WELCOME FROM THE PROVOST

Dear colleagues and friends of Stevens,

We are delighted to welcome you to the Stevens Innovation Expo 2016. Innovation and entrepreneurship are core values at Stevens. These values can be traced back to our founding fathers and are part of the rich 146-year history of our faculty and alumni, as demonstrated in this passage from the Stevens 1923 Book:

“Stevens Institute of Technology has a character so definite that everyone who comes into contact with it, or Stevens graduates, retains a lasting impression. The purposes and methods are clear and distinct.”

Today, you will get the opportunity to see those values and the Stevens legacy come to life. The creativity of our students and faculty comes to the forefront as they work to solve some of the most pressing and significant problems of our time.

We are pleased to have you with us for the 2016 Innovation Expo. Thank you for supporting the students and faculty.

Sincerely,

George P. Korfiatis, Ph.D.
Provost & University Vice President

Mo Dehghani
Vice Provost of Research, Innovation and Entrepreneurship

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AGENDA

Senior Projects Expo

1–3:30 p.m. Senior Design Projects
Canavan Arena, Walker Gymnasium
Griffith Building – Live Demonstrations

Research Presentations and Events

1–3 p.m. Faculty and Ph.D Poster Session
Babbio Atrium and Patio

3–4 p.m. Research Lecture
Convergence Science – The Future of Research
Grace Peng, Ph.D., Program Director at the National Institute
of Biomedical Imaging and Bioengineering (NBIB),
National Institutes of Health
Babbio 122

5–6 p.m. Research Networking Session with Grace Peng
Babbio Atrium and Patio

Entrepreneurship Presentations and Events

1–3 p.m. Startup Companies
Babbio Atrium and Patio

4–5 p.m. Thomas H. Scholl Lecture by Visiting Entrepreneurs
The History of the Internet Through the Eyes of a Stevens Graduate
and Entrepreneur
Sergio Heker, ’84, MS ’85; CEO of GLESEC
DeBaun Auditorium

5–6 p.m. Elevator Pitch Competitions
Introductory Remarks: Dr. Nariman Farvardin, President
DeBaun Auditorium

6–7 p.m. Reception
Babbio Atrium

Share your experience today on social media:
#StevensExpo2016
DR. NARIMAN FARVARDIN

Dr. Nariman Farvardin became the seventh president of Stevens Institute of Technology in July 2011. Since joining Stevens, Dr. Farvardin has been the driving force for the development and implementation of an ambitious 10-year Strategic Plan, entitled, *The Future. Ours to Create.*, which aims to increase the university’s stature, impact and size through growth and increased selectivity in undergraduate and graduate student populations; targeted investments in areas of societal benefit, including healthcare and medicine, sustainable energy, financial systems, defense and security, and STEM education; and an unyielding commitment to excellence across all sectors of the university.

Dr. Farvardin joined Stevens from the University of Maryland, where he was a member of the faculty for 27 years. He served as the University of Maryland’s Senior Vice President for Academic Affairs and Provost from 2007-2011, having previously served as Professor of Electrical and Computer Engineering, Chair of the Department of Electrical and Computer Engineering and Dean of the A. James Clark School of Engineering. Among Dr. Farvardin’s accomplishments at the University of Maryland was spearheading the development and implementation of the University of Maryland’s ambitious strategic plan, Transforming Maryland: Higher Expectations.

Dr. Farvardin is an accomplished researcher in the areas of information theory and coding, multimedia signal compression and transmission, high-speed networks and wireless networks. He has made significant contributions to a number of communications standards and practical systems in data communication, image and video compression, and voice coding in wireless applications.

Dr. Farvardin holds seven U.S. patents in data communication, image coding, and wireless communication. He also co-founded two companies: Zagros Networks, a venture-funded fabless semiconductor company; and NovaTherm Technologies, a high-tech start-up company that develops technologies to improve the energy efficiency of buildings.

Dr. Farvardin was chosen by the Governor of Maryland to serve on the state’s task forces for Science, Technology, Engineering and Mathematics (STEM) and Nano-biotechnology, and he chaired the University System of Maryland’s Task Force on Cybersecurity. He has also served on a number of special panels organized by the National Science Foundation, National Research Council, U.S. Department of Commerce, and National Council of Entrepreneurial Technology Transfer.

A passionate advocate of technological innovation, Dr. Farvardin has served on the boards of several companies and educational non-profit organizations. In December 2013 he was named a Fellow of the National Academy of Inventors, which honors academic innovators who are named on a patent issued by the USPTO and who have contributed to the invention of products, goods and services which have positively impacted quality of life, economic development and welfare of society. Also in Fall 2012, he was named CEO of the Year by the New Jersey Technology Council, the state’s premier trade association for technology companies.

Dr. Farvardin served as Chairman of the New Jersey President’s Council Task Force on Alignment of Higher Education Programs and New Jersey Workforce Needs. He is a member of the Board of Directors of the New Jersey Technology Council and the National Association of Independent Colleges and Universities; treasurer of the Association of Independent Colleges and Universities in New Jersey; Education Advocate of Choose NJ; and a member of the Business-Higher Education Forum.

Dr. Farvardin was the co-founder and chairman of the board of Zagros Networks, a venture-funded fabless semiconductor company in Rockville, Maryland. The company was created to develop technologies focusing on quality-of-service provisioning in packet switched networks. In 2010, he co-founded NovaTherm Technologies, LLC, developing a technology to reduce the energy consumption associated with building heating and cooling systems.

In recognition of his contributions to technology education and his support of innovation and entrepreneurship, Dr. Farvardin was featured in *The Washington Post* as one of the “Five to Watch” in 2003. Among his honors are the National Science Foundation’s Presidential Young Investigator Award, the George Corcoran Award for Outstanding Contributions to Electrical Engineering Education, and the University of Maryland’s Invention of the Year Award in Information Sciences.

A native of Tehran, Iran, Dr. Farvardin earned his bachelor’s, master’s, and doctoral degrees from the Rensselaer Polytechnic Institute in Troy, New York, in 1979, 1980, and 1983, respectively.
SERGIO HEKER

Thomas H. Scholl Lecture by Visiting Entrepreneurs

Sergio Heker is founder and CEO of GLESEC, a cybersecurity company with headquarters in Princeton, NJ, and operations across Latin America.

Mr. Heker has been involved in Internet security since 1985, when he started and operated the JvNCnet – the largest and fastest Internet network at the time – based at the John von Neumann Supercomputing Center, part of the ARPANET, one of the original six nodes of the NSFNET. JvNCnet became the first backbone-based regional network in the U.S. and the first to offer T1 Internet access. It was also the largest carrier of Internet traffic in the world.

After the infamous Morris worm in 1988 (the first Internet worm), which was contained by the efforts of Mr. Heker, he was called to testify before Congress on the security of the Internet.

In 1990, the JvNCnet network became a Princeton University department under the management of Mr. Heker. In 1992, he acquired the operation from Princeton, creating Global Enterprise Services (GES), the third commercial Internet service provider in the United States and a network that carried most of the traffic of the global Internet at the time, with services in Asia, Europe and Latin America. GES was also known as the “pharmaceutical” network since most of the largest pharmaceutical companies derived their Internet access from it.

In 1997, he sold most of the assets of GES and created NextGen Internet, one of the first e-business companies operating in the U.S. and Latin America, with primary operations in New Jersey and in Mexico and with a minor emphasis in information security.

Mr. Heker founded GLESEC in 2003 to respond to the need for information security intelligence and protection and to deliver managed operation and intelligence services with emerging technologies to the U.S. and Latin American markets.

Mr. Heker holds bachelor’s and master’s degrees in electrical engineering from Stevens. He is a frequent conference speaker and is widely recognized as an Internet pioneer. He is also a founding member of the Internet Society, a National Science Foundation principal investigator and reviewer, a member of Who’s Who of Global Business Leaders and Who’s Who in the Computer Industry and he belongs to Eta Kappa Nu and Stevens’ Gear and Triangle.

GRACE PENG

2016 Research Lecturer

Grace C.Y. Peng has been a Program Director in the National Institute of Biomedical Imaging and Bioengineering (NIBIB) at the National Institutes of Health since 2002. Her program areas at the NIBIB include mathematical modeling, simulation and analysis methods, and next-generation engineering systems for rehabilitation, neuroengineering and surgical systems. In 2003, she brought together the Neuroporsthesis Group (NPG) of program officers across multiple institutes of the NIH.

Also in 2003, Dr. Peng led the creation of the Interagency Modeling and Analysis Group (IMAG), which now consists of program officers from ten federal agencies of the U.S. government and Canada. IMAG has continuously supported funding specifically for multiscale modeling of biological systems since 2004. IMAG facilitates the activities of the Multiscale Modeling (MSM) Consortium of investigators, begun in 2006. Dr. Peng is interested in promoting the development of intelligent tools and reusable models and integrating these approaches in engineering systems and multiscale physiological problems.

Dr. Peng received a B.S. degree in electrical engineering from the University of Illinois at Urbana and an M.S. degree and a Ph.D. in biomedical engineering from Northwestern University. She performed postdoctoral and faculty research in the department of neurology at The Johns Hopkins University. In 2000, she became the Clare Boothe Luce professor of biomedical engineering at the Catholic University of America.
ELEVATOR PITCH COMPETITIONS

What is an Elevator Pitch: An elevator pitch is a short presentation made by an entrepreneur raising money for a venture. The term describes a pitch that’s short enough that it could be given during an elevator ride when the entrepreneur has the only chance to talk with a potential investor. In this competition, senior students take their design project and turn it into a potential business. In past years, these projects have gone on to become funded businesses and have moved to the next phases of development beyond the competition. A preliminary competition was held the previous week and the top eight teams are in the final competition. The students will be given two scores: one for the quality of the elevator pitch and one for the addressing information about the business model.

Quality of the Elevator Pitch:
– Was the information presented well?
– Was the presentation logically organized?
– Did the presenter speak clearly?
– Did the presenter seem knowledgeable?

How well the team has addressed the following information:
– Product/Service Description
– Problem Being Solved
– Competitive Business Advantage
– Business Model
– Target Market

There are three winners for this competition with the prizes mentioned below:
– 1st Prize - $ 5,000 & 1 year co-working membership for the team at Mission50.
– 2nd Prize - $ 2,000
– 3rd Prize - $ 1,000

Competition prizes provided by the Ansary Foundation.
STEVENS FACULTY RESEARCH

Stevens has deep-rooted technical expertise to advance the frontiers of education and research domains in areas of significant societal need. The university’s research focuses on healthcare and medicine, sustainable energy, financial systems, defense and security, and science, technology, engineering and mathematics (STEM) education.

DEFENSE AND SECURITY

Recent events around the globe have once again brought security and cybersecurity into the limelight. Protecting our geographical borders, critical infrastructure and vital communication and trade networks are crucial in defending against man-made and natural threats. In response to these emerging threats, Stevens has established cross-disciplinary research areas focused on developing transitional breakthroughs in national security technology.

Dr. Arthur Pyster, deputy executive director, Systems Engineering Research Center, received the U.S. Department of Defense/Systems Engineering Research Center award titled, “RT 145- ERD Tradespace Tools Research (Continuation of RT-120)” for $1,515,750.
Dr. Yuping Huang, assistant professor, physics and engineering, received the Office of Naval Research award titled, “Persistent Maritime Quantum Key Distribution” for $781,783.
Dr. Christos Christodoulatos, director, Center for Environmental Systems, received from the Consortium for Energy, Environment and Demilitarization (CEED), Department of the Army/ARDEC, an award titled, “Net Zero Technologies for the Army’s Industrial Munitions Base” for $4,965,887.
Dr. Georgios Portokalidis, assistant professor, computer science, received the Office of Naval Research award titled, “Adapting Static and Dynamic Program Analysis to Effectively Harden Debloated Software,” for $467,543.
Dr. Hady Salloum, research professor, associate dean and director of the Maritime Security Center, received the U.S. Department of Homeland Security award titled, “Modular/Mobile Maritime Domain Awareness (M3DA),” for $482,940.

Algebraic Cryptology Center
Gilman, Robert
Algebraic Cryptology Center

Chip-Integrated Photonic Circuits for Scalable Quantum Information Processing
Chen, Jiayang
Center for Distributed Quantum Computing

Collaboration of Analysis Tools for Tracking Information Flow in Android’s WebView
Sexton, Julian
Computer Science

Experimental and Computational Investigations of Projectile Motion
Thangam, Siva
U.S. Army Armament Research, Development and Engineering Center

Spectrum-Aware Cognitive Mobile Cloud Computing
Mahmoodi, Seyed Eman
Information Networks and Security Lab

Strain Engineered Graphene Growth for Suspended Nanoelectromechanical System Resonators
Hader, Grzegorz
Mechanical Engineering
FINANCIAL SYSTEMS

Our research focuses on integrating the latest hardware and software technologies to support innovative research into the most common and urgent problems in contemporary finance including systemic risk, enterprise-level risk management, software development and cyber security.

Bitcoin/Blockchain Volatility Forecasting via Flow Network Properties
Jinhyoung, Kim
School of Systems & Enterprises

Developing Liquidity Index for Stock Market Using High Frequency Data
Salighehdar, Amin
Hanlon Financial Systems Center

Genetic Programming Optimization for a Sentiment Feedback Strength-Based Trading Strategy
Liu, Anqi
School of Systems & Enterprises

Hanlon Financial Systems Lab: Technology Development to Support Teaching and Research
Bozdog, Dragos
Hanlon Financial Systems Center

Hedging with Cointegrated Prices in the U.S. Natural Gas Market
Emamzadeh, Sahar
School of Business

HFSL Introduction
Zhu, Xiaodi
Hanlon Financial Systems Center

Modeling Financial Derivatives Using Modern Stochastic Processes
Zhao, Zhe
Hanlon Financial Systems Center

Rare Events in Multidimensional Financial Datasets
Golbayani, Parisa
School of Systems & Enterprises

sHiFT - Stevens High Frequency Trading
Florescu, Ionut
Hanlon Financial Systems Center
HEALTHCARE AND MEDICINE

Major areas of research include tissue engineering of cancer biopsies for drug development and therapy selection, biomaterials that control infection of implanted prosthetic and medical devices, mobile healthcare and telemedicine apps, and data analytics and modeling of healthcare delivery systems.

Dr. Peter Tolias, director for the Center for Healthcare Innovation, received a 2015 Cepter Biopartners, LLC award titled, “Sponsored Research Lab 2,” for $1,003,024.

Dr. Robert Chang, assistant professor, mechanical engineering, received a 2016 National Science Foundation CAREER award titled, “Additive Biomanufacturing an Engineered Stem Cell Microenvironment,” for $500,000.

Dr. Hongjun Wang, associate professor, biomedical engineering, received a 2015 National Science Foundation award titled, “Biomimetic Reconstruction of Functional and Hierarchical Microvascular Networks,” for $389,909.

Dr. Samantha Kleinberg, assistant professor, computer science, received a James S. McDonnell Foundation award titled, “Multiscale Causality Across Time and Space,” for $450,000.

Dr. Negar Tavassolian, assistant professor, electrical and computer engineering, received a 2016 National Science Foundation CAREER award titled, “Synthetic Ultra-High Resolution Millimeter-Wave Imaging for Tissue Diagnostics,” for $500,000.

Dr. William Rouse, Alexander Crombie Humphreys Professor with the School of Systems & Enterprises, received an award from Robert Wood Johnson Foundation titled, “The Use of Policy Simulation in Marketing Decisions to Implement the Transitional Care Model,” $402,270.

