Dean, Heather Dinsmore, Jamaal Smith, Matthew Althausser, Ryan Bennick, Will Young, Tim Akpinar*

NYC Personnel: *A. Kolberg, Policy Analyst; C. Drayton, 1st Deputy Commissioner; H. Jackson, Deputy Commissioner; H. Bradshaw; J. Bruno, Commissioner; M. Clampet, Deputy Director; M. Lee, Director Watch Command; S. Cummins, Chief of Staff; B. Gair, Deputy Commissioner for Operations; D. O'Keefe, Dir. Intelligence; P. Anglim, Fleet Manager; V. Mewborn*

Faculty Advisors: *Prof. B. Skown, Prof. M. zur Muehlen, Prof. B. McNair*

Women's Lacrosse Skill-Development Training Device

The project designed a training device for women lacrosse players to improve the ability to draw without the assistance of others. Currently there are no similar training devices that allow women lacrosse players to practice the draw. While a team of mechanical engineers designed and built the first working prototype, a B&T student working with this team conducted an in-depth market study that reached out to all NCAA women lacrosse coaches to determine market need, pricing points, commercial feasibility, and initial identification of funding sources. The device has now been patented and continues to be developed for commercial application.

Students: *Neha Desai, Ryan Donovan, Michael Freeman, Robart Hoar, Thomas Presutti, O.Pierce Smith*

Faculty Advisors: *Prof. B. Skown, Prof. R. Berkof*

Community Blood Services of New Jersey

A team of B&T students, working with a team of electrical engineers, was charged with the overall goal of streamlining the communications systems and procedures between the Community Blood Services of New Jersey and regional hospitals, especially in emergency situations. The teams assessed communication protocols, infrastructure, procedures that Community Blood Services had in place at the start of the project. The teams through coordination with emergency agencies closely affiliated with the blood center and through collective collaboration led to the development of drill scenarios and significant infrastructure improvement.

Students: *Joel Perez, Sarah Quinn, Nick Mabunay, Shamim Akhtar, Ravi Amin, Ndiritu Muriku, Imtiazur Rahman*

Faculty Advisor: *Prof. A. Curtis* **PhD Advisor:** *P. Tanguturi*

Hydroelectric Project in Dominican Republic

The Stevens chapter of Stevens Engineers Without Borders is working in a local mountainside community in the Dominican Republic, charged with designing and building a cheap, inexpensive hydroelectric system to supply power to the local homes in El Pulce. The role of the B&T student is to assess the project's commercial feasibility, longer term impact on the community, market evaluation, and to raise the funds necessary to support this project.

(Engineers Without Borders Local Chapter)

Students: *Katie Weatherall, Greg Maietta, Nick Strand, Dave Velasco, Chloe Weck*

Faculty Advisors: *Prof. F. Fisher, Prof. S. Thangam, Prof. B. Skown*

product and its capabilities

3. Doing a market analysis and feasibility study about the opportunity being addressed
4. If appropriate, preparing a project milestone schedule related to the senior design team
5. And finally, and also very importantly, addressing how the combined team worked together

In the Spring semester – while engineers work on actually designing and building their "widget," B&T students develop and prepare a mini-business plan to further exploit the project's real world commercialization opportunity if appropriate.

Some Benefits for Students

- It is an opportunity to work at meeting a practical industrial need rather than pursuing a purely academic goal initiated by a faculty advisor
- Industrial problems have a scope that favors solution by cross-disciplinary teams
- Interacting with representatives of the sponsoring organization helps students develop greater professionalism and perspective

Some Benefits for Sponsor

- Sponsors can obtain solutions to problems or explore concepts that they cannot themselves address, because of time or personnel constraints
- Provides an opportunity to see potential hires in action and to establish a mutually beneficial relationship with these students
- Builds sponsor-faculty ties that may provide benefits in research and/or consulting in areas of interest to the sponsor
- Provides visibility for the sponsor on campus ■

TO LEARN MORE

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Bernard Skown Distinguished Service Professor and Program Director joined Stevens with responsibility for: curriculum development for business planning (*Unifying Spine*) in the B&T program. His professional background includes over twenty-five (25) years of executive management experience covering all facets of sales & marketing, business development, manufacturing, production operations, finance, strategic planning, and international operations. Mr. Skown's educational background includes a MBA in Finance & Marketing from the Harvard Business School and a BS in Engineering from the United States Military Academy. His military experience as a Signal Corps officer in the United States Army includes nearly four years in Germany and one year in Korea.

Castle Point Records

Castle Point Records is a student operated record label funded by Stevens. They released their first record in Spring of 2006, and followed with several other recordings by local artists. Several B&T students assisted in this company start-up by developing and building the necessary technical infrastructure required to support on-line retail store operations and by designing and implementing a company web site required to support company operations.

Students: *Tim Alexander, Ian Wolf, Stephen Puig, Alex Sorokin, Drew DePalma, Clifford Godfrey*

Sell Center LLC

This company was started by two Stevens's B&T undergraduate students in founding an online auction house. During the past year, several B&T students assisted the founders on the technical support development side in designing and automating a company-wide accounting system, as well as significant website design improvements and implementation policies and procedures.

Students: *Adam Morris, Anthony Latona, Shane Pierson*



Neha Desai, Ryan Donovan, Michael Freeman, Robart Hoar, Thomas Presutti, O. Pierce Smith