2009-10 SIE Capstone Projects

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Faculty Advisor: Reid Bailey

Sponsor: Kluge Vineyards
Type of Sponsor: Industry/Private
Expected Frequency of Direct External Client Interaction: Twice per month

Is this project a continuation of a prior capstone project? No

Intellectual Property:
• Will students be expected to sign a non-disclosure agreement with the sponsor? I don't anticipate so, but am not totally sure
• Will students on this project be expected to transfer their IP generated on this project to the sponsor (or otherwise not own it themselves)? I don't anticipate so, but am not totally sure

Project Description:
Viniculture, which refers to the science and study of grape growing for wine production, involves constant decision-making in a complex environment (numerous interactions between the vineyard, the surrounding ecosystem, the cultural techniques, the winery). Such decisions not only impact the economics of a vineyard but also the environment.

Viniculturalists at Kluge Estate (http://www.klugeestateonline.com/), located 20 minutes from UVA grounds, conscious of the economical and potential ecological costs, want a tool to quantify the impact of their activity. In general, they are looking for rational goals to pursue in order to reach the standard of sustainability. This concept preexists for the wine industry in other areas of the world but needs to be defined with accuracy in the specific region of Virginia.

In other words, Kluge Estate would like, through the same tool, to be able to assess the state of their activity, refer to a sustainable standard and assist their decision-making. Moreover, by helping to understand the different factors and trade-offs associated with different options available, Kluge Estate wishes to provide an easy-to-use solution to help the Virginia wine industry to reach sustainability.

There are two main phases envisioned for this project.

First, the capstone team needs to complete an inventory of input needs and environmental impact of Kluge Estate. The initial focus will be towards material, energy and labor use. It will be completed by an inventory of the impacts generated by the vineyard/winery activity (carbon footprint, pollutions, social environment).

The second phase of the project involves creating the audit and decision support tool. Kluge is particularly interested in understanding the trade-offs associated with selecting a parcel of land for planting new grape vines. For instance, the output of the tool could look something like "if Parcel A is picked vs. Parcel B, you can expect X amount of increased fuel usage, Y amount less pesticides to be used, Z amount of increased grape yield. Net, Parcel A will lead to an increase in $W of profit over the next twenty years." Eventually this tool should situate the activity in the sustainable referential previously defined.

Students on this team need to be excited about working on a project that requires them to take initiative, learn new things, and apply their systems skills to address a real world need. There will be a strong focus on applying your systems engineering skills to measure and affect environmental impact (see http://en.wikipedia.org/wiki/Life_cycle_assessment). Because a final built and tested decision support tool will likely be a software tool, students should be interested in applying programming skills (this could range from Microsoft Excel to a SQL database: the exact platform for the tool will be determined as part of the project).
Faculty Advisor: Reid Bailey and Mike Smith

Sponsor: SAIC
Client: Ft. Eustis
Type of Sponsor: Industry/Private
Expected Frequency of Direct External Client Interaction: Once per month

Is this project a continuation of a prior capstone project? No

Intellectual Property:
• Will students be expected to sign a non-disclosure agreement with the sponsor? I don't anticipate so, but am not totally sure
• Will students on this project be expected to transfer their IP generated on this project to the sponsor (or otherwise not own it themselves)? I don't anticipate so, but am not totally sure

Project Description:
Product synergy (also called industrial ecology) is a systems approach to reducing environmental impact. The fundamental concept is simple: divert "waste" flows from one organization to become input flows to other organizations. As the network of organizations involved grows, an "ecosystem" of material exchanges develops and net waste from the system is reduced. Despite its conceptual simplicity and numerous benefits, implementing product synergy is challenging: the focus of this project is to create and test a repeatable strategy for military bases to identify, evaluate, and implement product synergies.

Problem Statement: At great expense, the Army disposes of wastes, used materials, and other unwanted stuff every year. In 2006, DoD generated 1.6 million tons of solid waste and 0.9 million tons of construction and demolition debris. DoD spent $208 million to dispose of these materials in accordance with State and Federal requirements (Solid Waste and Recycling (SWAR) data). Conventional waste disposal in landfills consumes land, threatens groundwater resources, requires transportation (contributing to regional air pollution), and discards the inherent value of the original resource. The Army is interested in exploring the concept of "product synergy" as a means to divert valuable materials from its waste streams and to establish local partnerships to convert these materials into useful products. This concept benefits both the Army by reducing cost of disposing of waste material and the local economy by creating opportunities for the value-added activities associated with converting waste materials into useful products.

Target Installation: Initially, Fort Eustis, VA. If successful, effort would be expanded to include Naval Base Norfolk, Langley AFB, NASA Langley Research Center, and Newport News Naval Shipyard.

Frame of Reference: Eliminating waste is an iterative process, and DoD has been pursuing this goal for many years. **Product synergy is a cooperative effort to identify materials loops between military and private sector stakeholders.** Product synergy means finding uses for materials no longer able to meet their original purpose and creating loops where materials are re-manufactured/recycled into products the military and consumers will purchase. Traditionally, product synergy in industry means that slag from one plant’s steelmaking operations becomes a highly effective substitute for lime in a neighboring cement plant. Waste heat from another industrial process provides low cost hot water for neighboring homes and business. Spent caustic from petroleum refining becomes a valuable input to paper production. For the Army, the application is different. For example, product synergy at Fort Bragg
means transforming waste mattresses, generated at a rate of over 1,400/year and landfilled at a cost of $14,000/yr, into a raw material for a local mattress manufacturer. This local business re-wrapped and re-covered the mattresses and sold them back to Fort Bragg at $60/mattress, a 50% savings over the cost of a mattress made from virgin raw materials.

Product synergy takes perseverance and creativity to identify. It does not qualify as “low hanging fruit”. But the benefits, the synergies, regularly create win-win-win situations. The generators no longer incur the cost and loss associated with waste disposal. The manufacturers benefit from lower cost raw materials. The community benefits by the development of stronger relationships and economic ties. The environment benefits from lessened demands for landfill capacity and associated transportation impacts. In the best case, the installation will use the new product or material at reduced cost (see mattress example for Fort Bragg).

Establishing product synergy relationships would help to make Fort Eustis a more sustainable installation in numerous ways. By replacing disposal practices with re-use loops, fiscal and environmental impacts associated with disposal are minimized. By establishing partnerships with local firms to use and produce materials of interest, the local economy is strengthened and transportation impacts (fiscal and environmental) are minimized. Successful relationships can likely be extrapolated to the wider region, incorporating other military installations and commercial entities.