3D-Printed Bionic Nose with Electronic “Olfactory Epithilium”
Aliashrafi-Jodat, Yasamin
Mechanical Engineering

3D-Printed Polymeric Bone Scaffolds Withstand Physiological Loading in Spine
Maglaras, Constance
Orthopaedic Tissue Testing Engineering and Research Laboratory

3D-Printed Scaffold Designs for Grafting Applications in Segmental Bone Defects
Chung, Rebecca
Orthopaedic Tissue Testing Engineering and Research Laboratory

Activities at the Orthopaedic Testing Tissue Engineering and Research (OTTER) Laboratory
Valdevit, Antonio
Orthopaedic Testing Tissue Engineering and Research Laboratory

Biologically Motivated Stent Optimization
Kushnirenko, Vitali
Mechanical Engineering

Bone Marrow Stromal Cells Cultured by Bioreactor
Zhou, Gan
Biomedical Engineering, Chemistry and Biological Sciences

Differential Regulation of Skin Fibroblasts for Their TGF-β1-Dependent Wound Healing by Biomimetic Nanofibers
Xu, Meng
Biomedical Engineering, Chemistry and Biological Sciences

Fabrication of Multiscale Fibrous Scaffolds
Jia, Chao
Biomedical Engineering, Chemistry and Biological Sciences

Microgel Tethering for Nucleic-Acid Molecular Diagnostics
Ma, Youlong
Chemical Engineering and Materials Science

Patient-Specific Cell Culture Platform for Multiple Myeloma Treatment Selection
Chen, Zhehuan
Center for Healthcare Innovation

The Influence of Aneurysm Geometry on Endoleak after Endovascular Aneurysm Repair (EVAR)
Liu, Yue
Biomedical Engineering, Chemistry and Biological Sciences

The Vestibular System
Vatankhah, Maryam
Biomedical Engineering, Chemistry and Biological Sciences

Ultra-High-Resolution Millimeter-Wave Imaging for Biomedical Applications
Mirbeik-Sabzevari, Amir
Electrical and Computer Engineering

Upper Limb Kinematic Synergies for Prosthetic Control Scheme
Patel, Vrajeshri
Biomedical Engineering, Chemistry and Biological Sciences
STEM EDUCATION

To catalyze and support excellence in teaching and learning of science, technology, engineering and mathematics (STEM) and other core subjects through innovative, research-based instructional strategies and use of novel technologies.


Dr. Keith Sheppard, professor of chemical engineering and materials science and associate dean of the School of Engineering and Science, received a National Science Foundation award titled, “FOUNDATIONS: Integrating evidence-based Teaching and learning into the Core Engineering Curriculum,” for $2,752,458.

Dr. Linda Laird, director of the software engineering program, received a National Science Foundation award titled, “Software Engineering Master’s Program for Liberal Arts Graduates,” for $632,002.00.

Dr. Patrick Miller, deputy director and professor of mathematical sciences, received a U.S. Department of Education award titled, “Math Science Partnership year 3 (NJ Prime),” for $363,114.

Computers Teaching Mathematics
Panteleev, Dmitry
Mathematical Sciences

Growth and Transfer of MoS2, WS2, WSe2 and MoSe2
Wang, Xiaotian
EH Yang Research Group, Mechanical Engineering

Programmable Ultrafast Optical Arbitrary Waveform Generator
Shahverdi, Amin
QuEST Laboratory

Robot-Assisted Pedestrian Regulation in an Exit Corridor
Jiang, Chao
Robotics and Automation Laboratory

Significant Effect of pH and Ca 2+ on Colloidal Stability of Graphene Oxide in Water
Terracciano, Amalia
Center for Environmental Systems

The Effects on PPy(DBS) Redox Parameters on Droplet Wetting
Zhang, Runzhi
Mechanical Engineering

SUSTAINABLE ENERGY

With an eye toward some of the greatest challenges facing the global community today, Stevens has identified sustainability of energy and infrastructure as one of its major research focuses. Stevens seeks to develop solutions to energy challenges that promote economic and environmental sustainability through interdisciplinary collaborative research, education, and outreach programs.

Dr. Babak Heydari, assistant professor, School of Systems & Enterprises, received a 2015 National Science Foundation CAREER award titled, “Architecting Products to Balance Innovation and Competition in Business Ecosystems,” for $500,000.

Application of Bias-Voltage to Tune the Resonant Frequency of Membrane-Based Electroactive Polymer Energy Harvesters
Dong, Lin
Mechanical Engineering

Cost Effective Fabrication and Characterization of In-Membrane Micro-Fuel Cell
Mahmoodi, Seyed Reza
Chemical Engineering and Materials Science

EH Yang Research Group
Yang, Eui-Hyek
Mechanical Engineering

Modeling the Sustainable Energy System in a University as a Smart City
See Tao, Hoong Yan
School of Systems & Enterprises

Novel Thermo-Chemical Biomass Conversion with the Reciprocating Biomass Conversion Reactor (RBCR)
Dang, Wanjun
Mechanical Engineering

Reactive Proppant to Immobilize Metals and Radionulides in the Subsurface during Fraking
Prigioobbe, Valentina
Civil, Environmental and Ocean Engineering

Virtual Water from the Lenz of International Economics
Ghoddusi, Hamed
School of Business
Dr. Philippos Mordohai, associate professor of computer science, received a National Science Foundation award titled, “NeTS: Medium: Collaborative Research: Exploiting Fine-Grained WiFi Signals for Wellbeing Monitoring,” for $300,000.

Dr. Babak Heydari, assistant professor, School of Systems & Enterprises, received a 2015 National Science Foundation EAGER award titled, “Hybrid Socio-Technical Teams: A Theoretical Framework For Modeling And Design of Hybrid Networks of Human and Autonomous Agents,” for $229,903.00.

Dr. Henry Du, professor of chemical engineering and materials science, received a National Science Foundation award titled, “GOALI: Nanostructured Sapphire Optical Fiber Sensing in Harsh Environment,” for $406,733.

Dr. Stefan Strauf, associate professor, physics and engineering physics, received a National Science Foundation award titled, “MRI: Acquisition of Cryogen-Free Low-Temperature Scanning-Probe Spectroscopy System for Nanophotonic and Nanoelectronic Device Characterization,” for $312,000.

CVD Growth of Well-Aligned Carbon Nanotube Carpets
Fu, Shichen
Mechanical Engineering

Data-Driven Agent-Based Models of Socio-Technical Networks
Ehsanfar, Abbas
School of Systems & Enterprises

Direct Transfer of Corrugated Graphene Sheets for Stretchable Electrodes
Ding, Junjun
Mechanical Engineering

Effects of Electropolymerization Parameters of PPy(DBS) Surfaces on the Droplet Flattening Behaviors during Redox
Jian, Xu
Nanoelectronics and Nanomechatronics Lab

Growth Techniques of Monolayer WS2
Godin, Kyle
Mechanical Engineering

Highly Sensitive Self-Referencing Label-free FPMR Photonic Biosensor
Kalantarov, Dmitriy
Physics and Engineering Physics

Increasing Influence on Twitter
Ostad Ebrahim Vesaghi, Arash
School of Systems & Enterprises

Infrastructure Resilience Framework For Decision Making Comparison and Real Time Monitoring
Gama Dessavre, Dante
School of Systems & Enterprises

Lexicographic Search in Motion Planning
Shan, Tixiao
Robust Field Autonomy Lab

Misinformation in Social Media: A Challenge for Emergency Management
Luna, Sergio
School of Systems & Enterprises

Multi-Modal Classification of Imperfect Testing Data
Zhang, Qilin
Computer Science

Spontaneous, One-Pot Assembly of pH-Responsive Polymer Capsules
Yuhao, Wang
Biomedical Engineering, Chemistry and Biological Sciences

Thermo-Chemical Structural Health Monitoring of Composites
Golchinfar, Behnoun
Civil, Environmental and Ocean Engineering

Time Dependent Roughness Change of PPy(DBS) from Reduced to Oxidized State
Palumbo, Anthony
Mechanical Engineering
LEGEND:

1. **Canavan Arena**
   - Senior Design Projects
   - Registration – Parking Vouchers

2. **Walker Gymnasium**
   - Senior Design Projects

3. **Griffith Building**
   - Large-Scale Prototypes
   - Competition Design Projects
   - Solar Decathlon Components

4. **Babbio Tent, Atrium & Babbio 122**
   - Faculty & PhD Student Posters
   - Stevens Start-up Companies
   - Invited Research Lecture
   - Registration – Parking Vouchers

5. **DeBaun Auditorium**
   - Thomas H. Scholl Lecture
   - Pitch Competitions
BUSINESS PROCESSES AND SERVICES

Betting on Baseball
This project models the win expectancy percentage for each Major League Baseball (MLB) game. It reveals a disparity between the model’s win expectancy and the win expectancy that Las Vegas’s sportsbook moneylines determine for each game. The purpose is to seek alpha in the Las Vegas sportsbook’s market. The model contains MLB’s empirically driven sabermetric statistics to use predictive analytics to determine how a player will perform over the course of a season. These predictive analytics help determine the win expectancy for each team in each game. The project demonstrates how to exploit Las Vegas’s mispriced moneylines.

Students
Bridger Cohen/Quantitative Finance
Ryan Kevin Donovan/Quantitative Finance
Jayson Andrew Yano/Quantitative Finance

Advisor
German Creamer/School of Business

CMBS 2.0/3.0
This project examines the changes in the securitization, or pooling, of commercial mortgage backed securities (CMBS) since the financial crisis of 2008 and the change in key performance metrics of CMBS. Changes to the securitization of CMBS could be seen in loan structures and subordination levels of CMBS 2.0/3.0 (where CMBS 1.0 refers to CMBS structured before the financial crisis). Additionally, differences in the average levels of key performance metrics, used to assess the health of a CMBS, can be seen across CMBS 1.0-3.0, with current levels of performance metrics trending towards pre-crisis levels.

Students
April Sara Marie Fiorese/Quantitative Finance
Elena Piperi/Quantitative Finance
Amina Shahid/Quantitative Finance

Advisor
Stefano Bonini/School of Business

Monkey vs. Analysts
Burton Malkiel’s *A Random Walk Down Wall Street* introduces the concept of randomly generated portfolios, known as “monkey” investing, and their potential to outperform the market. The purpose of this research is to determine the efficacy of random investing in an Exchange Traded Fund (ETF). In addition to the strategy proposed by Malkiel, the researchers designed “smarter monkeys” that make informed decisions while maintaining the essence of random investing at their cores.

Students
David E Hogan/Quantitative Finance
Nicolas Robles/Quantitative Finance
Jeffrey Wyckoff/Quantitative Finance
Kevin Zychowski/Quantitative Finance

Advisor
Hamed Ghoddusi/School of Business

Risks in the Student Loan ABS Market
This paper focuses on the macroeconomic impact on the economy and markets of student loan default and aims to give a clearer picture of what influences the potential systemic risks around it.

Students
David Frank Inga/Quantitative Finance
Rachana Rajkumar/Quantitative Finance
Aditya Samarth/Quantitative Finance

Advisor
Khaldoun Khashanah/School of Systems and Enterprises

Student-Managed Investment Funds
The purpose of this project is to determine the performance of student-managed investment funds across the United States. The project also aims to lay the groundwork for others to pursue this area of study.

Student
Jonathan R. Stallone/Quantitative Finance

Advisors
Hamed Ghoddusi/School of Business
Stefano Bonini/School of Business

Students2Science
This team created and implemented a marketing strategy to increase and optimize Students2Science’s social media presence through the use of targeted, eye-catching communications with the goal of increasing S2S’s volunteer count by 15 percent. The team extensively interviewed current and prospective volunteers of S2S to identify motivations. The team also designed a sustainable marketing campaign that S2S will continue.

Students
Alexander Nicholas Barresi/Business and Technology
Jaymie M. Basilio/Business and Technology
Rebecca M. Merrick/Business and Technology
TinaMarie Scaramella/Business and Technology

Advisor
CV Harquail/School of Business

Using Reddit Sentiments to Predict Stock Price Movement
This team collected data from comments on Reddit that contain words pertinent to select companies. A Naive Bayes classifier was created to determine whether the comment sentiment is positive or negative. Depending on whether the company is perceived positively or negatively, a computer assigned a buy/sell/hold rating based on a mathematical model that the team created.

Students
Kevin Sushil Mehta/Quantitative Finance
Nicholas A. Monzillo/Quantitative Finance
Michael Ken Yorita/Quantitative Finance

Advisor
Patrick Houlihan/School of Business
Home Thin Client
Home Thin Client provides computers for the whole family without breaking the bank. It saves energy without sacrificing the speed or efficiency of the computer. A computer tower works as the server for the home while Raspberry Pi 2s act as the clients. VMs create accounts on the server, allowing users to employ their operating system of choice.

Students
Troy A. D’Angelo/Computer Engineering
Jacob Heutlinger/Computer Engineering
Keith Arlindo Monteiro/Computer Engineering
Patrick M. Murphy/Electrical Engineering
Edward Gene Runyon/Computer Engineering
Michael Sasso/Computer Engineering

Advisor
Hong Man/Electrical and Computer Engineering

Influence of Wavelength in FSO Turbulence and Scattering
This project analyzed the effect that the atmosphere has on lasers as they travel through various conditions. Temperature and pressure changes throughout the atmosphere can influence lasers a great deal, as can fog and rain. To reduce the effects these conditions have on a laser beam, this research examines whether wavelengths throughout the infrared region can minimize atmospheric changes. The experiment was set up in an atmospheric chamber. It simulated various environments using different temperatures, turbulence and optical deterrents.

Student
Connor Matthew Sellar/Physics

Advisor
Rainer Martini/Physics and Engineering Physics

Liquid Metal Antenna
This project involved building a configurable antenna using a gallium-indium alloy, which is liquid at room temperature. This alloy, GaIn, conducts voltage and reacts by expanding and contracting in a ceramic tube, creating an electric field through which radio waves can propagate. To ease user accessibility, an arduino interface was employed that allows for precise tuning. For a more technical analysis, users can employ the MATLAB interface to create a plot of the radio frequency patterns that arise from the GaIn antenna.

Students
Ethan Joseph Crump/Physics
Julia Christine Tsaoussis/Physics

Advisors
Harry Lenzing/Physics and Engineering Physics
Robert Pastore/Physics and Engineering Physics

Novel Broadband Camera and its Applications
Through a wavelength conversion technique, room temperature thermochromic liquid crystals can be used as a pixel-free detector to convert light from outside of the visible spectrum into a visible image. By adjusting the composition of various films applied to the crystal polymer, different areas of the spectrum can be photographed including mid/far infrared and low gigahertz radiation. A variety of these bands are tested in this project in applications such as laser beam profiling and radio/microwave imaging.

Students
Thomas James Halloran/Physics
Myles Connor Silfies/Physics

Advisor
Rainer Martini/Physics and Engineering Physics

Partial Phase Transition Phenomena for the Coagulation-Fragmentation Processes
While investigating the equations describing coagulation and fragmentation process in colloidal solutions, a strange result occurred. One would expect that the system would either undergo a total phase transition or remain in its initial state. Under certain conditions, however, it turns out that a partial phase transition occurs. In other words, some of the system changes state while the rest remains in the initial state. This investigation explores this behavior.

Student
Christopher John Moakler/Physics

Advisor
Pavel Dubovski/Mathematical Sciences

Plasmon Excitations for Encapsulated Graphene
Graphene has garnered great interest among materials scientists and industry. Its electron mobility, which describes how quickly its electrons can move in the presence of an electric field, is more than two orders of magnitude greater than that of silicon-based materials. Recent advances in device fabrication techniques have facilitated experimental exploration of a system in which graphene is enclosed by two identical metal sheets. This project aims to formulate a theoretical model for this system in which the dielectric function can be determined and apply it to engineering problems involving useful devices such as sensors and transistors.

Student
Thomas James Liebau/Physics

Advisor
Norman Horing/Physics and Engineering Physics
Software Defined Networking
Software Defined Networking (SDN) decouples network control and forwarding functions, enabling a network to be directly programmable. Providing configurable, cost-effective and adaptable functionality, it’s ideal for the growing complexity of networks today. This team focused on helping administrators easily keep pace with the dynamic needs of a modern network by implementing tools that monitor and potentially enhance network operation. The OpenDaylight platform was used as the software controller for the SDN network. The network was virtualized utilizing a hypervisor to assist with the design and testing of the SDN.

Students
Anthony N. Don/Computer Engineering
Prem S. Doshi/Computer Engineering
Joel Estrada/Computer Engineering
Jobin J. Johnson/Computer Engineering

Advisor
Hong Man/Electrical and Computer Engineering

Wireless Oscilloscope
Students and hobbyists have limited access to oscilloscopes due to cost. The team aimed to solve this problem with a small and portable oscilloscope. Through a bluetooth connection, a cell phone application displays the waveform. The product consists of an analog-to-digital converter followed by an FPGA that conducts the digital logic and sends the waveform to a bluetooth module.