Technical Approach: We envision a four-phase approach to establishing product synergies between Fort Eustis and local businesses. First, the capstone team would assess its wastes to identify materials of potential value that are currently being disposed. Next, we would create and implement a strategy for Fort Eustis to reach out to potential partners in the community who might be interested in these materials. The garrison and the partners would then formalize the synergistic relationship through contracts. Finally, the front-end of the problem will be addressed by creating strategies for Fort Eustis to purchase products which promote or are conducive to closed-loop material flows.

Who should be interested in this project?: Product synergy (in general) and this project (in particular), should interest you if you want to apply your systems skills to reduce environmental impact. We need students who are eager to learn more about product synergy and who have strong problem formulation skills. You’ll be given a lot of freedom to shape the direction of this project and we need students who are looking for such a project (no sitting back and waiting for us to tell you how to “do” this project!).

In addition to Prof. Bailey (with experience in industrial ecology) and Prof. Smith (with 20 years of experience consulting with SAIC), Kevin Palmer from the Center for Sustainable Solutions will help guide this project (you may remember him from SYS 355—he talked about sustainability and gave out books). Mr. Palmer has worked for years with military installations to reduce their environmental impact.
2009-03 -- Learning Human Behavioral Profiles in a Cyber Environment

Faculty Advisor: Peter Beling

Sponsor: Air Force Research Laboratory
Type of Sponsor: Grant (e.g., NSF, NIH)
Expected Frequency of Direct External Client Interaction: Once per month

Is this project a continuation of a prior capstone project? No

Intellectual Property:
- Will students be expected to sign a non-disclosure agreement with the sponsor? No
- Will students on this project be expected to transfer their IP generated on this project to the sponsor (or otherwise not own it themselves)? No

Project Description:
It is evident that, on free response exams, the test taking strategies of students vary widely. Some students prefer to work the easier questions first, some prefer to tackle the harder questions first, while still others might exhibit much more complex behavior, such as reading through the exam twice, then making a start on each question, and then answering each question to completion in the order easiest to hardest. There are a number of scenarios outside education in which one would like to develop behavior profiles that describe the actions that a person might adopt in a sequential decision making task. Several of the more sophisticated first-person shooter computer games, for instance, include computer players with strategies and tactics that adapt to best counter the behavior that their human opponents exhibit. Another example is in the area of cyber security where, when contemplating potential responses to a cyber attack, it may be critical to know to whom (that is, which nation, group, or individual) the attack should be attributed. Behavior profiles are potentially important in attack attribution because it may be possible to deduce the identity of the attacker from the pattern of actions associated with the attack.

This project will focus on testing the hypothesis that it is possible to learn repeatable patterns of behavior by observing the actions that humans take in performing simple computer-based tasks. The technical approach will focus on techniques from the field of imitation learning, which is a subfield of machine learning in which the objective is to learn to mimic behavior. Imitation learning may be thought of as having two primary approaches, behavioral cloning and inverse learning. Behavioral cloning attempts to predict actions directly from an observed feature vector that describes the environment. In inverse learning, by contrast, the basis for learning is training examples in the form of trajectories through a state space defined in terms of an underlying sequential optimization problem. Inverse learning is particularly well suited to anticipating behavior in domains unseen during training.

This project will involve the design and implementation of computer-based experiments with human subjects.
Faculty Advisor: Randy Cogill

Sponsor: Matt Trowbridge, an assistant professor in the medical school, will serve as the client
Type of Sponsor: Grant (e.g., NSF, NIH)
Expected Frequency of Direct External Client Interaction: Once per month

Is this project a continuation of a prior capstone project? No

Intellectual Property:
- Will students be expected to sign a non-disclosure agreement with the sponsor? No
- Will students on this project be expected to transfer their IP generated on this project to the sponsor (or otherwise not own it themselves)? I don't anticipate so, but am not totally sure

Project Description:
Although Charlottesville is a small city, finding good bike routes is not easy. The safest routes typically involve travel along residential streets, and routes along residential streets are often indirect. Good routes are typically found by studying maps, experimentation, or word-of-mouth from other cyclists.

In this project you will develop a bike route planner, essentially a Google Maps or Mapquest for bikes, for the Charlottesville area. This will be a web-based system where users can input the addresses of their starting point and destination, and a good bike route between these points will be suggested. The suggested routes will favor lightly travelled residential streets and streets with bike lanes. The system will also incorporate feedback from users to improve the quality of the bike routes generated by the system.

To complete this project, you will need to develop and apply your knowledge of shortest path algorithms (SYS 321), linear statistical models (SYS 421), databases, and web design (SYS 202). The system will be developed on a platform involving Linux, the Apache web server, Matlab, PHP, the PostgreSQL database management system, and the Google Maps API. The primary source of data for this project will be the TIGER data sets produced by the US Census Bureau.
Implementing and Analyzing a Data Mart for the Arlington County Initiative to Manage Domestic Violence Offenders

Faculty Advisor: James Conklin

Sponsor: Arlington County Government
Type of Sponsor: Grant (e.g., NSF, NIH)
Expected Frequency of Direct External Client Interaction: Twice per month

Is this project a continuation of a prior capstone project? No

Intellectual Property:

- Will students be expected to sign a non-disclosure agreement with the sponsor? No
- Will students on this project be expected to transfer their IP generated on this project to the sponsor (or otherwise not own it themselves)? No

Project Description:
Arlington County, Virginia is working on a grant titled Partnering to End Abuse in the Community for Everyone (PEACE). Part of this effort involves implementing a Data-Mart to link data from law enforcement, courts, and other involved agencies. In the first phase of this project, students will work very closely with the Grant Team to define the problem, specify requirements, and implement a data mart to support the community. As the data from these agencies have never been linked before, there will also be an analysis phase to help identify applications for the data beyond what has already been established. In this analysis phase, students will have the opportunity to recommend new approaches to law enforcement and the tracking of violent offenders through the law enforcement and criminal justice systems. This effort has the potential to set a precedent nationally as an approach to tracking offenders through the criminal justice services of state and local jurisdictions.