Students
Chad Alan Caruso/Electrical Engineering
Paul James Circolone/Electrical Engineering
Gillian N. Koch/Electrical Engineering
Patrick J. MacLane/Electrical Engineering
Joseph Steven Miles/Computer Engineering
Kyra Pastore/Electrical Engineering

Advisor
Bryan Ackland/Electrical and Computer Engineering

Advanced Heavy Lift Cargo Plane
The objective of this project was to design and construct a remote controlled model aircraft capable of special maneuvers while meeting requirements to successfully compete in the 2016 SAE Aero East competition. The aircraft must be able to perform an effective takeoff (i.e. the main wheels leave the ground). Once airborne, the plane must perform specific maneuvers such as dropping a payload of given mass into a target area and complete one 360-degree circuit of the flying field. Upon completion of the circuit, the aircraft must land successfully on a runway of specified length.

Students
Jordan Thomas Andrepon/Mechanical Engineering
Andrew Scott Mignola/Mechanical Engineering
Easton Conner Obojkovits/Mechanical Engineering
Ryan Patterson/Mechanical Engineering
Bret Viola/Mechanical Engineering

Advisor
Siva Thangam/Mechanical Engineering

Autonomous Vehicle Reconnaissance Package
The Autonomous Vehicle Reconnaissance Package (ARVP) project is aimed at producing a modular, autonomous reconnaissance vehicle system able to provide the functionality required in the Student Unmanned Autonomous System (SUAS) competition sponsored by the AUVSI (Association for Unmanned Vehicle Systems International) Seafarer Chapter.

Students
Jonathan Wong/Computer Engineering
Christian C. Arcilla/Mechanical Engineering
Matrix B. Arthur/Mechanical Engineering
Zakary Hunter Askild/Mechanical Engineering
Kenneth D. Chan/Computer Engineering
Ryan Chen/Mechanical Engineering
Jacob Dabal/Mechanical Engineering
Alexandra Doyle/Mechanical Engineering
Hyun June H. Ferrabolli/Mechanical Engineering
Ho Lun Fung/Computer Engineering
Claire Marie Griffin/Mechanical Engineering
David Jack Harman/Mechanical Engineering
Vidhi Devraj Sonani/Mechanical Engineering
Daniel Szwarc/Mechanical Engineering
Edwin Tan/Computer Engineering
Jason Wong/Mechanical Engineering

Advisor
Mishah Salman/Mechanical Engineering

Campus Rainworks Challenge
The RainWorks Team has taken on the EPA’s RainWorks Challenge to create a green stormwater infrastructure master plan for Stevens Institute of Technology. The team will propose specific techniques to mitigate stormwater runoff and reuse rainwater. The master plan aims to be the first stormwater management plan for the Stevens campus. Its goal is to decrease runoff and reduce contaminant discharge and potable water consumption. The plan aims to provide a practical example for the future of urban campus green infrastructure and introduce community education opportunities.

Students
Adriana Nicole Herrera/Environmental Engineering
Zachary Michael McKeehan/Civil Engineering
Taylor J. Race/Civil Engineering
Sabrina E Smith/Engineering Management

Advisors
Elizabeth Fassman-Beck/Civil, Environmental and Ocean Engineering
Leslie Brunell/Civil, Environmental and Ocean Engineering

Competition projects are located in the Griffith Building.
Eco-Car  
The objective of this project is to develop and successfully create a hydrogen-powered vehicle prototype and advance the state of the art in automotive technology. The team worked parallel to the Shell EcoMarathon, so the car must be completed by the competition deadline and be in a safe, drivable condition. The car must also abide by all the rules in regulations set forth by the Shell Corporation. This project aims to demonstrate how auto manufacturers can build toward a sustainable future and increase consumer interest in renewable fuel sources. The EcoCar is an environmentally friendly, zero-emissions compact that will be able to travel long distances on a minimal amount of fuel.

Students  
Cameron L. Clements/Mechanical Engineering  
Blase M. Feeney/Mechanical Engineering  
Jason Fersa/Mechanical Engineering  
Taia L. Harrison/Mechanical Engineering  
Forrest R. Klawunn/Mechanical Engineering  
Liam P. McAdams/Mechanical Engineering  
Matthew D. Michaud/Mechanical Engineering  
Ross P. Rosell/Mechanical Engineering  
Advisor  
Jan Nazalewicz/Mechanical Engineering  
Alexander De Rosa/Mechanical Engineering  

Formula SAE  
Formula SAE is a student design competition organized by SAE International (Society of Automotive Engineers). Formula SAE operates based on the following concept: A fictional manufacturing company has contracted a design team to develop a small formula-style race car to challenge teams from around the globe to design, fabricate, develop and compete. The prototype race car is to be evaluated for its potential as a production model. The target marketing group for the race car is the non-professional weekend autocross racer. Each student team designs, builds and tests a prototype. This group’s project is a Formula SAE racecar. The project is ultimately judged by FSAE competition judges. This team has decided that reliability should be a primary concern and differentiating factor.

Students  
JasonEsteban Cevallos/Mechanical Engineering  
Mark W. DeMaio/Mechanical Engineering  
Nicholas G. Dimitriades/Mechanical Engineering  
Nicholas D. DiPrimo/Mechanical Engineering  
Christopher L. Garrett/Mechanical Engineering  
James Jordan Holle/Mechanical Engineering  
Mark J. Knopsnyder/Mechanical Engineering  
David J. Krier/Mechanical Engineering  
Mark R. Peterson/Mechanical Engineering  
William M. Poulos/Mechanical Engineering  
Carl Raymond Russo/Mechanical Engineering  

Advisors  
Jan Nazalewicz/Mechanical Engineering  
Alexander De Rosa/Mechanical Engineering  

Regular Heavy Lift Cargo Plane  
The mission of the team was to build a plane to represent Stevens Institute of Technology in the SAE Aero Competition. The team was determined to make a plane that will lift off and complete multiple successful mission runs. The goal was to build a plane that will be as light as possible while also being able to carry as much payload as possible.

Students  
Logan Bagarozy/Mechanical Engineering  
Vasandhram Balasubramanian/Mechanical Engineering  
Nicholas Cundari/Mechanical Engineering  
Richard S. Henry/Mechanical Engineering  
Jane P. Hughes/Mechanical Engineering  

Advisor  
Siva Thangam/Mechanical Engineering  

Integrated Solar Shade/ Flood Protection Shutters for Glazed Openings  
A solar shade/ flood protection shutter system was student-designed, prototyped, tested, fabricated and ultimately installed as part of Stevens’ winning 2015 Solar Decathlon entry. The system is configured as bifold panels and attached to a structural frame in front of large south-facing fully glazed patio-style sliding doors. In the open position, the shutters act as solar shades that block the high summer sun while allowing low winter sun through the glazing to heat the building interior. Integrated solar panels supply energy to a direct DC hot water system, part of a resilient energy system designed for the project. In preparation for a storm event, shutters are closed and latched from the outside, protecting the building from flood waters as well as floating and windborne debris.

Students  
2015 Solar Decathlon Team  

Team Aerosync  
Team Aerosync is participating in the annual ACRP Design Competition for airport improvements and suggestions. Its goal is to minimize the time passengers spend in the security screening queue while also improving their overall experience with a new SimpleQ system. The SimpleQ system will accomplish these goals while also increasing revenue and customer satisfaction at airports. The system will not interfere with the TSA screening process; safety remains the top priority. It will provide convenience for both customers and employees. SimpleQ uses new technology, provides opportunity for revenue generation and decreases queue waiting time.

Students  
Shuyuan Jin/Engineering Management  
Ashely M. Oliver/Engineering Management  
Samantha E. Scarpone-Jones/Engineering Management  
Harleen Vohra/Engineering Management  

Advisor  
Eirik Hole/School of Systems and Enterprises
Debyte
Debyte is a web platform designed to anonymously match up users of differing opinions so they can debate a topic.

Students
Joshua D. Nelson/Computer Science
David J. Orshan/Computer Science
Alexander Rogacki/Computer Science

Advisor
David Klappholz/Computer Science

Flair Soccer
Elite Players’ Pickup is a company that plans to run pickup soccer programs for municipal youth soccer organizations, to supplement and expand options for players. The goal is to develop players’ skills in an environment where they are free to play their own way with no coach interventions. Players will be encouraged to have fun and respect each other as they develop skills that could lead them to higher levels in the sport.

Students
Michael Ainbinder/Business and Technology
Santiago J. Cabrera/Business and Technology
Matthew Ferentini/Business and Technology
Brett Andrew Incollingo/Business and Technology
Thomas Adam Sheridan/Business and Technology
John Sideris/Business and Technology

Advisor
C.V. Harquail/School of Business

HangoverLyte
The HangoverLyte team seeks to solve the problem of hangovers for college students by offering a specially designed beverage to treat specific symptoms. The team is producing the custom formula and packaging it in-house in a cost-effective manner. The goal is to sell 2,000 units, primarily via bulk sales, to fraternities and sororities. Bulk buyers may customize the label.

Students
Jaymes Gregory Davis/Business and Technology
Christopher Keosayan/Business and Technology
James F. Margulis/Business and Technology
James J. Shannon/Business and Technology
Zeqi Shen/Business and Technology

Advisor
C.V. Harquail/School of Business

Internal Econometrics of Hockey Games
This project aims to find and examine statistical evidence that a hockey team’s performance affects its revenues and attendance. Simple linear regression was used to help determine whether such links exist. The project team predicted that a team with a strong record would have higher attendance and revenues than one that does not perform well.

Students
Aldo S. Alvarez/Quantitative Finance
Gregory Lawrence Caminneci/Quantitative Finance
Ryan Evan Zupfer/Quantitative Finance

Advisor
Richard Anderson/School of Business

Production of Non-Alcoholic Beer
This project concerns the production of non-alcoholic beer using a reverse membrane process. In this process, alcoholic beer is fed into the system and the alcohol is removed. The use of membranes allows the beer to be stripped of the alcohol without losing many of its other flavors, which is a common problem with other methods of alcohol removal. The purpose of this project is to create a profitable product that provides consumers with a non-alcoholic beer that has a closer resemblance to the taste and texture of alcoholic beer.

Students
Rakan Hadi Alqahtani/Chemical Engineering
Brian C. Dubord/Chemical Engineering
Sarah T. Gilbert/Chemical Engineering
Katelyn Mei Tran/Chemical Engineering

Advisor
Yujun Zhao/Chemical Engineering and Materials Science

ReCall: RFID Indicator Light System
Many people forget things when they rush out the door. This project aims to solve this problem by providing a positive reminder before a person leaves. Unlike competitors’ products, we are using RFID technology to track items only within a small area. The limited range of ReCall means that the system can only be used for finding items locally, reducing privacy concerns.

Students
Raymond George Doss/Electrical Engineering
Carson A. Pryor/Electrical Engineering
Miranda K. Ripken/Electrical Engineering
Brian Richard Voyer/Electrical Engineering

Advisor
Bruce McNair/Electrical and Computer Engineering
Patent searching is inherently difficult. Existing tools are insufficient, unsatisfactory or expensive. This software service is faster and more powerful than its competitors and is available on all major browsers. It can save a patent firm multiple trips to the patent searching facility in Washington, D.C. The system is being implemented on Amazon cloud servers as a web application.

**Students**
Alex Patrick Sabella/Computer Engineering
Dillon V. Uzar/Computer Engineering
Sara Vitkus/Computer Engineering
Timothy Ashton Harris Williams/Computer Engineering

**Advisor**
Mukund Iyengar/Electrical and Computer Engineering

The objective is to create a new opportunity within the Stevens housing system by offering a special-interest housing option for one of the most popular buildings, River Terrace. Students can earn points that increase their odds of having the opportunity to live in one of Stevens’ most prized dorms through academic achievement, club and athletic involvement and community service. The team hopes that this program will motivate students to become more involved and attentive to achieve an attainable and desirable living arrangement.

**Students**
Lauren J. Lim/Business and Technology
Alexander J. Lorenz/Business and Technology
Kaitlin Mulligan/Business and Technology
Megan Petuskey/Business and Technology
Brianna M. Sandone/Business and Technology
Sydney Spitz/Business and Technology

**Advisor**
C.V. Harquail/School of Business

The objective was to research, design and build a mechanism that increases stability of a stand-up paddleboard (SUP) without prohibitively increasing drag. The design application is aimed to benefit beginner riders as well as people who are interested in paddle board sports such as paddle board yoga, where balance is key but is hard to maintain. (This project includes a live demonstration in the Griffith Building.)

**Students**
Holly E. Good/Mechanical Engineering
Mary K. Hall/Mechanical Engineering
William Todd Raymond/Mechanical Engineering
Cathryn Lee Shelton/Mechanical Engineering

**Advisor**
Kevin Connington/Mechanical Engineering

Do you take a train, light rail, subway or bus every day? Are you uncomfortable on your commute to school or work? Your Pillo is a stylish, portable memory foam pillow designed to improve your comfort on your commute.

**Students**
Nicholas G. Konstantinou/Business and Technology
Albert Choi Lee/Business and Technology

**Advisor**
C.V. Harquail/School of Business

This company is a seasonal subscription box service that provides local, unique and seasonally appropriate clothes and accessories to parents in the Northeast, alleviating the stress of shopping with a child. Wee Wardrobe has partnered with local boutiques and businesses to provide dynamic surprises for moms and stylish and original pieces for their children.

**Students**
Genevieve Hope Finn/Business and Technology
Paige Margaret Kelley/Business and Technology
Jennifer R. Middleton/Business and Technology
Brenna Puza/Business and Technology
Gavriella Risman-Jones/Business and Technology
Erika Justine Wilcox/Business and Technology

**Advisor**
C.V. Harquail/School of Business

This project explores the structures and functions of a performing musical tour. It involved creating questionnaires to be answered by people who work in tour management. Their answers and information from other sources provide data to determine how a musical tour can be improved and made more efficient to better the livelihoods of artists.

**Students**
David Bellman/Music and Technology
Richard Graham/College of Arts and Letters

**Advisor**
C.V. Harquail/School of Business

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William Todd Raymond/Mechanical Engineering
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**Advisor**
Kevin Connington/Mechanical Engineering

Do you take a train, light rail, subway or bus every day? Are you uncomfortable on your commute to school or work? Your Pillo is a stylish, portable memory foam pillow designed to improve your comfort on your commute.

**Students**
Nicholas G. Konstantinou/Business and Technology
Albert Choi Lee/Business and Technology

**Advisor**
C.V. Harquail/School of Business
Acoustic Aquatics
The purpose of the project is to upgrade the current acoustic system to record data to be transmitted over bodies of water.

Students
Omar Ahmed Alhussein/Mechanical Engineering
Deepika Jhangiani/Electrical Engineering
Harsh Maharishi/Mechanical Engineering
Gladys A. Njoku/Mechanical Engineering
Christopher E. Strachan/Mechanical Engineering

Advisors
Marehalli Prasad/Mechanical Engineering
Alexander Sutin/Davidson Laboratory

Armor
It is difficult to reach out for emergency assistance in dangerous situations. This project helps ensure you get home safely with immediate access to 911 even when your phone is dead. TinyLily is a compact and low-cost microcontroller that is being used to write the code that will place the call to 911. A GSM module will be used to carry out the call by receiving commands from the TinyLily microcontroller.

Students
Ahmad Saad Alshehri/Electrical Engineering
Tom Cruz/Computer Engineering
Marissa Liberacki/Computer Engineering
Sydney Patricia Sweeney/Computer Engineering
Jaime Villavicencio/Electrical Engineering

Advisor
Bruce McNair/Electrical and Computer Engineering

Austere Landing Zone
The Austere Landing Zone project aims to help the United States Special Operations Command (SOCOM), which seeks to land military aircraft on unpaved runways to deploy soldiers in hostile war zones. This project is a physical device that performs analysis on the soil from above the ground, unlike the existing Dynamic Cone Penetrometer (DCP) method, which requires multiple soldiers and soil readings to determine the weight-bearing capacity of soil. This product will determine weight-bearing capacities within one period of darkness in a timely, silent, accurate, GPS-independent, concealable and one-man-operable or remote-capable fashion, minimizing troop casualties.

Students
Kristen Elizabeth Goncalves/Civil Engineering
Daniel S. Huber/Electrical Engineering
Gaby A. Khoury/Civil Engineering
Fernando Miller/Civil Engineering

Advisors
Sophia Hassiotis/Civil, Environmental and Ocean Engineering
Dimitri Donskoy/Civil, Environmental and Ocean Engineering
Leslie Brunell/Civil, Environmental and Ocean Engineering

Sponsor
Department of Defense Capstone Marketplace Project

Blofish
There are currently 2,500 active Navy SEALs, and they depend on a personal flotation device (PFD) to stay afloat in case of emergency. Current automatically inflated PFDs use a dissolvable pill that punctures a carbon dioxide cartridge upon water contact. These vests are not effective for most missions because they often deploy prematurely, leading the user to discard the device. This project is developing a product to provide SEALs with a reliable, automatically actuated PFD inflation mechanism that utilizes a depth and time sensor system to protect the user in a life-threatening situation.

Students
Kevin R. Acker/Mechanical Engineering
Jamie K. Craig/Biomedical Engineering
Peter W. Giannini/Mechanical Engineering
Christina Marie Guida/Biomedical Engineering
Michael Gabriel Marnell/Biomedical Engineering

Advisor
Marissa Gray/Biomedical Engineering, Chemistry and Biological Sciences

Sponsor
Department of Defense Capstone Marketplace Project

EPITOME
There are currently 2,500 active Navy SEALs. Throughout their training and careers, they are put in situations that require them to maintain a high level of performance for extended periods of time. Remaining at such performance levels and despite the body’s limitations can put these SEALs and their teams in danger. By tracking certain physiological indicators, the EPITOME Sensor aims to measure the user’s fatigue, thereby preventing injury and improving quality of life by providing a personalized fatigue threshold estimate.

Students
Courtney M. Beneat/Biomedical Engineering
Mark Benjamin Marcelo/Biomedical Engineering
Marina Rodriguez/Biomedical Engineering
Mary E. Stack/Biomedical Engineering

Advisor
Helen Kambic/Biomedical Engineering, Chemistry and Biological Sciences

Sponsor
Department of Defense Capstone Marketplace Project
Mechanized Ordnance Carrier/Loader

The purpose of this project is to design, construct and integrate a wirelessly controlled mechanized ordnance carrier/loader (MOCL) system for the Navy to transport and load ordnance aboard aircraft carriers. The current system is a manual weapon skid that requires three ordnancemen to operate and lift the ordnance up to the aircraft to be attached to the pylon. The intent of this product is to eliminate as much human intervention as possible by mechanizing the process and reducing the number of ordnancemen needed to one.

(This project includes a live demonstration in the Griffith Building.)

Students
Seth Joseph Essendrop/Mechanical Engineering
Kishwar Rafid Hoque/Mechanical Engineering
Damian Suarez/Computer Engineering
Andy Tsang/Mechanical Engineering
Zachary T Verbovsky/Electrical Engineering

Advisor
Charles Geraldi/Mechanical Engineering

Software-Defined Radio Jammer

This software-defined radio jammer solves key problems found among current RF jammers today – a lack of immensely configurable and precise RF jamming through the use of software control. Most RF jamming systems today rely too heavily on unchangeable hardware control. Military, police and government officials would be interested in this new system because it is essentially a “universal” jammer that could replace all previous distinct and outdated hardware-defined RF jamming systems. Software control, upgradability, configurability and enhanced functionality distinguish this system. The prototype the group designed was created using a HackRF One software-defined radio peripheral controlled by a novice-level graphical user interface.

Students
Kevin T. Furlong/Computer Science
Zara Graves/Computer Science
Scott Harris/Computer Science
Rafal Poniatowski/Computer Science
Dennis Stewart/Computer Science

Mentors
Michael Del Pozzo, NAVAIR
Jason Garced, NAVAIR
Andrew Tandoi, NAVAIR

Advisor
David Klappholz/Computer Science

Thermogenic

Combat fatalities are at least eight times more likely when military personnel suffer from hypothermia. Thermogenic is a compact, battery operated, efficient, active warming device that utilizes heated humidified air to increase core temperature via the lungs. This device aims to save lives by stabilizing soldiers in the battlefield more quickly than the current standard of care until transport to a medical center is available.

Students
Keith Gillette/Biomedical Engineering
Jenna Gloria/Biomedical Engineering
Sabina Katherine Incantalupo/Biomedical Engineering
Rebecca Noelle O’Connor/Biomedical Engineering
Erin Marie Silvestri/Biomedical Engineering

Advisor
Vikki Hazelwood/Biomedical Engineering

Upper Body Exoskeleton Project

The mission of the Upper Body Exoskeleton team is to design and prototype an exoskeleton system for the United States Department of Defense that will enhance soldier productivity by augmenting the user’s upper body strength and alleviating muscle fatigue. The system will provide the user with full anatomic range of motion and will automatically provide power as necessary to facilitate the user’s desired movement or action.

Students
Peter N. Bruinooge/Mechanical Engineering
Andrew J. Minarik/Mechanical Engineering
Ryan T. Oldja/Mechanical Engineering
Sean M. Zabriskie/Mechanical Engineering

Advisor
Kishore Pochiraju/Mechanical Engineering

Sponsor
Department of Defense Capstone Marketplace Project
EDUCATION AND THE ARTS

A Serious House: The Process of Composing a Piece of Orchestral Music Based on Arkham Asylum

The goal of this project is to compose a seven to ten minute piece of music for full orchestra based on the graphic novel Arkham Asylum: A Serious House on a Serious Earth. Ultimately, the music should adequately convey the images found in the novel and the central conflict between the two main characters, Batman and the Joker. This will be achieved through the use of texturally driven compositional choices to depict the images and the use of highly dramatic compositional choices to depict the story. In addition to the music, a paper will be produced outlining the process and decision-making involved in the composition of this piece.

Student
Victor Iannarella/Music and Technology

Advisor
Andy Brick/College of Arts and Letters

Architectural Exploration in Augmented Realities

This thesis explores the relationship two poets create between their poetry and visual works. William Blake and Claire Best each reveal the dependent relationship of text and image through a photographic series that accompanies Best’s poetic performances and engravings that surround Blake’s poetry. This research explores the idea that to fully understand the works of either artist, both elements are required. The research involves the exploration of photography and the use of augmented reality by creating a book of photographs that are coded to register with an application. Through this application, which acts as a camera, a 3D model of the building or object featured in the photograph will appear on the screen.

Student
Julia Phillips Guignard/Visual Arts and Technology /Literature

Advisors
Susan Levin/College of Arts and Letters
Christopher Manzione/College of Arts and Letters

Compositional Techniques for Narrative and Dynamic Structure

This thesis is a study of compositional technique in orchestral composition as informed by narrative and structure. The piece is written as a score for a imagined video game whose primary mechanic is space exploration.

Student
David Levi Estes-Smargiassi/Music and Technology

Advisor
Andy Brick/College of Arts and Letters

Discerning the Reality of China’s ‘Ghost Cities’ and Educating Through Games

This project separates the prevailing public perception of the “ghost city” phenomenon in China from its complicated, multilayered reality. Blending classic social theory on standards, information distribution and city planning with the modern-day economic, social, and infrastructural components of China’s race to urbanize by 2020, the author seeks not only to unpack China’s ghost cities, but also to use them as tools to educate. The author will infuse a third area of research, that thoroughly explores the mythically misinformed ghost cities of China and uses the phenomenon to educate about the scope of urbanization, from technology to society.

Student
Frank Guarini/Science and Technology Studies / Visual Arts and Technology

Advisors
Andrew Russell/College of Arts and Letters
Jeff Thompson /College of Arts and Letters

Efficiency in Education: Discussing the Effectiveness of Education Technologies

This work will discuss a popular buzz word in education: effectiveness. By researching childhood psychological development, current methods of measuring effectiveness and the current implemented education technologies, this project provides a framework for the most efficient utilization of education technologies.

Student
Diana Joan Magnani/Science and Technology Studies

Advisor
Andrew Russell/College of Arts and Letters

Joel and Spirit

This project is an experimental electronic musical titled Joel and Spirit. Motion tracking programs such Synapse will allow performers on stage to control musical parameters within a digital audio workstation. Digital music and audio elements will be used to enrich the onstage environment and bring experimental music to the stage. This project also involves looking for other instances of electronic or experimental music used in theater and motion tracking installations in musical theater.

Student
Edward P. Albright/Music and Technology

Advisors
Anthony Pennino/College of Arts and Letters
Richard Graham/College of Arts and Letters

Narrative Use of Harmonic Structures

This thesis is a study of compositional and narrative abilities in an orchestral setting. The piece retells part of a story from pop culture in an orchestral setting, abstracting the concrete storyline to ideas and emotions that are then expressed in the orchestra.

Student
Brian Richard Voyer/Music and Technology

Advisor
Andy Brick/College of Arts and Letters
Not Just for Kids: Understanding Comics as Genuine Literature

This project focuses on Western comics, specifically, how comics are a valid form of literature. The study begins with the origin and history of comics and explores the different ages of comics: the Golden Age, the Silver Age, the Bronze Age, the Dark Age, and the Modern Age. To underscore the literary merit of comics, it focuses on Classics Illustrated, a series published from 1941-71 that adapted classic stories such as The Iliad into comic book form. The research also examines Marvel Illustrated, a more current publication of classic stories. The thesis also involves adapting The Wedding of Sir Gawain and Dame Ragnelle into a short comic.

Student
Virginia Keating/Visual Arts and Technology / Literature

Advisors
Deborah Simreich-Levi /College of Arts and Letters
Jeff Thompson / College of Arts and Letters

Rise of Liberal Arts Training in STEM Education

In light of recent educational initiatives looking to encourage and expand the science, technology, engineering and mathematics (STEM) curriculum, the study and pursuit of the humanities has been deemed irrelevant by several politicians and STEM advocates. Yet humanities education exposes students to a broader range of experiences that widen their ability to think critically and creatively, and to foster an understanding of political, economic and social issues. Increasingly, what companies and industries search for in potential employees is not just technical knowledge and prowess, but a well-rounded education and understanding that includes both STEM and liberal arts. The focus of this thesis is whether liberal arts has a place in STEM education, using Stevens itself as a case study.

Student
Romina Evita Hipolito Ronquillo/Science and Technology Studies

Advisor
Theresa MacPhail/College of Arts and Letters

The Binaural Band: Three Dimensional Audio for Live Concert Album Production

There is a separation between listening to a “live” album and being at a live performance by a band. At a performance, the energy coming off of the stage, plus the excitement coming from the rest of the audience, gives the concertgoer an experience that cannot be replicated by a home stereo system. The performance can be captured by specific microphones, and the auditory experience that the audience member receives can be replicated with binaural audio. By recording a live performance via a binaural microphone and other mics, it’s possible to create a stereo mix that would allow those with headphones to have a more personal, immersive experience.

Student
Anthony Bevacqua /Music and Technology

Advisor
Robert Harari/College of Arts and Letters

The Muslim Brotherhood: The Catalyst for the Rise of Islamic Fundamentalism in the 20th and 21st Centuries

This paper shows that the ideology developed and promulgated by the Muslim Brotherhood is a centralizing catalyst that resulted in the rise of other Islamic terrorist groups in the 20th and 21st centuries. It traces the history and ideology of the Muslim Brotherhood and its founder, Hassan el-Banna, from its founding until the 1960s. It then examines the connection between the Muslim Brotherhood and Osama bin Laden and the rise of Al Qaeda, leading to the attacks on September 11 and the Iraq War. Finally, it connects these events and the rise of the Islamic State in Iraq and Syria (ISIS). By better understanding the roots, history and interconnectedness of these terrorist groups, the international community can be better equipped to combat them.

Student
Ameer Halim/Humanities and Social Sciences/Chemistry

Advisor
Lindsey Cormack/College of Arts and Letters

The Psychoacoustic Effect of Mono, Stereo and Surround Sound Playback Systems

This is an in-depth study of the psychoacoustic profile resulting from mono, stereo and surround playback systems in a controlled acoustic environment. Through analysis of the physics of sound wave propagation within an acoustic environment, certain phenomena will be explored via an original musical composition that will be recorded with a single omni microphone for a mono signal, a multi-mono microphone technique for the stereo mix and an ambisonic microphone for surround sound capture. A focus group expresses how each of these formats are perceived. The results are analyzed to show the measurable effect of psychoacoustic influence on the listener within each format.

Student
Kelsey Mayhew/Music and Technology

Advisor
Robert Harari/College of Arts and Letters

Underwater Binaural Recording Utilizing a Hydrophone Dummy Head

Binaural recording is currently the most realistic audio reproduction method, aiming to recreate all auditory cues and achieve optimal spatial recognition. The goal of this project is to fabricate a physical dummy model that is viable for underwater recording to create a hyperrealistic underwater soundscape. This project addresses the lack of attention to underwater environments in audio recording; sounds are often fabricated instead of getting actual underwater location recordings. To accomplish this project, the differences in sound propagation of air and water were considered. General binaural recording principles were considered and tweaked to apply to the underwater recording process. Research was conducted to identify the best materials for underwater use. Ultimately, this binaural hydrophone dummy will be tested in an underwater environment in hopes of creating an accurate aural reproduction.

Student
Courtney Gnash/Music and Technology

Advisor
Aysegul Durakoglu/College of Arts and Letters
Biogas Generator
This team is developing a small-scale biogas generator to produce renewable energy for small restaurants. The team’s ultimate goal is to efficiently convert waste cooking grease into usable electricity. Though biogas production dates back to the 19th century, the team will advance existing technology to develop an affordable, efficient and easy-to-use biogas generator.
(This project includes a live demonstration in the Griffith Building.)

Students
Keith Christopher Cays/Mechanical Engineering
Patrick E. Cleary/Mechanical Engineering
Rachel L. Gordon/Chemical Engineering
Jaewoo Jung/Chemical Engineering
Tyler J. Maher/Engineering Management
Jake W. Odell/Mechanical Engineering

Advisor
Hamid Hadim/Mechanical Engineering

Energy Recovery Wheel
The Energy Recovery Wheel is an innovative, revolutionary means of exchanging energy between the supply and return air streams within HVAC systems in apartments and small homes that can achieve significant savings. The wheel, made from a thermally conductive and air-permeable material, slowly rotates between these air streams, absorbing, gaining and transferring energy to pretreat the air entering the system and decreasing the energy loads and demand required for an HVAC unit to treat the incoming air to the desired temperature. This diminishes energy demand levels associated with HVAC systems, reducing costs and energy needs for apartments, homes, offices and air-conditioned spaces.

Multifunctional Skylight
This project aimed to design a skylight that reduces the use of non-renewable energy while generating power from solar energy. The goal was an annual energy savings that provides a reasonable return on investment based on the initial cost of the skylight. The skylight must meet all requirements set by GGP to replace its existing systems. The design used in this project combines cutting-edge energy-generating and energy-efficiency technology.
(This project includes a live demonstration in the Griffith Building)

Students
Grace Gallagher/Mechanical Engineering
Matthew Hetherington/Mechanical Engineering
Kevin M. McKlusky/Mechanical Engineering
Gregory G. Moy/Mechanical Engineering
Miles Bradford Winship/Mechanical Engineering

Advisor
Hamid Hadim/Mechanical Engineering
Kamau Wright/Mechanical Engineering

Power Generation System for Automobiles
This project was aimed at designing a power generation system for a passenger car that improves the efficiency of gasoline and decreases harmful emissions. The system converts gasoline to hydrogen through a series of chemical reactions and uses the hydrogen in a fuel cell to power the car. The use of fuel cells in passenger cars is feasible through this system design because it improves the operating range and cost of fuel storage compared to on-board hydrogen tanks.

Students
Ryan A. Brandow/Chemical Engineering
Anthony J. Cherone/Chemical Engineering
Joseph C. Pascucci/Chemical Engineering
Derrick Charles Sokol/Chemical Engineering

Advisor
Yujun Zhao/Chemical Engineering and Materials Science

Nuclear Solutions
The current liquid-liquid process for extracting uranium from spent nuclear fuel is unsafe and inefficient and requires a large area of operation. Nuclear Solutions aims to provide the nuclear reprocessing industry with a more efficient, sustainable, safe and novel method of extracting uranium from spent nuclear fuel through crystallization. Using Indian Point Energy Center as a case study, the team proposes advancements that it hopes can be implemented at other nuclear energy plants to improve the future of spent nuclear fuel.

Students
Janice B. Frontera/Chemical Engineering
Shawn Michael Maguire/Chemical Engineering
Brian Samuel Minevich/Chemical Engineering

Advisor
Yujun Zhao/Chemical Engineering and Materials Science
Sail-Assisted Bulk Carrier
The Sail-Assisted Bulk carrier is being developed for the maritime transportation industry to meet pressures from growing environmental regulations and the increasingly volatile price of oil. This design employs sails to harness the renewable energy of trade winds on a bulk carrier to reduce fuel consumption. This project primarily seeks to prove and optimize the economic feasibility of the investment and application of sails on a bulk carrier.