Students interested in database systems, information technology systems, law enforcement, and community support will find this capstone interesting and rewarding. The Data Mart built in this effort will go into use immediately and serve as the foundation for future work in tracking and managing violent offenders. Students will be expected to do some development with support from the team advisor. Team members will have many opportunities to interact with the client and have numerous opportunities to make essential design decisions.
Faculty Advisor: James Conklin

Sponsor: Booz Allen Hamilton
Type of Sponsor: Industry/Private
Expected Frequency of Direct External Client Interaction: Once per month

Is this project a continuation of a prior capstone project? Yes

Intellectual Property:
- Will students be expected to sign a non-disclosure agreement with the sponsor? No
- Will students on this project be expected to transfer their IP generated on this project to the sponsor (or otherwise not own it themselves)? No

Project Description:
We are now in the age of transnational terrorism and crime, enabled and empowered through the fiber optic backbones submerged across the world's oceans in the 1990s. The Internet is one of the most powerful manifestations of this explosion of international connectedness. The Internet in its base form is a seemingly anonymous medium for communications, shopping, entertainment and other purposes. This is deceiving, as IP addresses can be tracked, cookies and malware can identify and locate you, and unencrypted emails can be read. The intelligence and law enforcement community relies upon these vulnerabilities to monitor targets of interest. This defensive bulwark against online anarchy is beginning to crumble.

Covert and anonymous communications and non-traditional banking mechanisms are beginning to proliferate and are being used by those criminal and terrorist groups who were previously held in check through these various counter-measures. Networked virtual environments (NVEs) such as Second Life now give individuals the ability to cloak themselves in anonymous personae and communicate, coordinate and even recruit through these virtual worlds. Additional systems are being created specifically to accommodate anonymous communications and money transfers. These systems are proliferating and becoming layered, linking and assisting the functionality of the each other, and facilitating the effectiveness of transnational criminals and terrorists.

Objective: Countering the threat posed by these anonymous communications and financial systems require understanding them first. Building on the survey of anonymous systems conducted by last years team and the team will examine techniques for monitoring and tracking anonymous communications through the TOR network and other anonymous communication systems. This project will expose students to cutting edge internet security research and some of the leading research efforts in this area. Students interested in communication systems, cybercrime, and internet security will find this an exciting project. Internet security and cybercrime are becoming a driving force in the design of virtually all networked systems. This experience will provide a good background for any student planning to work in the design of networked systems.
2009-07 -- Improvement of Cost Estimation Strategies for Maritime Systems and Sensors Undersea Systems

Faculty Advisor: James Conklin, Donald Brown

Sponsor: Lockheed Martin Maritime Systems & Sensors Undersea Systems
Type of Sponsor: Industry/Private
Expected Frequency of Direct External Client Interaction: Once per month

Is this project a continuation of a prior capstone project? No

Intellectual Property:
• Will students be expected to sign a non-disclosure agreement with the sponsor? Yes
• Will students on this project be expected to transfer their IP generated on this project to the sponsor (or otherwise not own it themselves)? No

Project Description:
Lockheed Martin is the largest defense contractor in the world and its Maritime Systems & Sensors Undersea Systems (USS) business unit performs nearly $1B in sales annually across a diverse portfolio of domestic as well as international anti-submarine warfare systems, integration, unmanned underwater vehicles, acoustic sensors, and rail management programs. The business process requires new projects to be estimated and proposed to prospective customers, after which the project must be successfully executed to hopefully result in a reasonable return of profit to the business and its shareholders.

The nature of cost estimates is that they are never perfect; however, a significant miss exposes the business to incurring a potentially large loss of profit or, conversely, could cause a missed opportunity to win in a competition. This project will focus on the engineering portion of estimates comprised of systems engineering, software, hardware, and integration/test components. Executive management would like to better understand the key characteristics which drive variability of estimates and how to "get it right" with a high degree of confidence. Students will learn how Lockheed Martin currently conducts cost estimates, research cost estimating strategies in the literature, analyze and model historical cost data, and ultimately generate recommendations to Lockheed Martin's senior management. As part of this effort students will also design and implement a project cost estimation tool based on these observations and recommendations. The observations and recommendations from this project will be directly applied to the business process.

Engineering cost estimation requires a spanning knowledge of technology, a company's capabilities, and systems engineering. Students on this project will work closely with experienced cost estimators from the Marine Systems and Sensors Undersea Systems business unit. The lessons learned on this project will be useful in almost any engineering career. Additionally, team members will have the opportunity to present their results to senior management within Lockheed Martin.
Faculty Advisor: Kenneth G. Crowther

Sponsor: UVa Emergency Preparedness / UVa Athletics / UVa Deans Office
Type of Sponsor: Other (please specify)
Expected Frequency of Direct External Client Interaction: Once per month

Is this project a continuation of a prior capstone project? No

Intellectual Property:
• Will students be expected to sign a non-disclosure agreement with the sponsor? No
• Will students on this project be expected to transfer their IP generated on this project to the sponsor (or otherwise not own it themselves)? No

Project Description:
Outdoor stadiums are vulnerable to a number of natural and human-based threats. Moreover the security and safety of stadiums requires the cooperation and coordination of a number of diverse teams, including: school and association athletics, stadium staff, police, medical, regional emergency, and weather. Since disastrous events happen rarely it is sometime difficult to understand whether the various response organizations have adequately prepared for such events.

This project works directly with the UVa Office of Emergency Preparedness and the UVa Athletics to implement a simulation model for understanding the evacuation of Scott Stadium. Students will have an opportunity to interact with various staff, attend and observe a real evacuation exercise, gather data at important Scott stadium events, and build and evaluate the effectiveness of various simulation models for understanding the evacuation and sheltering of stadium fans. The ultimate goal of this project is to help the UVa Office of Emergency Preparedness and Athletic Department understand what specific preparedness improvements can be made to reduce the risk of injury to those attending various stadium events that may require an evacuation.
Faculty Advisor: Kenneth G. Crowther, Yacov Y. Haimes

Sponsor: US Department of Transportation, Federal Aviation Administration
Type of Sponsor: Grant (e.g., NSF, NIH)
Expected Frequency of Direct External Client Interaction: Once per semester

Is this project a continuation of a prior capstone project? No

Intellectual Property:
- Will students be expected to sign a non-disclosure agreement with the sponsor? I don't anticipate so, but am not totally sure
- Will students on this project be expected to transfer their IP generated on this project to the sponsor (or otherwise not own it themselves)? No

Project Description:
Air transportation has been one of the most significant innovations during the last century, but it comes with risk. The greatest risk in flight is experienced while in the crowded air space around the airports and on runways. In fact, it is for this reason that preventing runway incursions and conflicts have been on the National Transportation Safety Board (NTSB)'s 'Most Wanted' list of desired safety improvements for over a decade! Evaluating the efficacy of safety solutions for mitigating runway incursions depends heavily on the ability to identify the risk factors that most significantly define the state of the system that impact the probability and consequences of incursions.