Students
Marcia Lee/Naval Engineering
Colin Phillips/Naval Engineering
Austin Kyle Shaeffer/Naval Engineering
Nilsu Uyguner/Naval Engineering

Advisor
Len Imas/Civil, Environmental and Ocean Engineering

Shock-Tube
The purpose of this project is to create a fully functioning shock tube. The shock tube will be used to create supersonic flows and shock waves in a controlled environment for research purposes. The ultimate goal is to get a better understanding of how shock waves behave and how the boundary layer develops in supersonic flow.

Students
Ryan Sung-Hyun Chu/Mechanical Engineering
Jonathan B. Escobar/Mechanical Engineering
Luke Gerard Hillers/Mechanical Engineering
Muhammad Ammar Mustafa/Mechanical Engineering
Eric D. Oswin/Mechanical Engineering

Solar Canopy
This project involves the design, planning, analysis and development of a prototype of Green Power Solutions' concept of a solar canopy. The canopy will be designed for the Caribbean beach resort environment and for use in residential settings on the eastern seaboard of the United States. The final goal for this project is to deliver a functioning, thoroughly tested prototype canopy. Green Power Solutions hopes the team can take its preliminary canopy concepts to the alpha prototype stage, with the potential for a scale build. The group will engage in market research and cost analysis to present a plan for large-scale fabrication and production.
(This project includes a live demonstration in the Griffith Building.)

Students
Charles Cannon/Mechanical Engineering
Allison Jane Clayton/Civil Engineering
Mark Anthony Farsi/Business and Technology
Nicholas Ferrara/Civil Engineering
Connor J. Lapczynski/Mechanical Engineering
Samuel J. Smyth/Business and Technology

Advisor
Leslie Brunell/Civil, Environmental and Ocean Engineering

Sponsor
Green Power Solutions

Sustainable and Resilient Playground
PowerPlay's mission is to design an energy-producing playground for parks, communities and homes that can be used anywhere in the world. This not only includes the design of individual equipment but also the surrounding area, which includes surface and subsurface design to provide a safe, resilient and sustainable area for decades of use. The energy that is produced by playground equipment, used by children and adults throughout the day, could be used to store energy, power street lights, park lights, water pumps and other equipment as needed.

Students
Abigail Gobeille/Mechanical Engineering
Frank A. Roberto/Mechanical Engineering
Joseph L. Setola/Mechanical Engineering

Advisors
Nick Parziale/Mechanical Engineering
Leslie Brunell/Civil, Environmental and Ocean Engineering

Sponsor
Hoboken City Council

Texas Heat
The brief: “Redesign team Lone Cow’s project to create a system that will achieve steady-state, given Fort Worth regional conditions, to heat water to 120 degrees Fahrenheit.” Tom Velky, Stevens Institute of Technology, Class of 1956, has been a sponsor of this design project for three previous phases. He owns numerous apartment complexes in Texas, which rely on large central units that provide both hot water and HVAC to the apartments. These end up being costly and inefficient for complexes that have upwards of 100 units. Because Texas has a cooling season of about seven months, Mr. Velky proposed using energy-efficient air conditioners’ exhaust to heat domestic water for each individual apartment unit, a more efficient and cheaper method of cooling the apartment while still providing the desired 40 gallons per day of hot water for the apartment unit.
(This project includes a live demonstration in the Griffith Building.)

Students
Mieszko Strozek/Civil Engineering
Tyler J. Brown/Mechanical Engineering
Christopher A. Cutri/Civil Engineering
Sean T. Dirscherl/Civil Engineering
Michael Anthony Fasulo/Mechanical Engineering

Advisors
Maxine Fontaine/Mechanical Engineering
Leslie Brunell/Civil, Environmental and Ocean Engineering

Sponsor
Hoboken City Council
The Energy Pricers
The energy industry is defined as all the industries that are involved in the production and sale of energy. Traditionally, the energy industry is priced in a way that heavily weights oil prices in its methodology and analyzes the energy industry as if it were one big, consistent financial industry. This project aims to prove that the energy sector is actually a segmented sector that would best be analyzed through a lens focused on energy subsectors by creating a Fama & French-inspired multi-factor asset pricing model.

Students
Jeffrey James Althoff/Quantitative Finance
Joseph M. Cellitti/Quantitative Finance
Jason Canaris Pagoulatos/Quantitative Finance
Matthew J. Sheehan/Quantitative Finance

Advisor
Hamed Ghoddusi/School of Business

Wireless Charging
This project intends to solve the problem of phones, and other smart devices, dying by the end of the day. The final product would ideally implement antennas transmitting RF signals via beamforming to a receiver, which converts to DC power. The group set out to test the concept by lighting an LED via directional antennas.

Students
Albab Ahmed Ali/Electrical Engineering
Glenn Beach/Electrical Engineering
Joshua Lefeber/Electrical Engineering
Michael T. Lyons/Electrical Engineering

Advisor
Yudong Yao/Electrical and Computer Engineering

ENVIRONMENTAL AND SUSTAINABILITY

CO2NQUER Capture of Carbon Dioxide
This team seeks to address the rising concentration of carbon dioxide in the atmosphere by focusing on the technique of direct air capture (DAC). This process is a novel and unique approach to carbon management that improves upon current practices of carbon capturing storage and focuses on low-concentration environments. DAC technology has the potential to be deployed in any given area, allowing for greater flexibility in deployment and integration.

Students
Shane Q. Arlington/Chemical Engineering
Thomas M. Cunningham/Chemical Engineering
Kathleen Moyer/Chemical Engineering
Kristen J. Romanowski/Chemical Engineering
Ahmed Shifa/Chemical Engineering

Advisor
Yujuan Zhao/Chemical Engineering and Materials Science

F-C.A.R.E. (Field Calculator and Analyzer for Researching the Environment)
Environmental researchers waste time and energy recording measurement data in field journals, transferring them to digital tables, performing calculations and generating visual models to assess trends. As a result, they also often do not know what other information they may require until these analyses are completed. By using F-C.A.R.E., customers will have a convenient and effective mobile solution for recording and calculating data digitally. F-C.A.R.E. will not only provide users with help assessing data, it will also allow them to export data for further analysis in spreadsheets. F-C.A.R.E. is being designed as a multi-platform application for Windows, Android, iOS and Macintosh.

Students
Christian Basilio Coronado/Computer Engineering
Kevin Gordon Quigley/Computer Engineering
Carolina Tejada/Computer Engineering

Advisor
Bryan Ackland/Electrical and Computer Engineering

Knights of the Water Table
Water scarcity and pollution are some of the biggest problems facing the developing world today, even in hydrologically rich regions such as El Salvador. The mission of this project was to develop and integrate a model purification and distribution system. This, in turn, will provide a reliable and clean source of water for communities in all parts of the country and will assist in developing a new means of waste management and water treatment. (This project includes a live demonstration in the Griffith Building.)

Students
Zacky J. Abdelnour/Civil Engineering
Abdulaziz Mohammad Alattas/Mechanical Engineering
Shane Dennis Chiaravalle/Civil Engineering
Nicholas G. Costagliola/Civil Engineering
Sean C. Donovan/Civil Engineering
Tyler John Parcells/Engineering Management
Zachary Pergolizzi/Civil Engineering

Advisor
Tsan-Liang Su/Civil, Environmental and Ocean Engineering
Leslie Brunell/Civil, Environmental and Ocean Engineering
Dawn Digrius/California State University
Nitric Acid Recycle
To adhere to criteria determined by the Environmental Protection Agency as a part of the Clean Water Act, this group set out to help a radioactive materials processing facility design and implement an additional distillation column that would minimize the concentration of dissolved nitrate in the wastewater stream. By installing a distillation unit complete with process controllers, the team can successfully and safely meet the dictated limit of 10 mg/L as N in the stream.

Students
Kevin Aeckerle/Chemical Engineering
Stephanie A. Basile/Chemical Engineering
Kelly A. Kapper/Chemical Engineering
Danielle M. Zibrin/Chemical Engineering

Advisor
Yujun Zhao/Chemical Engineering and Materials Science

Phosphorus Removal from Princeton Meadows Wastewater Treatment Facility
The primary objective of this project was to develop cost-effective technology for the removal of phosphorus from the Princeton Meadows Wastewater Treatment Plant to meet the newly proposed EPA discharge limit of 0.2 ppm of phosphorus. This is in contrast to the current environmentally weak standard of 1.0 ppm. Current technologies of alum and ferric salts were reanalyzed, in addition to new technologies, to determine the most cost-effective and efficient technology to meet the new criteria.

Students
Anthony Raposo/Environmental Engineering
Rachel Leah Watson/Environmental Engineering

Advisor
Xiaoguang Meng/Civil, Environmental and Ocean Engineering

Solar Powered Pump
For American landowners who need water for crops, livestock and homes, this project provides a sustainable, autonomous, complete water delivery system that includes pumping and storage, based on a user’s specific water demands. Unlike the systems currently in place, this system uses sustainable energy to reduce environmental impacts while providing the most energy-efficient solution. (This project includes a live demonstration in the Griffith Building.)

Students
Erin Elizabeth Eitel/Mechanical Engineering
James Patrick Fining/Computer Engineering
Nicolas Nievas/Chemical Engineering
Elizabeth Pascetta/Engineering Management
Tyler James Rishell/Mechanical Engineering

Advisors
Kevin Connington/Mechanical Engineering
Tsan-Liang Su/Civil, Environmental and Ocean Engineering
Xiaoguang Meng/Civil, Environmental and Ocean Engineering

Sponsor
Rockland County Water Task Force

Rockland County Green Infrastructure Analysis
Rockland County faces a crisis: There will not be enough potable water in 20-25 years to accommodate its growing population and development. Green infrastructure is a solution that will allow groundwater to infiltrate properly, quickly and completely to replenish the aquifers, replacing the current impermeable surfaces. This team’s product would guarantee sufficient potable water for Rockland County for years to come to sustain the population.

Students
Taylor K. Carden/Civil Engineering
Travis Lacey/Civil Engineering
Sarah LeClerc/Civil Engineering
Brendan W. Wilton/Civil Engineering

Advisors
Elizabeth Fassman-Beck/Civil, Environmental and Ocean Engineering
Leslie Brunell/Civil, Environmental and Ocean Engineering

Sponsor
Rockland County Water Task Force

Rockland County Green Infrastructure Analysis
Rockland County faces a crisis: There will not be enough potable water in 20-25 years to accommodate its growing population and development. Green infrastructure is a solution that will allow groundwater to infiltrate properly, quickly and completely to replenish the aquifers, replacing the current impermeable surfaces. This team’s product would guarantee sufficient potable water for Rockland County for years to come to sustain the population.

Students
Taylor K. Carden/Civil Engineering
Travis Lacey/Civil Engineering
Sarah LeClerc/Civil Engineering
Brendan W. Wilton/Civil Engineering

Advisors
Elizabeth Fassman-Beck/Civil, Environmental and Ocean Engineering
Leslie Brunell/Civil, Environmental and Ocean Engineering

Sponsor
Rockland County Water Task Force

Solar Squad
The Solar Squad is dedicated to providing clean water for impoverished families in the region around Mali. The Sol Survivor Unit-P is a solar powered purification system that distills contaminated water from local freshwater sources into clean drinking water. Unlike any other units on the market, the Sol Survivor utilizes passive purification methods that are low-cost, easy to maintain, and time efficient.

Students
DaiHyun Brook/Mechanical Engineering
Kathleen Mallory Gamble/Mechanical Engineering
Ann E. Heinle/Mechanical Engineering
Lindsay Ziegler/Mechanical Engineering

Advisor
Kevin Connington/Mechanical Engineering
### Healthcare

#### The Great Disconnect
This project focuses on the Clean Power Plan (CPP), a set of new standards the Environmental Protection Agency and President Obama announced in 2015 and that took effect this year. The CPP aims to reduce pollution from power plants. This project looks into the CPP itself and examines its pros and cons and explores underlying attitudes that are unique to Americans about environmentalism and industry.

**Student**
George Robert Robbins/Science and Technology Studies

**Advisor**
Andrew Russell/College of Arts and Letters

#### Water Purification for Developing Countries
The senior design team is committed to bringing potable water to suffering communities in underdeveloped countries by improving a current filtration system designed by Axenika water for Pristina Capital Partners, LLC to distribute. The present system filters from local freshwater sources and will be optimized for low-cost, simple implementation and minimal operational and maintenance needs. The new system – Stevens BRISK Water Filtration – will help save lives and promote development in third world countries.

*(This project includes a live demonstration in the Griffith Building.)*

**Students**
Isaac Downey/Mechanical Engineering
Kalen Harold Gans/Mechanical Engineering
Brandon Matthew Lynch/Mechanical Engineering
Shannon Marie Pierce/Mechanical Engineering
Ryan E. Wilson/Mechanical Engineering

**Advisor**
Charles Geraldi/Mechanical Engineering

**Sponsors**
Brian Murray
Dee Davis

#### Differences Between the Protein Distribution and Secretion of Different Types of Cells
Last semester, the protein distribution and secretion of the Schwann cell sheets was compared to Schwann cells in tissue culture plate. This semester, the protein distribution and secretion of different types of cells derived from human embryonic kidney cells (HEK293) was compared.

**Student**
Sara Hassan/Chemistry

**Advisor**
Xiaojun Yu/Biomedical Engineering, Chemistry and Biological Sciences

#### EndoBrite
Some 3.1 million gastroscopic surgeries are performed annually in the U.S. using an endoscopic light source attached to a gastroscopic tube. Fifty-four percent of patients undergoing this procedure experience post-operative infections as a result of tube insertion. This team’s objective was to develop a bioluminescent gastric delivery device that is stable in stomach acid and that, when swallowed, will emit sufficient light for at least 30 minutes to enable surgery before it then safely dissolves in the small intestine. The EndoBrite capsule would eliminate the need for light wires and enable surgeons to utilize a smaller gastroscopic tube, reducing incidence of throat trauma and infection. Decreased throat trauma and infection would save patients up to of $78 million dollars.

**Students**
Juan Carlos Cao Yao/Biomedical Engineering
Aleksandra Agnieszka Petelski/Biomedical Engineering
Ravi William Sun/Biomedical Engineering

**Advisor**
Art Ritter/Biomedical Engineering, Chemistry and Biological Sciences
**Epi Pen**
Epinephrine auto injection systems are used to treat patients experiencing anaphylactic shock and are commonly obtrusive and a nuisance to carry. This team worked to redesign the traditional epinephrine auto injector to create a compact, convenient system. The design focuses on portability and potential integration with personal items such as keychains or wallets. The team also explored other possible administration methods. The primary goal was to deliver a compact auto injector prototype. A secondary goal was to integrate it with a mobile application that includes tailored feature sets for varying demographics.

**Students**
Justin D. Desilets/Mechanical Engineering
Emily Rose Grupe/Mechanical Engineering
Ryan M. Lacey/Mechanical Engineering

**Advisor**
Robert Chang/Mechanical Engineering

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**ErgoBreathe CPAP Mask**
Patients with sleep apnea need a CPAP mask that effectively keeps their airway open without compromising comfort and mobility while sleeping. A primary concern of sleep apnea patients is leakage from the mask. The FlexFit CPAP Mask reduces unwanted leakage through modular design, with custom-fitted cushioning and adjustable headgear. Current alternatives do not offer enough adjustability for a single solution to all patient needs. The ErgoBreathe CPAP Mask offers a variety of configurations to better suit a wider array of users through modular components and movable cushioning.

**Students**
Kiril Manchevski/Mechanical Engineering
Justin T. Niemeier/Mechanical Engineering
Andreas I Pallikaras/Mechanical Engineering
Clare Zelesny/Mechanical Engineering

**Advisor**
Robert Chang/Mechanical Engineering

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**Heart Driver**
Approximately 140,000 car accidents a year result from medical emergencies at the wheel. This threatens the lives of car drivers, passengers, pedestrians and other motorists. This team set out to create an autonomous vehicle monitoring and response system to detect medical emergencies for drivers. This system uses pulse sensors located in the steering wheel of a car. If an emergency occurs, the vehicle will respond by dialing 911, slowing the car and pulling over to the road’s shoulder.