This project focuses on how regional aviation monitoring authorities select airports for the purpose of running Runway Safety Analysis Teams (RSATs). RSATs are collaborative and multidisciplinary teams of experts (e.g., air traffic controllers, pilots, aviation experts and officials, airport staff, airline staff) that discuss and evaluate the safety of the airports runway operations. After two-weeks of meetings, they produce a set of action items for airport safety improvement. This capstone team will help the FAA develop a risk-based methodology for selecting which of the airports should be the focus of an RSAT. It is expected that we will work with the FAA to understand the risk factors involved in runway incursions, from these risk factors we will develop a methodology for prioritization of airport RSAT formation, and we will deliver the methodology as an MS Excel tool that can be tested and improved by the FAA during the summer 2010 for setting up next year's RSATs.
Project Description:
Medical education is undergoing a revolution. The amount of knowledge young physicians and nurses in training must master is growing exponentially as are expectations for their performance, yet the amount of time they can devote to their studies is not. Knowledge that formerly was gained by interaction with patients must be taught more efficiently. To help clinicians acquire knowledge earlier, schools are turning to simulators that mimic the symptoms of disease, before students encounter a patient. Training in simulated environments can improve task performance and patient outcomes while reducing risks. Graded levels of task difficulty, immediate and post performance feedback to users, and a range of anatomically and disease accurate scenarios are all important considerations in addition to basic human-machine interaction issues. The current generation of simulators, however, often fails to consider these issues or the increasing demands of learners. One method of training involves using virtual reality and force feedback. Basically, a force-feedback device (e.g., SensAble OMNI) transfers mechanical forces to a user’s hands, representing the sensation of impact and vibration. The user views a 3D environment on a computer screen and may visualize the interaction he feels with his hands. In the context of medical simulation, forces represent contact interactions with organs and skin. Force feedback simulation has been used for removing shattered kidneys, suturing tissues, and making incisions for cardiology and neurosurgery procedures. At UVa, a basic framework is being established for simulating chest tube insertion, one procedure employed frequently and with great importance in emergency medicine. The goal of this project is to define, build, and evaluate training procedures and performance metrics so that a simulated environment can be employed to train all UVa medical and nursing students to high levels of proficiency. Systems analysis and development tasks to be performed include:
   a) refining the 3D human-machine interface and evaluating its usability
   b) defining operator performance metrics
   c) implementing a stochastic algorithm to characterize operator performance
   d) designing an experiment to be conducted with medical/nursing students and using statistical data analysis

The above are to be implemented in software for the force-feedback device (in C/C++, Matlab, and OpenGL). Throughout the project, the team will consult with the clients, selected professors and doctors, and medical and nursing students at UVa. There is an opportunity to present findings at a conference away from UVa.
2009-11 -- Supporting Food/Exercise Monitoring for Patients at the UVa Children's Fitness Center

Faculty Advisor: Stephanie Guerlain

Sponsor: UVa Children's Fitness Center
Type of Sponsor: Industry/Private
Expected Frequency of Direct External Client Interaction: Twice per month

Is this project a continuation of a prior capstone project? No

Intellectual Property:
• Will students be expected to sign a non-disclosure agreement with the sponsor? No
• Will students on this project be expected to transfer their IP generated on this project to the sponsor (or otherwise not own it themselves)? Yes

Project Description:
Despite growing national concern regarding obesity, it has remained difficult to improve weight control among children who are overweight (Thomas, 2006 & Colines, Warren, Neve, McCoy, Stokes, 2006). Over the past two decades, the prevalence of children who are obese has doubled, while the number of adolescents who are obese has tripled. According to the National Health and Nutrition Examination Survey (NHANES) 31.9% of children and adolescents were overweight (BMI at or above the 85th percentile) and 16.3% were obese (BMI at or above 95th percentile) in 2006 (Ogden, Carroll, Flegl, 2008). Without weight reduction efforts, recent data confirms that overweight children continue to worsen in their degree of being overweight over time, gaining BMI at a rate of 0.1 SD/year and moving farther from the normal curve (Rudolph, Greenwood, Cole, Levine, Sahota, Walker, 2004). In many areas – including Charlottesville – the prevalence of pediatric overweight is in the range of 45%; thus, in these regions it is almost more common to be overweight than normal weight.

The CFC at UVa was formed as the first multidisciplinary primary treatment program for overweight children in Virginia with the goal of improving weight control and reducing co-morbidities in a 6 month behavior modification program. The CFC serves a wide geographic area that includes rural and urban areas. Since its formation in 2003, the CFC has treated over 1500 overweight children and has been prospectively collecting clinical and laboratory data on each of its patients and compiling this into a database. The CFC program has yielded significant improvements in BMI z-scores (calculated as the number of standard deviations a child’s BMI is from the mean) of -0.1 S.D. in 6 months as compared to the expected rate of gain in BMI z-score of 0.1 S.D./yr among children without intervention.

There are five areas of concern that this capstone will address:
1) Two observations of daily living (ODLs) required for any obesity campaign must include: activity/exercise level and food intake. Conventional assessment relies on self-reporting which is unreliable because most patients
   a) guess the duration of exercise or portion size,
   b) forget to write something down,
   c) quickly tire of keeping the record, and
   d) lose the documentation.
2) Current self-reporting and use of paper diaries does not provide the CFC with a full picture of what is affecting patient progress, or lack thereof. The diaries capture self-reported intake and exercise but they do not capture the context, e.g., the mood or energy level of the patient at the time of the behavioral choice.
3) Other measures of activity may be better than self-reports, such as what can be recorded by an automated activity monitor.

4) Patients, their families and the CFC staff are not empowered to communicate beyond the brief bi-monthly or monthly visits thus potentially leaving the patients and their families feeling isolated in their efforts.

5) Children from rural areas are less likely to come in for follow-up visits and thus do not have the benefit of the entire behavior-modification program.

We propose to address these issues via additional data capture, analysis, and sharing of observations of daily living (ODLs), two-way sharing of data via personal health records, 24/7 email and phone access to care providers, and social networking capabilities amongst patients. This approach, though targeting overweight adolescents with co-morbidities, should be generalizable beyond this setting and patient population.