**Students**
Robert L. Basciano/Electrical Engineering
Dylan T. Boyle/Electrical Engineering
Timothy F. Cavagnaro/Mechanical Engineering
Kaitlyn Rose O’Connor/Mechanical Engineering

**Advisors**
Maxine Fontaine/Mechanical Engineering
Marehally Prasad/Mechanical Engineering

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**Head Impact Telemetry System**
This team’s mission is to advance impact data collection technology and improve knowledge of the forces that cause brain injuries during physical activity. Unlike other devices, which only focus on the head, the Head Impact Telemetry System measures forces on the head and the upper body, setting this product apart from competitors’. Medical researchers, doctors, athletes and even parents will directly benefit from the Head Impact Telemetry System.

**Students**
Jamie Lynn DeGennaro/Mechanical Engineering
Stephen A. Ippolito/Mechanical Engineering
Justin Lam/Mechanical Engineering
Noelle M. Mulligan/Mechanical Engineering

**Advisor**
Milan Simonovic/Mechanical Engineering

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**Intraocular Glaucoma Treatment Device**
Glaucoma sufferers cannot obtain an inexpensive, easy-to-implant, customizable treatment device. Many current devices pose the risk of serious complications. This group strove to create a device to meet these needs so that every eye has a chance to see great things.

**Students**
Benjamin Foran/Mechanical Engineering
Elizabeth Heinbach/Mechanical Engineering
Matthew Allan Heinrich/Mechanical Engineering
Maura K. Quinn/Mechanical Engineering

**Advisor**
Eui-Hyeok Yang/Mechanical Engineering

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**Involos — Asset Location System Team**
Involos is a tracking system for hospital emergency room applications that helps hospital personnel quickly locate important life-saving equipment. Few hospitals use an equipment tracking system due to their complexity, the need for multiple hardware components and high cost. By using simple tracking techniques, the location of a device can accurately be displayed on a user-friendly interface. The design focuses on simplicity and cost-efficiency.

**Students**
Tiffany K. Chow/Biomedical Engineering
Jeffrey T. DeVince/Biomedical Engineering
Jonathan Itskovitch/Biomedical Engineering
Brianna S. Marchal/Biomedical Engineering

**Advisor**
Marissa Gray/Biomedical Engineering, Chemistry and Biological Sciences

**Mentor**
Herman G. Morchel, M.D., Hackensack University Medical Center
LumbarJACK
Over half a million patients in the U.S. undergo anterior lumbar fusion procedures to alleviate degenerative disc pain. This surgery requires multiple sized devices and hardware tools for accurate fit and placement. The LumbarJACK minimizes these problems. The LumbarJACK is an adjustable bivalve device with tracks for inserts that can accommodate any disc height (lordotic angle). The device is stabilized by teeth on the outer walls and a channel to accommodate bone graft. This device will restore normal spine loading and alleviate both pain and discomfort for the patient. Reducing the size and storage of multiple implants will contain hospital costs.

Students
Kristopher N. Alvarez/Biomedical Engineering
Emily C. Noonan/Biomedical Engineering
Naiya Jayantkumar Patel/Biomedical Engineering
Nicholas Jennings Sieber/Biomedical Engineering
Alanna Zappariello/Biomedical Engineering

Advisor
Antonio Valdevit/Biomedical Engineering, Chemistry and Biological Sciences

Mentor
Colin Harris, M.D.

Massaging Calf Sleeve
This team researched the business aspect of a new product for physical therapy. The device is a compression sleeve designed to fit over athlete’s lower leg and relieve pain from various calf injuries. The team gathered feedback from student athletes, coaches, physical therapists and PT buyers. The ultimate goal was to create interest in the product and gather more than 20 PT buyers’ email addresses and 100 athletes’ email addresses to determine the level of interest once the product is on the market.

Students
Galyna Bartkiv/Business and Technology
Yixing Chen/Business and Technology
Felicia Heard/Business and Technology
Maria G. McClure/Business and Technology
Edward Carl Scanlan/Business and Technology

Advisor
C.V. Harquail/School of Business

Microfluidic Device
The objective: to create an environment for therapeutic stem cells within a scaffold to maintain a stable homogenous population prior to delivery to target sites for medical purposes to help speed up healing processes.

Students
Thomas Andrew Mandicz/Mechanical Engineering
Ryan P. O’Connor/Mechanical Engineering
Jessica M. Walsh/Mechanical Engineering

Advisor
Robert Chang/Mechanical Engineering

Mye-Solate
Multiple Myeloma cancers are increasing and are still incurable, with approximately 26,900 new cases estimated to have been diagnosed in the U.S. in 2015. Current practices involve isolation of myeloma cells from bone marrow, but are costly and yield only 10 percent of cells. Mye-Solate is a device that combines the specificity of magnetic cell separation techniques with the small volume environment of a microchamber to efficiently isolate cancer cell lines from minimal volumes of bone marrow sample. Mye-Solate will ultimately become an inexpensive tool for research teams to use while conducting both preclinical evaluations of therapies and diagnostic screenings of patient-specific therapeutics on the isolated cell lines.

Students
Danielle Gherardi/Biomedical Engineering
Jaimie Mastrogiacomo/Biomedical Engineering
Matteo M. Sturla/Biomedical Engineering

Advisors
Antonio Valdevit/Biomedical Engineering, Chemistry and Biological Sciences
Woo Lee/Chemical Engineering and Materials Science

Mentor
Jenny Zilberberg, Ph.D., Hackensack University Medical Center
Myofascial Release Device
Muscles knots plague many athletes and hinder their performance in practice and competition. This team’s primary objective was to create a user-friendly device that relieves muscle knots and adhesions in a more effectively and efficiently than current products. Other products either cannot apply enough pressure or require the help of another person, usually an athletic trainer or physical therapist. The team aimed to eliminate both those problems while making a product that’s easily accessible for athletes, athletic training rooms and strength and conditioning programs across the country.

Students
Angela R Bauroth/Mechanical Engineering
Gregory Jakusik/Mechanical Engineering
John J. Lee/Mechanical Engineering
Christopher Melendrez/Mechanical Engineering
Alexander James Xu/Mechanical Engineering

Advisors
Yazan Manna/Mechanical Engineering
Maxine Fontaine/Mechanical Engineering

Non-Egg Based Flu Vaccine (NEBFlu)
Influenza, more commonly known as the flu, is an infectious disease that’s of global concern. The contagious nature of the virus makes it easy for the disease to proliferate in a population where vaccination is uncommon. The most common way to produce the influenza vaccine is through an egg-based manufacturing process. While effective, this type of vaccine cannot be used by as many as 40 million people worldwide who are allergic to eggs. NEBFlu created a non-egg-based production system to manufacture a trivalent recombinant influenza vaccine by exploiting the influenza virus’ genetic information to create the hemagglutinin protein in production bioreactors. This project presents an optimized manufacturing process that can satisfy yearly demand for the vaccine.

Students
Jeffrey R. Earl/Chemical Engineering
Palash Parimal Mehta/Chemical Engineering
Alexa L. Policari/Chemical Engineering
Jacob Thigpen/Chemical Engineering

Advisor
Yujun Zhao/Chemical Engineering and Materials Science

NoviByte
NutriByte is an easy and intuitive way to track your nutrition simply by taking a picture of your meal. Tracking all of your macros is very hard and time consuming. Our design makes it quick and easy to keep track of what you are consuming. We are using cutting-edge image recognition tools in conjunction with the crowd sourcing of nutrition identification for macro tracking.

Students
David S. Chmielewski/Electrical Engineering
Francesco Garruzzo/Electrical Engineering
Richard Robert Housley/Computer Engineering

Advisor
Mukund Iyengar/Electrical and Computer Engineering

Stitch Perfect: Carter-Thomason III
The Carter Thomason III is expected to improve surgeons’ laparoscopic port site closure techniques and increase odds of a successful procedure through an innovative design. Ensuring the success of wound closure leads to the reduction in the risk of developing a port-site hernia. By removing this risk, the Carter Thomason III also eliminates the cost, time and pain associated with the required revision surgery necessary to treat port-site hernias.

Students
Luke Richard Magera/Biomedical Engineering
Michelle E. Osorio/Biomedical Engineering
Nicolette Vasiliki Pappas/Biomedical Engineering
James Anthony Priftakis/Biomedical Engineering
Elizabeth A. Richard/Biomedical Engineering

Advisor
Helen Kambic/Biomedical Engineering, Chemistry and Biological Sciences

Mentors
Rosemary Garofolo, Cooper-Surgical
Nicole Miller, Cooper-Surgical
Superoxide Radical Anion in Mass Spectrometry

The superoxide radical-anion (O$_2$•-) is an ionic species that can be formed when atmospheric oxygen captures (or attaches) low-energy electrons. O$_2$•- has proved to be a very versatile reagent ion by ionizing an analyte in as many as four different ways: deprotonation, adduct formation, molecular anion formation and oxidative ionization. This project presents research that helps define and understand these ionization pathways.

Students
Isra Hassan/Chemistry

Advisor
Athula Attygalle/Biomedical Engineering, Chemistry and Biological Sciences

The Effects of Aging and Progeria on Micronuclei Formation and Subsequent DNA Damage

This research focused on the formation of micronuclei as a measurement of DNA damage in accelerated aging cell lines, specifically lymphocytes from Werner’s Syndrome patients. The goal of this research was to quantify the frequency of micronuclei formation in progeria cells. These results were compared to that of wild type cells from a middle aged donor, as provided by the Coriell Institute for Medical Research. Then DNA damage agents, including Etoposide and CPT, were added to the cells to determine the micronuclei frequency of each cell line under specific stresses.

Student
Kathleen Nevola/Chemistry

Advisor
Joseph Glavy/Biomedical Engineering, Chemistry and Biological Sciences

The Ethics of Genomics

This paper focuses on the ethics of genomics, specifically genome sequencing, testing and editing. Genomics has rapidly progressed in recent years, some say at a terrifying rate, and current laws and regulations haven’t been able to keep up. Technologies, such as CRISPR, already enable gene editing. This research focuses on the implications of genomics on prenatal care, such as the possibility and implications of curing disorders in the womb, plus the potential for cosmetic edits, i.e. “Designer babies.” Genomics will also affect how patients are treated by doctors. After testing a patient’s genome and understanding what the patient may be predisposed to, doctors will be giving more preventative care and less reactive care. Insuring patients also becomes an issue. The social, cultural, and scientific implications of genomics will vary wildly, depending on how genomics are handled ethically.

Student
Jennifer Rutledge/Science and Technology Studies / Social Sciences

Advisors
Andrew Russell/College of Arts and Letters
Alex Wellerstein/College of Arts and Letters

VAP ZAP

Ventilator-associated pneumonia (VAP) is the predominant hospital-acquired illness in patients with endotracheal intubation. Every year in United States, VAP affects more than 250,000 patients in intensive care units and a third of those patients die. This costs the healthcare system $3-$10 billion annually. The current method for prevention is to suction secretions in the endotracheal tubes, but it is ineffective in reducing VAP occurrence. VAPZAP is a portable sterilizer that utilizes UV-C radiation to reduce the accumulation of VAP-causing agents. The VAP ZAP provides a safe and efficient method of reducing VAP and lowers costs and hospital stays for intensive care unit patients.

Students
Yona Bauzti/Biomedical Engineering
Shaan Fawzi Huiz/Biomedical Engineering
Moon Sick Jung/Biomedical Engineering
Anthony Whittaker/Biomedical Engineering

Advisor
Helen Kambic/Biomedical Engineering, Chemistry and Biological Sciences

VibroNeedle Team

An estimated 16 billion needles and syringes are used each year worldwide to administer medication and vaccines. In the United States, fear of needles remains a common problem for 50 million people, 20 percent of whom avoid medical treatment altogether. By providing medical professionals with a holder that accommodates common syringe sizes, VibroNeedle overrides the nerve pathways that would normally transmit pain. VibroNeedle promotes pain relief through gentle vibration and minimizes anxiety by hiding the needle from the patient’s view.

Students
Summer J. DeMaio/Biomedical Engineering
Gabriella Sara Green/Biomedical Engineering
Joseph LoRicco/Biomedical Engineering

Advisor
Helen Kambic/Biomedical Engineering, Chemistry and Biological Sciences
Crux: The Puddle Project
Puddle is a crowd-sourcing application that allows users to report incoming weather while providing live data to fellow users. The application enables users to record and shoot their very own Weatherman broadcast, which can be shared to Facebook, Twitter and Instagram. The goal is to engage the public with weather updates that create a faster, more creative and fun way to receive news. The CRUX Lab design team seeks to create a detailed top-level creative concept which includes an economic plan and precise design to be used and developed by skilled programmers for the city of Hoboken.

Students
Sarah A. DeLeonardis/Engineering Management
Wesley M. Elford/Engineering Management
Abel Dominic Teano/Engineering Management

Advisors
Eirik Hole/School of Systems and Enterprises
Alexandros Washburn/School of Systems and Enterprises

Gnarly Infrastructure
This team of engineers designs unique solutions to coastal deficiencies. Through the use of natural and composite methods, it defends communities and conserve the shorelines. By instituting sustainable foundations now, assets of inhabitants and the infrastructure of coastal communities will be protected for years to come.

Students
Nicole S. Kapasakis/Civil Engineering
Courtney J. Lee/Civil Engineering
Michael J. Marone/Civil Engineering
Andrew J. Scrutchfield/Civil Engineering

Advisors
Jon Miller/Davidson Laboratory
Thomas Herrington/Davidson Laboratory

For MTA: 7 Line Trans-Hudson Crossing
To cross the Hudson River into New York City, commuters and travelers are forced to use one of a handful of bridges and tunnels, already beyond capacity and deteriorating. Three sets of twin tubes provide rail transit. Each is more than a hundred years old and in dire need of substantial maintenance. A new set of tunnels is needed to supplement the current ones and increase transit ridership across the river. The proposed design analyzes multiple alignments connecting Hoboken or Secaucus with Midtown Manhattan to maximize capacity and minimize cost and local impacts.

Students
Nino Gianmarco Colonnelli/Civil Engineering
Daniel G. Knight/Civil Engineering
Haines P. Marston/Civil Engineering
James Rudolph-Shabinsky/Civil Engineering

Advisors
Sarath Jagupilla/Civil, Environmental and Ocean Engineering
Leslie Brunell/Civil, Environmental and Ocean Engineering

Sponsor
WSP Parsons Brinckerhoff

Mount Beacon Access Road
The goal of the Mt. Beacon Access Road project is to design an access road for the Mt. Beacon Incline Railway Restoration Society, which is working to restore the historic incline railway in Dutchess County, New York, that was destroyed by fire in 1983. The Mt. Beacon Access Road provides a construction access route to the peak of the mountain, which will be the construction site for the new station. Unlike the existing road that is currently in a state of disrepair, this design features a new access road that provides accessibility for delivery and emergency vehicles.

Students
Joseph A. Brosnan/Civil Engineering
Yidong Cao/Civil Engineering

Advisors
Thomas Wakeman/Civil, Environmental and Ocean Engineering
Leslie Brunell/Civil, Environmental and Ocean Engineering

Mentor
Frank DiLorenzo, Mount Beacon Incline Railway Society

Somerset County Bridge Design (SCBD)
This team’s mission is to create a safe commute for the drivers of Somerset County, who need a more structurally sound timber bridge. The bridge is situated at the intersection of Pleasant Run Road and South Branch Road and will be designed to be durable, safe and innovative. This will be done with the use of newly developed materials while making the bridge aesthetically pleasing, time-efficient and cost-effective.

Students
Kayla Marie Mallay/Civil Engineering
Alexander Richard Torrisi/Civil Engineering
Lan Zhang/Civil Engineering

Advisor
Thomas Wakeman/Civil, Environmental and Ocean Engineering

Sponsor
WSP Parsons Brinckerhoff

Mentor
Naik Consulting Group
Coastal and Beach Resiliency Agency
Superstorm Sandy exposed the vulnerabilities of the Tottenville neighborhood, located along the southeast shore of Staten Island. The low-lying region was severely damaged by large, wind-driven storm surges and heavy wave action. The goal of the proposed design is to prevent future storms from causing similar physical destruction and its resulting economic impact. An expanded, tiered beachfront, a combined boardwalk-seawall structure and improved rainwater management systems within the community can reduce the impacts of future storms and help to reconnect Tottenville residents to the coast.