In particular, you will be expanding upon a text messaging diary system that has been prototyped to help collect food and mood diaries. You will also be evaluating alternative exercise “body sensors” that are available for capturing daily exercise levels. You will be involved in conducting focus groups with children and their caregivers for evaluating these alternative technologies, and for developing an integrated solution that enables children, their families, and practitioners at the CFC (nurses, dieticians and counselors) to share this personalized health information. You should join this capstone if you are comfortable working with technology, enjoy integrating software, and like working with people to solve a real social problem.
Faculty Advisor: James H. Lambert

Sponsor: Engineering Research and Development Center of the US Army Corps of Engineers (USACE); and USACE Alaska District
Type of Sponsor: Grant (e.g., NSF, NIH)
Expected Frequency of Direct External Client Interaction: Once per week or more

Is this project a continuation of a prior capstone project? No

Intellectual Property:
• Will students be expected to sign a non-disclosure agreement with the sponsor? No
• Will students on this project be expected to transfer their IP generated on this project to the sponsor (or otherwise not own it themselves)? They will be bound by the terms of the University's patent agreement that apply to this contract.

Project Description:
Climate change influences sea-level, ocean acidification, severity and frequency of extreme weather, the balance of ecosystems, and other phenomena of importance to natural and man-made systems. The impacts of climate change are more significant in particular regions of the US, including Alaska and the Gulf Coast. Coupled with changes in societal behaviors, the physical manifestations of climate change affect the performance of coastal protections, navigation systems, flood control, water supply, and other civil works. In partnerships with the US Army Corps of Engineers, we have developed a multicriteria decision analysis to identify the scenarios of climate change, society, and environment that are most critical to the performance of particular engineering and infrastructure systems. The capstone effort will develop, refine, and test methodology for coastal protection and dams of the continental US and Alaska. We will produce web, video, and other materials to disseminate the methodology. We will share the lessons learned to other agencies, installations, and facilities. We will interact and benefit from our coordination with the USACE Engineering Research and Development Center and Institute for Water Resources, the National Oceanic and Atmospheric Administration, the National Center for Atmospheric Research, the Environmental Protection Agency, the US Fish and Wildlife Service, the US Geological Survey, and others. The capstone students will expand their knowledge of policy analysis, risk and uncertainty analysis and social, financial and economic systems analysis for major civil works infrastructures and systems.

Further reading:
Faculty Advisor: G. Louis  
Working on a team with R. Dillingham - Medicine  N. Botchwey - Architecture & Envtl Planning  K. Firehock - Architecture & Environmental Planning  R. Swap - Environmental Science

Sponsor: Center for Water, Health, Environment, and Development  
Type of Sponsor: Grant (Smith Charitable Trust)  
Expected Frequency of Direct External Client Interaction: Twice per month

Is this project a continuation of a prior capstone project? Yes

Intellectual Property:
- Will students be expected to sign a non-disclosure agreement with the sponsor? No
- Will students on this project be expected to transfer their IP generated on this project to the sponsor (or otherwise not own it themselves)? No

Project Description:
There are 0.8 billion people worldwide that lack access to safe drinking water and 2.2 billion that lack access to basic sanitation. This situation contributes to elevated rates of mortality and morbidity among the affected populations, including the deaths of 1.8 million people annually (WHO, 2004) most of whom are children under 5 years of age. The situation is worst in Africa, Asia, and Latin America and the Caribbean. Asia has the largest number of people without access to water and sanitation services (WASAN), and Africa has the highest percentage of population lacking access. The Center for Water, Health, Environment, and Development (WHEAD) at the University of Virginia (UVA) and University of Venda (UNIVEN) is building a model in Limpopo province, South Africa, to sustain access to adequate levels of safe water and sanitation services, and improved human health outcomes in developing communities. The goals of the water and health in Limpopo (WHIL) project are; (i) to characterize any causal relationship that exists between access to WASAN services and the level of community health, and (ii) to use this information to craft appropriate interventions to sustain access to adequate WASAN services and associated improvements in community health in Limpopo. The WHIL project is being conducted in the villages of Tchibvumo and Tshapasha. The 2008 WHIL Capstone developed a project management plan for the project. The goals of the 2009 WHIL Capstone are:

1. to create and test an effective information management system for the project, and  
2. to establish a framework for evaluating different alternatives to sustain access to adequate WASAN services in Limpopo.

The first goal will be achieved by three objectives:
1. Evaluate the existing framework for data collection, storage, retrieval, mapping, and analysis with respect to efficiency, accuracy, security, and accessibility.  
2. Analyze the existing data collected for consistency with the project’s stated data collection goals (state of access to WASAN services, status of community health as indicated by incidence of diarrhea in children 0-24 months old).  
3. Use the results of the analysis to recommend changes to the project’s information management and mapping systems.

The second goal will be achieved by three objectives:
1. Characterize alternatives for acquiring sustained access to adequate WASAN services in Tchibvumo and Tshapasha.  
2. Develop the criteria to evaluate these alternatives.
3. Perform a tradeoff analysis to illuminate the short and long term benefits, risks, uncertainty, and strategic considerations associated with the alternatives.

The Capstone group will meet once each week with the project advisors at the University of Virginia, and submit a weekly project report to the project advisors. The UVA Capstone team will collaborate with an Univen Capstone team conducting related data collection, analysis, and mapping work, as well as research into relevant water policy. Students considering this project will be required to know GIS, basic statistics and databases. They should also be willing to work in Limpopo for 6 û 10 weeks in Summer 2010 on the WHIL project.
Recent national data show that nearly 21 million Americans have diabetes - a lifelong condition that affects people of every age, race, and nationality, and is the leading cause of kidney failure, blindness, and amputations not related to injury. Approximately 1.5 million of these people have Type 1 Diabetes Mellitus (T1DM), in which the immune system destroys the pancreatic beta cells, permanently suppressing insulin secretion. A typical T1DM patient will need 50,000 insulin shots over his/her lifetime, accompanied by testing of blood glucose levels several times a day. Blood glucose concentration (BG) is normally controlled by a hormonal network that includes the gut, liver, pancreas, and brain. T1DM disrupts this network, resulting in a hormonal imbalance that causes hyperglycemia (BG greater than 180 mg/dl), with severe long-term health consequences. The primary purpose of diabetes treatment is to minimize post meal hyperglycemia while avoiding hypoglycemia (BG less than 70 mg/dl) through accidental overcompensation with insulin.