Students
Kaitlyn Astel/Civil Engineering
Kieran Daly Cross/Civil Engineering
Brian Riley/Civil Engineering
Jeremiah Cabotaje Ybanez/Civil Engineering

Advisors
Thomas Herrington/Civil, Environmental and Ocean Engineering
Leslie Brunell/Civil, Environmental and Ocean Engineering

Sponsor
Stantec

The Queens Office Tower
The team proposes a structural frame design for an office building in Queens, New York, that is being developed by a private contractor. Exploring sustainability, cost efficiency and the needs of the community, the office building design will be the most attractive option that is both structurally sound and economically viable. The Queens Office Tower Team’s final design will thrive politically and financially — championing the art of urban design by making the city a better place.

Students
Julia Cruz/Civil Engineering
Brian Paul Mulraney/Civil Engineering
Thomas J. O’Neill/Civil Engineering

Advisors
Khondokar Billah/Civil, Environmental and Ocean Engineering
Johnathon Fiore, Gilsanz Murray Steficek

The Reinfocers
The Reinfocers provide safe, efficient and site-specific support of excavation systems in areas with the most challenging soil and site conditions. The team prides itself on collaborating with other engineering and construction firms to fit the needs and requirements of the client.

Students
Brian Richard Hennelly/Civil Engineering
Kevin M. O’Connell/Civil Engineering
Dylan Wong/Civil Engineering
Demitri T. Zoubroulis/Civil Engineering

Advisors
Sarah Jagupilla/Civil, Environmental and Ocean Engineering

Sponsor
MoreTrench

VANGUARD
VANGUARD has developed the design for the reconstruction of Front Street in Lower Manhattan between Old Slip and John Street. The plan includes design aspects such as green infrastructure solutions and roadway upgrades. While adhering to specific New York City Department of Transportation guidelines and codes, the group designed a singular hybrid alternative that highlights climate resiliency, improved stormwater drainage, traffic calming solutions and the reconstruction of the existing infrastructure. The team aims to create a long-lasting, safe, durable roadway that benefits New York City.

Students
Katlyn Christenson/Civil Engineering
Austin Churn/Civil Engineering
Kyle Patrick Connor/Civil Engineering
Yuriy P. Kaunzinger/Civil Engineering

Advisors
Leslie Brunell/Civil, Environmental and Ocean Engineering

WHISPER
WHISPER seeks to provide bridge owners and inspectors with a continuous health monitoring system to ensure the safety of heavily traveled bridges. Current structural health monitoring methods rely on visual inspection or utilize bulky wired systems that are unable to perform frequent status checks. In contrast, WHISPER is a compact, non-intrusive device that will detect possible defects in structures on a microscopic scale and provide engineers with necessary data to prevent them from becoming potentially fatal. Utilizing wireless technology, WHISPER is a flexible patch that can be easily applied on critical areas of a structure. Additionally, WHISPER will provide real-time structural health monitoring while withstanding environmental impacts.

Students
Timothy Michael Fair/Civil Engineering
Alexandra T. Haracz/Electrical Engineering
Elizabeth Irene Knott/Civil Engineering
Joseph M. Laemmle/Mechanical Engineering
Dhruvil Parikh/Computer Engineering
Mohamed Saleh/Civil Engineering
Sonali Thaker/Electrical Engineering
Abigail C. Wasmuth/Civil Engineering

Advisors
Marcus Rutner/Civil, Environmental and Ocean Engineering
Dimitri Donskoy/Civil, Environmental and Ocean Engineering
Leslie Brunell/Civil, Environmental and Ocean Engineering

Sponsor
M&P International
Achievement Rewards
The online and mobile advertising industry suffers from ad-blockers and disdain towards advertisements. Users are annoyed by intrusive ads and consider most ads untrustworthy. This team is offering a new and engaging way to spark consumer interest in advertisements by offering “exclusive deals” in exchange for users completing real world challenges. The team is developing an Android app that can monitor a variety of user actions. These actions are then employed to provide users with various rewards in a relational database.

Students
Michael H Kovalski/Computer Engineering
Randall W. Suliga/Computer Engineering
Adam M Taranov/Computer Engineering

Advisor
Dov Kruger/Electrical and Computer Engineering

Emotector
Human emotions are difficult to detect but they can be a great way to access people's real thoughts. The Emotector is a software-based system that detects the subject's emotions. By capturing the movements and the interrelations of the subject's facial muscles, it's possible to generate an analytical report that reveals a subject's emotions.

Students
Xin Liu/Electrical Engineering
Alexander John Nieduzak/Computer Engineering
Yufei Wu/Computer Engineering

Advisor
Hong Man/Electrical and Computer Engineering

Generating Sounds in Motion Capture
This project explores the application of procedural audio to motion-capture data. The programming language Pure Data is used to interpret an actor's motion data as parameters for a dynamic audio engine to generate friction sound effects. The project focuses on the process of moving the data through the system and also on the applications of the project for animation and video game sound design.

Students
Alexander John Post/Music and Technology

Advisor
Richard Graham/College of Arts and Letters

Golf Recap
Golf Recap is a mobile app and web app that lets golfers and clubs track their scores. It is also a social media platform where golfers can post, view and comment on pictures of things such as their clubs, the places they play and scorecards.

Students
Benjamin M. Barnett/Computer Science
Matthew R. Continisio/Computer Science
Piotr Fatyga/Computer Science
Eric Dutra Rodefeld/Computer Science
Alan R. Zimmer/Computer Science

Advisor
David Klappholz/Computer Science

Medical Data Collection
The goal of this project is to replace traditional pen-and-paper data collection methods in clinical trials with an Android application that uses non-intrusive language recognition to complete data forms. The project includes the creation of an Android app and integration with natural language processing software. In addition, an online program allowing the intuitive creation of the medical forms used in clinical trials and database management software allowing blank or completed forms to be stored on a server will be developed.

Students
Dominik Jan Jedruszczak/Computer Science
Zachary David Klappholz/Computer Science
Dane Matthew Pilcher/Computer Science
Robert Abraham Sokolov/Computer Science
Daniel Szymczuk/Computer Science

Advisor
David Klappholz/Computer Science

Mentor
Klaus Sonnenleiter

Parking Pass
Parking in cities is a hassle. Parking Pass is designed to make it much easier to find available parking spaces on city streets. Customers would pay a small one-time fee for a mobile app that helps them quickly find a parking space. Parking Pass would save customers time, money (possibly from parking violation tickets) and stress related to running late searching for parking. Parking Pass would employ laser sensors mounted on light poles to determine whether a car is below. Multiple sensors aimed at several parking spaces will relay the absence of cars on street sides so customers can park.

Students
Thomas J. DeGirolamo/Electrical Engineering
Anup P. George/Electrical Engineering
Peter A. Sbilis/Electrical Engineering
Varun Shivkumar/Electrical Engineering
Stephen T. Zisa/Electrical Engineering

Advisor
Serban Sabau/Electrical and Computer Engineering
Performance Sphere
Sometimes, one of the most enjoyable parts of a performance is the connection between a musician and the audience. This project involves creating a new form of interactive controller that affects features of a musical performance in real time. It will be a 3D-printed sphere containing a variety of sensors: an accelerometer, gyroscope and various pressure sensors along the outside. Sensor data is be transmitted via Bluetooth Low Energy to an Arduino microprocessor interfaced with the performance computer. The data will control various parameters of the musical performance that relates to the movements of the sphere. The goal is to apply a relatively new technology, Bluetooth LE, to a creative purpose.

Student
Miranda K. Ripken/Music and Technology

Advisor
Seth Cluett/College of Arts and Letters

Sample-Based Composition with Evolutionary Algorithms
This project is an interactive software installation that composes music. A user will be able to select audio samples to be spliced and rearranged to create a composition. The software composes using an algorithm that models evolution by natural selection.

Student
Andrew Wiggins/Music and Technology

Advisors
Richard Graham/College of Arts and Letters
Brian Borowski/Computer Science

Sound and Animation: The Act of Creating Worlds from Imagination
Because animation involves creating worlds entirely from the imaginations of the animators, sounds — either diegetic or non-diegetic — become associated with an action or object. Sound designers, foley artists, ADR directors, voice actors, composers and sound engineers to translate these exaggerated sounds to the audience as part of the motion picture. This research examines the use of sound design in animation, how each field influences the other and how sound design helps animated films create a sound-world uniquely different from that of live-action film.

Students
Alistair Scott/Music and Technology

Advisor
Seth Cluett/College of Arts and Letters

TraumaGraph
TraumaGraph is mobile trauma evaluation and treatment application for iOS and Android. The application will be used as a grounding tool for patients of trauma and anxiety while they are experiencing panic attacks. Users provide information about their experience with the app on a voluntary basis and will be provided unique experiences that cater to their psychological needs based on analytics.

Students
Michael A. Abramo/Computer Science
Kevin Alvarez/Computer Science
Matthew J. Konstantinou/Computer Science
Michael Peleshenko/Computer Science
Tyler A. Romeo/Computer Science

Advisors
David Klappholz/Computer Science
Andrew Grapsas/Computer Science

Mentors
Blaine Grapsas
Andrew Grapsas
PROCESS IMPROVEMENT

**ABE Fermentation**
The team created a model process for Acetone-Butanol-Ethanol (ABE) fermentation using the chemical engineering simulation software Aspen Plus. Butanol is the desired product of this process because of its superiority (particularly in terms of energy density) to the more commonly used biofuel, ethanol. Thus, the goal was to create a system that maximizes butanol production and separates the three alcohols effectively so that they may all be pure products. Furthermore, the process was designed so that the overall cost of equipment and energy were minimized.

**Students**
Rowena B. Dolot/Chemical Engineering
Danielle Finis/Chemical Engineering
Harrison Kane/Chemical Engineering
Laura Tantillo/Chemical Engineering

**Advisor**
Yujun Zhao/Chemical Engineering and Materials Science

**Additive Manufacturing Heat Exchanger**

Heat exchangers remove heat from air conditioning and refrigeration systems. This team worked with United Technologies engineers to develop a compact heat exchanger for aerospace applications. Heat exchangers help remove heat from hot fluids by transferring it to an adjacent cooler fluid. Increasing the area of contact between the fluids helps facilitate better and more efficient heat transfer. But as the surface area increases, there is a drop in pressure. The goal was to develop a design that optimizes heat transfer while reducing pressure drop and weight by using advanced metal additive manufacturing to explore more optimal geometries.

**Students**
Evan Michael Klimchak/Mechanical Engineering
Carly Elisa LaGrotta/Mechanical Engineering
Daniel Moore/Mechanical Engineering
Cassandra Nicholas/Mechanical Engineering
Angelia G. Umali/Mechanical Engineering

**Advisor**
Eric Williams/Mechanical Engineering

**Mentor**
United Technologies Corporation – Aerospace Systems

**Economic Recovery of Edible Protein from Cheese Whey by Ultrafiltration**
The project’s main goal was to simulate a filtration process system that isolates the waste products in cheese manufacturing so that whey protein can be sold to companies that produce protein supplements. The method chosen consists of two ultrafiltration stages to achieve a 35 percent protein product, a combination of the rejected protein with the permeate stream to achieve a 75 percent protein product and two ultrafiltration stages to achieve an 85 percent protein product. Each line feeds into the other, with the output from the 35 percent product becoming the input for the 75 percent product and so forth. The process is modeled using Aspen Plus through the use of pumps, valves, separator blocks, mixers and splitters.

**Students**
Angela E. Atura/Chemical Engineering
Lakeisha K. Ordonez/Chemical Engineering
Valerie Ellen Rovner/Chemical Engineering
Preston M. Tarry/Chemical Engineering

**Advisor**
Yujun Zhao/Chemical Engineering and Materials Science
**Gas to Liquids**
Our gas to liquids design is a chemical process that is targeted toward any refinery that produces fuel. The recent discovery of natural gas deposits in the United States has created a great opportunity for the refining industry. This design is tailored toward harnessing that natural gas and converting it into fuel. Our method will limit the dependency the U.S. has on foreign oil. The proposed design will be the most efficient and environmentally friendly method in today’s market.

**Students**
Brant Cumella/Chemical Engineering
Zizi Kandil/Chemical Engineering
Gearht VanVoorhis/Chemical Engineering
Felix Jun Jie Zhang-Xu/Chemical Engineering

**Advisor**
Yujun Zhao/Chemical Engineering and Materials Science

**iRecon**
The goal of the project is to implement intelligent software that will automatically analyze reconciled data to resolve database breaks. Discrepancies between comparable database tables are currently detected and resolved by people, but this is a long and laborious task. iRecon will analyze the data breaks between database tables in a quick and user-friendly manner. It will also allow users to add rules for handling the data discrepancies to further check the integrity of the reconciled data and output the feedback.

**Students**
Nathan W. Edwards/Computer Science
Zachary Job/Computer Science
Amanda Kowalski/Computer Science
Sean Carl Loveall/Computer Science
Steven Nunes/Computer Science

**Advisor**
David Klappholz/Computer Science

**Sponsor**
New York Life

**Iron Mountain**
The team aimed to improve Iron Mountain’s rush delivery success metric by using data mining and modeling techniques to identify area of the process that can be improved, saving the company money, increasing customer satisfaction and making the overall process more efficient.

**Students**
Danielle R. Fischer/Engineering Management
Ian W. Tyger/Engineering Management
Ruiting Wu/Engineering Management
Xu Yan/Engineering Management

**Advisor**
Eirik Hole/School of Systems & Enterprises

**J&J Intake Portal**
Johnson & Johnson has several data analytics teams that provide internal consulting services. These teams are fairly new, disconnected and without organized and streamlined pre-sales and preliminary workflow processes. As a result, the company is losing potential clients to more expensive external consulting firms. This team is building an enterprise-wide, automated platform for interacting with potential clients, providing accessible information on their capabilities and allowing for the intake of project requests.

**Students**
Neda Aniseh Ameri/Engineering Management
Edward N. McGrath/Engineering Management
Lindsay Aaryn Stone/Engineering Management

**Advisor**
Eirik Hole/School of Systems and Enterprises

**Organic Solutions**
The world is looking for alternatives to petroleum derived-fuels. This project seeks to develop a process that uses coal and biomass sources to produce methanol. Methanol can be processed into a variety of different products, most importantly, gasoline.

**Students**
Jonathan T. Collins/Chemical Engineering
Vincent Michael Raimondi/Chemical Engineering
Ryan Tarnopoll/Chemical Engineering
Kenneth M. Trimblett/Chemical Engineering

**Advisor**
Yujun Zhao/Chemical Engineering and Materials Science
Ambler II

The AMBLER II system is designed to be a walking bipedal robot with closed loop balance and control. AMBLER II is the successor to AMBLER I and is meant to expand on the operations of that previous robot, specifically with functionality in walking, turning and recognizing obstacles without being mechanically assisted. AMBLER II is being developed to create human-like walking under the constraints of a low budget. AMBLER II has the potential to be utilized by the military to clear buildings in hostile situations. It differs from other robots on the market because it is low in cost and can also walk and avoid obstacles that could block its path. The military currently only has robots that use a rolling system to defuse IEDs and not a system to ensure a room is safe for soldiers to enter.

Students
Zachary Patrick Kastner/Mechanical Engineering
Sahil Patel/Mechanical Engineering
Sarvesh Shah/Computer Engineering
Aakash J. Sheth/Mechanical Engineering
Mackenzie J. Swartout/Mechanical Engineering
Kyle E. Walton/Mechanical Engineering

Advisor
Brendan Englert/Mechanical Engineering

Automated Surface Cleaning Robot

Professors who are paid to teach spend too much time cleaning white boards after each class, wasting money and valuable time. This project aimed to design an electromechanical device that does the cleaning automatically, quickly and efficiently, using a cleaning solution if necessary. The target audience for this project is teachers and students who work with white boards every day. An additional market for this product is school administrators, who pay teachers to teach, not clean boards. There is no such product in the market right now.

Students
Peter J. Corey/Mechanical Engineering
Edward Richard Green/Mechanical Engineering
Daniel R. Howard/Mechanical Engineering
Joshua Bennett Matus/Mechanical Engineering
Sean Tomlinovich/Mechanical Engineering

Advisor
Marehalli Prasad/Mechanical Engineering

Automatic Fiber Optic Splicer

Splicing fibers takes time and effort and can fail. This system will improve the time-consuming process of splicing fiber optic cables. It saves time, money and training required for technicians. Additionally the system can be used in environments that are not suitable for humans. It uses 3D-printed conveyor belts controlled by precise stepper motors and Arduinos. A micro-camera is used for image recognition alongside LabVIEW to sort fibers.