Encouraged by the recent introduction of reliable continuous glucose monitoring devices, the diabetes technology community has embraced the challenge to develop effective closed-loop systems for regulating BG with conventional insulin pump technology. The challenge in designing control algorithms with these devices is delay. The total delay associated with diffusion between the blood stream and subcutaneous tissues for insulin infusion and BG measurement is often modeled as an unknown lag between 30 and 45 minutes, representing a significant barrier to stable rejection of disturbances like meals and exercise. Model-predictive algorithms have been proposed as a means to overcome this problem, where control actions are computed at regular update intervals based on model-driven predictions about the future evolution of the system, using all prior knowledge about future disturbances. While clinical evaluation of such techniques is underway, the current generation of algorithms relies on precise knowledge of meals ahead of time. Future use of this technology in the home must be able to accommodate uncertainty about meals.

This capstone project aims to develop models and algorithms for characterizing behavioral influences on the control of diabetes, focusing especially on random meal behavior. The goal is to inform the development of control algorithms that adapt gracefully to uncertainty about upcoming meals, being most aggressive when future disturbances are known with certainty and being correspondingly more circumspect when the disturbance process is highly variable. The project will involve studying prior work on behavioral characterization, seeking and/or developing sources of data for developing models, prototyping algorithms for parameter estimation, and possibly integrating with on-going control design efforts taking place at UVA.
2009-15 -- User Interface for a Handheld Video Surveillance System

Faculty Advisor: Jianping Wang (primary) and S. D. Patek (secondary)

Sponsor: Systems Technology Integration Lab
Type of Sponsor: SIE Research Laboratory
Expected Frequency of Direct External Client Interaction: Once per month

Is this project a continuation of a prior capstone project? Yes

Intellectual Property:
• Will students be expected to sign a non-disclosure agreement with the sponsor? No
• Will students on this project be expected to transfer their IP generated on this project to the sponsor (or otherwise not own it themselves)? I don't anticipate so, but am not totally sure

Project Description:
Wireless video surveillance networks are increasingly important in mission critical applications, providing guidance to soldiers in the battlefield or helping first responders in their daily work. The fact that these systems are "wireless" implies flexibility and ease-of-deployment. However, with these advantages comes the disadvantage of bandwidth constraints, restricting the frame rate and resolution of the transmitted video feeds and possibly adversely affecting mission effectiveness. Bandwidth allocation is of crucial importance when multiple users compete for network resources.

As a project of long-standing interest to the Wireless Internet Center for Advanced Technology (WICAT), prior SIE Capstone teams have made major contributions toward the development of bandwidth allocation schemes for wireless video surveillance. In 2007/08, Czarnecki, Kang, et al. successfully demonstrated a scheme for quantifying and updating user preferences, used in algorithms that reconcile the diverse interests of mobile users with limited resources. In 2008/09, Birisan, Chhabra, et al. developed a handheld client application for this system, giving users the ability to describe in real time what aspects of the video feed they find to be useful, frame rate versus image resolution, so that the system can automatically adapt the video stream to maximize user-utility. The 2008/09 Capstone team was able to conduct human user experiments to demonstrate that their system for "Dynamic Preference Specification" can lead to better mission outcomes compared to a similar scheme in which frame rate and image resolution preferences are held fixed.

The Capstone project this year will extend the user interface for the client application developed in 2008/09, with the objective of giving users the ability to specify the “absolute” utility of the video streams they are receiving. Whereas the existing video client allows users to specify frame rate versus resolution, the system is such that all users generally consume equal shares of bandwidth whenever there is surveillance imagery to be received. The enhanced client application will give individual users the ability to say “I need more bandwidth now,” whenever they perceive that this is important for achieving mission success (knowing that other receivers will get less).

Prototype implementation, live demonstrations of technology, and experimental validation will be a major part of the capstone group’s activities. While programming is not a central focus of the project, the work will involve some JAVA coding; a willingness to develop this skill is expected.
Facility Advisor: William T. Scherer

Sponsor: Hard Rock Hotel & Casino
Type of Sponsor: Industry/Private
Expected Frequency of Direct External Client Interaction: Once per week or more

Is this project a continuation of a prior capstone project? No

Intellectual Property:
• Will students be expected to sign a non-disclosure agreement with the sponsor? Yes
• Will students on this project be expected to transfer their IP generated on this project to the sponsor (or otherwise not own it themselves)? Yes

Project Description:
Overview: Hard Rock Hotel & Casino is a Las Vegas destination resort offering dining, spa, pool, entertainment and nightlife options for guests. Currently, a simplistic system is in place to market to guests differently based on booking channel. Question posed by management: can this system be improved by segmenting guests within and across channels, increasing the types of marketing that are performed, and providing line-personnel with information to allow them to up-sell different products and services to guests?

Background: Guests arrive at Hard Rock Hotel & Casino after booking through a variety of channels: Group Sales, OTA, Transient, and Casino (all other channels are outside scope). When a reservation is received, a variety data about guests is collected, with each channel receiving different depths of information. This data shapes the ways to market to each guest. Here is the information currently collected for each channel:
- Group Sales: varies, but often group known
- Transient: email and all demographic info
- OTA: name, date, CC#
- Comp: all info

NOTE: Changing the depth of information collection is outside the scope of this project, but if there are areas where it would be valuable to improve data collection, then recommendations are welcome. Given the information obtained about guests, there are numerous opportunities to ‘touch’ guests:
- confirmation emails
- pre-stay marketing emails
- pre-stay marketing text messages (not done yet, a little shady)
- check-in up-sells
- in-room voicemail
- in-room collateral
- mid-stay text
- mid-stay email

A limited number of tests and variations can be run given time and fiscal resources (and because you are dealing with an understaffed, overworked group of line-level employees in a fast-paced, stressful environment). Management believes a 5% lift in overall spend for some groups is possible.

The project team will receive data from the client contact and will have the ability to make reasonable changes whenever they propose an analysis-supported recommendation(s) for proposed changes in operations.