Students
Mathew Cherian/Electrical Engineering
Joseph Alexander Duncan/Electrical Engineering
Jeffrey Logan Huber/Electrical Engineering
Piotr Karol Kulik/Electrical Engineering
Nathalie Tran/Physics

Advisors
Dov Kruger/Electrical and Computer Engineering
Kishore Pochiraju/Mechanical Engineering

Sponsor
General Dynamics

Botanical Solutions

This project’s mission is to create a product for the upper-middle class households that would like an easy way to start a garden. The Botanical Solutions Robotic Gardener is an autonomous device that will push households into a self-sustaining lifestyle. The product is a versatile yet compact solution for household produce production. Why make yard work hard work?

Students
John Atkinson/Mechanical Engineering
Joseph R. Cirasa/Mechanical Engineering
Yuan Gong/Mechanical Engineering
Daniel James Sheedy/Mechanical Engineering
Daniel E. Timpanaro/Mechanical Engineering

Advisor
Richard Berko/Mechanical Engineering
Drone with Automatic Surveillance System
This project provides a solution for companies that want a portable automatic surveillance system that works both indoors and outdoors and is easy to operate. Traditional surveillance systems are expensive and can’t effectively monitor huge areas that contain lots of obstacles. Companies need a more efficient solution that can eliminate blind spots and is mobile and easy to install. This project combines multiple technologies into a hex-copter that includes a real-time feedback system, optimal routing by GPS and an auto-recharge system. The drone would carry an RF camera that can watch over a complete surveillance area.

Students
Jia Deng/Electrical Engineering
Luzhen Huang/Electrical Engineering
Su Huang/Electrical Engineering
Jiaqi Lu/Computer Engineering
Ziqian Xia/Electrical Engineering
Juan J. Zuniga/Electrical Engineering

Advisor
Yi Guo/Electrical and Computer Engineering

Omnibot
This omnidirectional robotic platform is designed to facilitate filming and 3D scanning technology in outdoor and indoor environments by combining cutting edge transportation technology with intuitively simple controls. (This project includes a live demonstration in the Griffith Building.)

Students
Kevin M. Cariddi/Mechanical Engineering
Eric A. DeSanto/Mechanical Engineering
Kevin W. Fontana/Mechanical Engineering
Nathaniel Aaron Goldfarb/Mechanical Engineering
Sean Patrick Rooney/Mechanical Engineering

Advisor
Biruk Gebre/Mechanical Engineering

Robotic Fish
The team’s goal is to build a robotic fish capable of monitoring environments and water quality. The robotic fish should endure high water pressure and be waterproof. Multiple professional-level sensors should be placed on the body of the robot to collect accurate real-time data underwater for use in research. The robotic fish can navigate with the aid of a GPS system. It has the ability to send back the real-time monitoring videos from its outside webcam.

Students
Xu Chen/Electrical Engineering
Guanhua Ding/Electrical Engineering
Rong Lei/Electrical Engineering
Longhai Liang/Electrical Engineering

Advisor
Yi Guo/Electrical and Computer Engineering

SewerBot
The SewerBot is an autonomous robot for the City of Hoboken that is capable of continuously testing and measuring sewer pipe conditions as well as mapping its location.

Students
Allison Dumandan/Computer Engineering
Kyle Goodman/Mechanical Engineering
Michael Serrante/Mechanical Engineering
Paul Joseph SferraZza/Mechanical Engineering
Bryan Specht/Mechanical Engineering

Advisor
Mishah Salman/Mechanical Engineering

VR Cardio
Exercising is a bland and tedious task. Virtual Reality Cardio makes exercise fun. The stimulation from interactive entertainment will increase users’ motivation and drive to exercise harder and more consistently. This product would be relatively inexpensive and intuitive and should work with any bike, video game or PC-supported VR headset. The system uses a smartphone’s gyroscope or accelerometer, an Arduino board and a sensor that searches for a magnet to pass each time the wheel spins. All information is transmitted into a computer via USB, where a Python script interprets the signals and sends out corresponding inputs to the game.

Students
Tyler J. Eckel/Electrical Engineering
Nito Lugo/Computer Engineering
Tanbeer Omar Mahmood/Computer Engineering
Alan A. Steinberg/Electrical Engineering

Advisor
Dov Kruger/Electrical and Computer Engineering
Bonbouton
Bonbouton is the smart clothes platform that allows users to collect their vital information to make wiser decisions about their health and lifestyles.

Personnel
Linh Le, CEO
Thuy Pham, Chief of Design

Contact
Linh Le: linh@bonbouton.co

Seeking
Product development partners in personal healthcare and/or performance athlete.

DentalDress
DentalDress is a medical device company engaged in the development of biomimetic coating on dental implants to solve challenging problems in the dental industry. DentalDress provides dental implants with coating, which allows for rapid and controllable regeneration of tissues (such as gum) onto the implants for secured seals. DentalDress products are low cost, easy to manufacture and effective at inducing tissue regeneration and they present minimal hurdles for Food and Drug Administration clearance because all the materials used are already approved for other applications. They also require no major modifications to current dental implant manufacturing processes. The company has been awarded several federal and state grants worth close to $200,000.

Personnel
Chao Jia/Biomedical Engineering
Lichen Wang/Biomedical Engineering
Dr. Hongjun Wang/Biomedical Engineering
Dr. Werner Kuhr

Contact
Chao Jia: cjia@stevens.edu

FinTech Studios
FinTech Studios is a leading cloud-based provider of curated fintech apps, investment research and big data analytic products operated in partnership with top fintech startups, financial institutions, data providers and strategic partners. Its flagship product, Apollo, is a platform that helps people navigate through the vast sea of financial information and surface impactful data instantly. Each day, Apollo crawls over 10 million news articles from across the Internet, filters this down to nearly 10,000 high-quality stories and presents it as a coherent, curated news feed that highlights actionable events. Integration with secure messaging and social media management makes it easy to share content with anyone. Apollo is available as a web application and as a downloadable program for Windows, Mac, iPhone and iPad.

Personnel
Kevin Barresi, CTO
Jim Tousignant, CEO & founder
Rich Taylor, Vice President
Andrew Haines, Partner & co-founder

Contact
Kevin Barresi: kbarresi@stevens.edu
Mimictrade, Inc.
Mimictrade’s mission is to make it easier for people who have never invested before to start trading and making money without the time and pain usually involved. Mimictrade puts seasoned investor portfolios in competition against each other and lets novices learn by example from the portfolios that come out on top.

Personnel
Dylan Praul/Computer Engineering: President & CEO
Mukund Iyengar/Faculty
James Dominikewicz/Alumnus
Marc Fields/Alumnus

Contact
Dylan Praul, dpraul@mimictrade.com

Savizar, Inc.
Savizar has developed a patent searching tool that outperforms all existing technology. Built from the ground up with speed, power and convenience in mind, this groundbreaking tool returns results in milliseconds, has all of the searching capabilities of USPTO East and is available on anything with a browser.

Personnel
Sara Vitkus/Computer Engineering
Dillon Uzar/Computer Engineering
Alex Sabella/Computer Engineering
Tim Williams/Computer Engineering

Contact
Sara Vitkus, sara@savizar.com

Seeking
Law firms for beta testing

Wave Dental
Approximately 20 million tooth extractions are performed annually. Despite this large number, with the exception of numbing agents, procedural advances have remained relatively unaltered. Wave Dental has developed technology that employs focused vibrations to oscillate and loosen teeth without cutting restraining ligaments and gum tissue. With elevation of the tooth from the socket using the same technology, tooth removal is achieved with less trauma and reduced extraction force.

Personnel
Antonio Valdevit/Biomedical Engineering, Chemistry and Biological Sciences
Rebecca Chung/Biomedical Engineering, Chemistry and Biological Sciences
Paul Magnone/Consultant

Contact
Antonio Valdevit: avaldevit@aol.com
BEHIND INNOVATION, DESIGN & ENTREPRENEURSHIP AT STEVENS

Meet the faculty behind the Senior Design program and the Innovation Expo.

The Program for Innovation, Design and Entrepreneurship at Stevens (IDEaS) integrates learning and technical design with entrepreneurial thinking and creates an environment that fosters innovation. Under the pedagogical leadership of Interim Dean Keith Sheppard and program director Kishore Pochiraju, professor of mechanical engineering, IDEaS provides students with a curricular framework and opportunities to interact with professional mentors who guide them towards maximizing the societal and commercial value of the senior design projects.

Each year, Sandra Furnbach Clavijo, program manager in the Office of Innovation and Entrepreneurship and an innovation mentor for the IDEaS program, brings together more than 500 students and 150 Capstone projects for the Innovation Expo. Sandra works with all the Senior Design professors, the design mentors and deans to organize an integrated Senior Design experience.

Associate Teaching Professor Leslie Brunell – a member of the Department of Civil, Environmental and Ocean engineering – coordinates all the civil engineering Senior Design projects and one section of Multidiscipline Engineering Senior Design. Many of her students’ projects are sponsored by industry, allowing the design teams to gain firsthand experience under professional mentors. She was recognized by the New Jersey Inventors Hall of Fame in 2014 for Advancement of Invention and Process.

Eric Williams served as the coordinator for the mechanical engineering Senior Design course. He is a recent graduate of Virginia Tech, where he worked on the mechanics of flexible robots. His multidisciplinary experience enables him to provide technical advice to students working in various areas. Assistant Professor Brendan Englot teaches Senior Design X2, a course for interdisciplinary projects in robotics and mechatronics. His class attracts highly motivated students from several disciplines. Prior to joining Stevens in 2014, he was a research scientist at United Technologies.

Industry Professor Vikki Hazelwood is director of the biomedical engineering program. Together with Assistant Professor Antonio Valdevit, Prof. Hazelwood has developed and led a senior design program that immerses students in the invention process in the context of their Capstone design projects. Dr. Hazelwood received the Advancement of Invention Award from the New Jersey Inventors Hall of Fame.

Erik Hole, an engineering management lecturer, is part of a department that helps students learn about the intersection between business operations and engineering. Successful projects by engineering management students have ranged from helping a major New York hospital reengineer its emergency intake and triage process to national award-winning concepts for providing power and HVAC services to aircraft.

Professor Bruce McNair is the Senior Design coordinator for the Department of Electrical and Computer Engineering’s Capstone Senior Design course, in addition to being the instructor for Design VI – Senior Design Dress Rehearsal. He works with students in the department’s Frank Boesch Laboratory, which is used by students from many disciplines who require electronics in their Senior Design projects.

Yujun Zhao, teaching associate professor of chemical engineering and materials science, worked with students on projects that have potential applications in energy, automobiles, food, pharmaceuticals and the environment.

The Senior Design projects come to life in the Institute Machine Shop and the Prototype Object Fabrication (PROOF) Laboratory. Machinists, George Wohlrab and Bruce Fraser, have more than 85 combined years of experience, which they use to help students bridge the gap from design to fabrication. Research Engineer Biruk Gebre (ME) enabled 3D printing of several hundred components at the PROOF Lab. This year, laboratory supervisor Milan Simanovich (ME) and part-time machinist, Marshall Reid have integrated CNC machining into the senior design program.
Stevens Institute of Technology would like to thank the corporate sponsors of the Senior Design program.

**EXELIS**

In 2015, Exelis was acquired by Harris Corporation, creating a company with greater scale, capabilities, core franchises and more balanced business portfolio. The combined company has a broad portfolio of advanced, technology-based solutions to solve government and commercial customers’ mission-critical challenges.

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New York Life Investments, an indirect, wholly owned subsidiary of New York Life Insurance Company, is a premier investment management firm serving a variety of sectors—retail, institutional, bundled defined contribution and defined benefit, and guaranteed products.

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General Growth Properties, Inc. is an S&P 500 company focused exclusively on owning, managing, leasing and redeveloping high-quality retail properties throughout the United States. GGP is headquartered in Chicago, Illinois and is publicly traded on the New York Stock Exchange under the symbol GGP.

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Specialty Geotechnical Contractor Moretrench is nationally recognized as an industry leader in developing and implementing engineered solutions to the complex and challenging soils and groundwater issues that are often a part of underground construction. We are founded on a history of innovation that dates back almost 100 years, and are committed to fostering and promoting that same spirit of innovation in tomorrow’s young engineers.

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Our work begins at the intersection of community, creativity and client relationships. We are active members of the communities we serve; that’s why at Stantec, we always design with community in mind.

**WSP Parsons Brinckerhoff**

WSP Parsons Brinckerhoff, one of the world’s leading engineering and professional services consulting firms, has been in the forefront of transportation engineering for more than a century, beginning with the design of the original New York City subway (1891-1904).
ABOUT STEVENS

Stevens Institute of Technology, The Innovation University®, is a premier, private research university situated in Hoboken, N.J. overlooking the Manhattan skyline. Founded in 1870, technological innovation has been the hallmark and legacy of Stevens’ education and research programs for more than 140 years. Within the university’s three schools and one college, more than 6,800 undergraduate and graduate students collaborate with more than 380 faculty members in an interdisciplinary, student-centric, entrepreneurial environment to advance the frontiers of science and leverage technology to confront global challenges. Stevens is home to three national research centers of excellence, as well as joint research programs focused on critical industries such as healthcare, energy, finance, defense, maritime security, STEM education and coastal sustainability. Stevens is in the midst of a 10-year strategic plan, The Future. Ours to Create., designed to further extend the Stevens legacy to create a forward-looking and far-reaching institution with global impact.

OFFICE OF RESEARCH, INNOVATION AND ENTREPRENEURSHIP (ORIE)

The Offices of Research and Innovation and Entrepreneurship have been combined in recognition that the ability to take research to a product development and commercialization stage takes Stevens’ invention to another, higher level. The desire to drive toward this higher level of invention achievement is supported by common leadership for research and entrepreneurship under the Vice Provost of Research, Innovation and Entrepreneurship. The provision of experienced leadership and a deep understanding of the challenges and needs of the research community create an environment that encourages faculty and students to engage in all aspects of scholastic inquiry. It also led to the development of a Stevens incubator facility, the Stevens Venture Center. This center is designed as an enabler for students at all levels to succeed in the commercial development of their innovation and/or invention.

The ORIE has broad oversight over multiple research and innovation areas within the university. This includes the Office of Sponsored Programs, the Office of Innovation and Entrepreneurship, Stevens’ research centers, research collaboration with external research partners, intellectual property, facility security and export, participation on the Policy Task Force and close alignment with related functions, such as the Vice Provost of Academics, who is responsible for the graduate and undergraduate communities.

OFFICE OF SPONSORED PROGRAMS (OSP)

OSP provides support and assistance to faculty from conceptualization to finalization of research projects. Preaward operations focus on development by maintaining faculty profiles in PIVOT, a subscription service that identifies faculty interests with published funding opportunities. Preaward also works closely with faculty to build their proposals, including budget assistance, help with required forms and interfacing with sponsors. The Faculty Support Center (FSC) partners with faculty upon award receipt to ensure project management and also interfaces with both sponsors and other central business functions such as Finance, Purchasing and Human Resources on the principal investigator’s behalf to resolve any questions or issues that arise. OSP also provides contract review, compliance monitoring, export control expertise and houses the Facilities Security function. Any person employed at Stevens who possesses a security clearance, or obtains one while employed at Stevens, will find assistance in OSP for security-related matters.

OFFICE OF INNOVATION AND ENTREPRENEURSHIP (OIE)

The Office of Innovation and Entrepreneurship (OIE) facilitates entrepreneurship and technology commercialization programs and activities. It is a one-stop shop for faculty, researchers, students and alumni who want to start a company or need help with identifying market opportunities. OIE assists with business strategies, tailoring and field test solutions, source management teams and capital; bringing real-world corporate and entrepreneurial experiences back into the graduate curriculum. OIE has responsibility for managing the day-to-day operations of the Stevens Venture Center, and is dedicated to realizing and supporting research outcomes in the marketplace. It encourages ingenuity in research and promotes initiatives for change in education, infrastructure and administration.

For more information about the Stevens Innovation Expo, contact:
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Sandra.Furnbach@stevens.edu
The Stevens Alumni Association is formed to establish, maintain, and cultivate among its members a sentiment of regard for one another and of attachment to Stevens Institute of Technology, and to promote in every way the interests of the institute.

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