The skills and traits that will ensure a successful and rewarding experience from this project are:
The Impact Of The Locust Therapeutic Community On Recidivism: A Retrospective Study

Faculty Advisor: K. Preston White, Jr. Michael C. Smith

Sponsor: Thomas Jefferson Area Community Criminal Justice Board
Type of Sponsor: Other (please specify)
Expected Frequency of Direct External Client Interaction: Twice per month

Is this project a continuation of a prior capstone project? Yes

Intellectual Property:
- Will students be expected to sign a non-disclosure agreement with the sponsor? No
- Will students on this project be expected to transfer their IP generated on this project to the sponsor (or otherwise not own it themselves)? No

Project Description:
The Albemarle-Charlottesville Regional (ACRJ) Jail has initiated several programs designed to help reduce recidivism and to create a less-hostile confined environment with better-managed inmates. Currently, a study is being conducted on the Re-entry Program to measure effectiveness of this program on the issue of recidivism. A similar study needs to be conducted on the LOCUST Therapeutic Community Program, a behavioral-modification substance-abuse program that focuses on cognitive-behavioral and overall lifestyle changes.

Research Objectives
The objective of this research is to quantify the impact of the TC program on recidivism, based on available data. This determination will be used to assess the effectiveness of the ACRJ TC and to help identify areas that may need improvement to help the program become more effective.

Definitions
A therapeutic community (TC) is a participative, group-based approach to long-term mental illness, personality disorders, and drug addiction. The approach is based on milieu therapy principles and usually is residential, with the clients and therapists living together. It includes group psychotherapy as well as practical activities. TC’s are value-based drug-treatment programs that focus on total, multi-dimensional change.

The values of the LOCUST (Lives of Change Under Sober Terms) Therapeutic Community can be summed up as a “view of right living.” This view emphasizes truth and honesty, work ethic, learning to learn, personal accountability, economic self-reliance, responsible concern for peers, family responsibility, community involvement, and good citizenry. The basic goal of the LOCUST TC is to offer a lifestyle that includes drug abstinence, elimination of anti-social (criminal) behavior, development of employable skills, and the acquisition of positive attitudes values and behaviors that reflect honesty, responsibility, non-violence, and self-reliance.

Recidivism is the re-arrest and/or re-incarceration of an individual booked into a jail or another detainment facility. The effect of incarceration on former prisoners has been a very common topic of discussion for many years. In most cases, it is believed that many prisoners will find themselves right back where they started, in jail.

In the United States, sixty-eight percent of males and 58% of females are rearrested, and 53% and 39% respectively are re-incarcerated (2003). [Visher, Christy A. 2003. “Transitions From Prison To Community: Understanding Individual Pathways”. The Urban Institute, Justice Policy Center, District of Columbia Washington, 2003]. According to this same national study, within 3 years almost 7 out of 10 released
males will find themselves back in prison. The study says this happens due to personal and situation characteristics, including the individual’s social environment of peers, family, community, and state-level policies.

A retrospective study is a longitudinal study that looks back in time. For instance a researcher may look up the arrest records of previous years to look for a trend.

A longitudinal study involves repeated observations of the same items over long periods of time. It is a type of observational study often used in sociology to study life events throughout lifetimes. One objective is to determine the correlation of events to attributes of people. Unlike cross-sectional studies, longitudinal studies track the same people, and therefore the differences observed in those people are less likely to be the result of differences across study populations.

**Approach**

The proposed retrospective study will undertake a literature search to document what is known about recidivism and its relationship to drug addiction and therapies. Of particular interest will be studies of similar nature to that proposed, the results and conclusions of these studies, and the sources of data and statistical methodology employed.

The study also will seek, compile, and reduce data for ACRJ inmates since the reestablishment of the program in June 2000. Data will be required for both those participating in the TC and those not participating in the program, in order to provide comparisons between these two groups locally and similar groups nationally. For each group, we must also know those individuals reoffending and not reoffending.

One known statistical issue to be resolved is data censoring. Censoring occurs when the value of an observation is only partially known. Type I censoring occurs if an experiment has a set number of subjects and stops the experiment at a predetermined time, at which point any subjects remaining are right-censored. In the proposed study, data for those not reoffending are censored in this way. (We know only that surviving individuals have not reoffended to date, but not if or when they might reoffend in the future. For deceased individuals, we know only that they did not reoffend through the date of their deaths.) Censoring is well studied and not an obstacle to analysis.

We anticipate that one statistically approach to the analysis for each group will be stepwise logistic regression, to determine the significance of explanatory variables on whether or not an individual in either group had reoffended to date. Among the potential explanatory variables are:

-- Race -- Gender -- Age -- Marital status -- Jurisdiction -- Drug use -- TC enter/exit dates -- Phase up dates -- Education -- Employment -- Drug court involvement -- Criminal HX -- Addiction DX -- Number of previous incarcerations -- Other program participation -- Other variables that may affect outcomes

**Link between crime substance abuse and crime**

Since substance abuse and crime are closely linked, prison offers an ideal setting for providing treatment services to inmates whose lives have otherwise reached an impasse. Since 1977, the Stay'n Out model has enabled thousands of individuals to address those attitudes and behaviors which led them to prison in the first place, and to develop the life skills and self-confidence needed to eventually become responsible and tax-paying members of society. The Stay'n Out model has a proven 77% success rate based upon a five-year follow-up study conducted by National Development and Research Institutes, Inc. (Wexler, Lipton et al., 1992). The Stay'n Out model uses a modified version of the therapeutic community (TC) model pioneered in the nineteen-sixties. Participants live on separate units from the general prison population, and participate in group settings, individual counseling and special topic workshops. Each person is responsible for his or her own recovery, but also participates in the life of the whole community, taking on job functions and challenging her or his peers to fulfill their own potential. Participants move through three major phases as they grow in self-awareness and maturity. After completion, some will become cadres, assistants to program staff. Upon release from prison, many graduates will participate in programs like Serendipity to further facilitate their return to family and society. In the late 1960s within the US correctional system, the Asklepion Foundation initiated therapeutic communities in the Marion Federal Penitentiary and other institutions that included clinical intervention based upon Transactional Analysis, the Synanon Game, internal twelve-step programs and other therapeutic modalities. Some of these programs lasted into the mid 1980s, such as the House of Thought
in the Virginia Correctional system, and were able to demonstrate a reduction of 17% in recidivism in a matched-pair study of drug-abusing felons and sex offenders who participated in the program for one year or more. Modified therapeutic communities are currently used for substance abuse treatment in correctional facilities of several U.S. states including Pennsylvania,[1] Texas,[2] Delaware,[3] and New York.[4] In New York City, a program for men is located in the Arthur Kill Correctional Facility on Staten Island and the women’s program is part of the Bayview Correctional Facility in Manhattan.[2]

Brief History of Therapeutic Communities For Substance Abusers

Bill Wilson most frequently traces the treatment history of substance abusers back to the founding of Alcoholics Anonymous (AA) in 1935. During the Second World War, the use of group therapy arose from a need to provide treatment for a large number of people with a limited number of therapists. It was during this time that Dr. Maxwell Jones created the term “Therapeutic Community”.

In 1958, an AA member named Charles Dederich founded the Synanon Therapeutic Community, to address the needs of addicts for whom AA was not working. It began as a small group of addicts living together in a beach house in Santa Monica, California. The members of this community encountered one another’s behaviors in small groups and held seminars and symposiums. A newcomer slurring the words symposium and anonymous together resulted in the name “Synanon”.

Other therapeutic communities evolved from this experience, including Delancey Street Foundation and Daytop Lodge. Unfortunately, these early attempts at providing therapeutic community treatment met with limited success, primarily due to heavy reliance on charismatic leadership of an individual who was vulnerable to the misuse of power. The exclusion of outside ideas from this type of leadership resulted in a community with the characteristics of a cult that limited the growth potential of its members. Later attempts at therapeutic community treatment such as Daytop Village, corrected the mistakes of earlier communities, and began showing good results.

The Therapeutic Community at ACRJ was first established in 1993 as a result of the efforts of the Region Ten Community Services Board to incorporate jail-based substance abuse treatment with their Main Street Program. Due to various problems, it was dissolved in 1999. It was re-established in June, 2000, and directed by jail staff based at the institution rather than staff from outside the jail. This step corrected many of the problems experienced by the former therapeutic community. The program is designed to be consistent with Standards for the Operation of Therapeutic Communities within the Virginia Department of Corrections in order to facilitate networking with prison-based TCs, halfway house Phase V programs, and community-based peer support groups such as Winner’s Circle.

The Therapeutic Community Approach

Therapeutic community treatment has become an increasingly popular approach to treating inmates with substance abuse problems. Outcome studies of numerous prison-based therapeutic communities have demonstrated significant reductions in recidivism, and the resulting cost effectiveness is providing the impetus for nationwide implementation in correctional facilities.

The therapeutic community approach addresses drug and alcohol abuse/addiction as a disorder of the whole person, involving both the individual’s unique psychological status, and lifestyle. This includes the individual’s style of thinking, behavioral patterns, responses to emotions, general physical health, social interactions and fundamental values and goals. It is seen as a problem with the person, not the drug.

The kinds of problems typically addressed in the therapeutic community milieu include poor tolerance for frustration and discomfort; difficulty delaying gratification; low self-esteem; problems with authority; difficulty accepting and managing responsibility; poor impulse control; unrealistic view of self; difficulty coping with feelings; dishonesty with self and others; manipulation; guilt; resentments; reading and writing deficits, difficulty focusing attention and ineffective communication skills.

Recovery is viewed as a total change in lifestyle and image. It is a form of developmental learning that takes place within a social context of self-help and mutual self-help. It is not something that is “given” to the person in treatment, or something the person “gets”. It is a process, not an event. The therapeutic community can help initiate lifestyle and image change. Then it is up to the individual to use the tools he has learned to continue his recovery.

The principles of “Right Living” provide direction in all activities of the therapeutic community. These include truth and honesty in word and deed; living in the “here and now”; acceptance of personal responsibility for your destiny; living by a clear moral code; social responsibility (you are your brother’s
keeper); and the value of hard work and excellence. In this approach, the inner person is seen as basically “good”, however, the person’s behavior can be “bad”.

Behaviors are addressed in the therapeutic community in terms of what was done, and how it impacted others. Confrontation is utilized to raise awareness, not attack the person. It is the behaviors that are the focus of change. New members typically have difficulty with change. The structure and processes of the therapeutic community are designed to help them learn the importance of increasing their tolerance for change because change is the only certainty in life. Members gradually learn how to learn and value learning as a way of coping with life.

The therapeutic community is the only treatment approach to date that teaches good citizenship and community involvement. Good manners become an effective tool for self-management, and are the key to gaining the cooperation of others.

Eligibility
Substance-abusing inmates that come into the correctional system generally fall into one of four categories. The first category of substance abusing offenders is the criminogenic offender. These offenders have developed a lifestyle characterized by criminal thinking and criminal behaviors. The use of drugs or alcohol may be a part of their general pattern of behavior. A second category includes those inmates whose abuse or addiction to substances is a primary factor in their incarceration. A third category includes those inmates who use drugs recreationally or experimentally. The use of drugs or alcohol is not obviously a factor in the incarceration of these inmates. An inmate whose use is minimal, but who is primarily a dealer, would not fall in this category since dealing is a criminal behavior and clear evidence of involvement in the drug subculture, that indicates a pattern of criminal thinking to justify or excuse this behavior. A dealer would be classified as a criminogenic offender. The fourth category of offenders is the population dually diagnosed with severe mental illness (e.g. Schizophrenia, Bi-Polar Disorder, Dissociative Disorders, Major Depression etc.) requiring psychotropic medication monitored by a Psychiatrist and/or mental retardation and combined with substance abuse.

Eligibility
Inmates screened as appropriate for the program will fall into the first category: the substance-abusing or addicted offender. Clinical experience indicates that inmates with histories of sexual offenses are in need of specialized treatment in other programs. Criminogenic offenders may or may not be appropriate for a substance abuse therapeutic community, depending of their level of desire to give up the criminal lifestyle. Criminogenic risk factors include antisocial behavior, associations, criminal history, and personality.

What Does The LOCUST Therapeutic Community Do?
The primary objective of the LOCUST Therapeutic Community is to foster personal growth and change. LOCUST utilizes four categories of activity to promote comprehensive change in the individuals who enter treatment: behavior management; emotional/psychological; intellectual and spiritual; and vocational/survival skills. The healing force that accomplishes this change is the community, acting in a highly organized and structured fashion and imposing activities and responsibilities on the individual.

The LOCUST TC utilizes a combination of counseling, group therapy and peer pressure to rehabilitate hardcore substance abusing offenders and assist them to redirect their lives toward positive goals. The program provides a family environment in which honesty, trust, and self-help are stressed. At the same time, strict discipline and adherence to rules set a no-nonsense tone and make clear the seriousness of the work at hand.

From day one, members are expected to take responsibility for themselves in terms of personal cleanliness, tidiness and appropriateness of behavior. In addition, they are assigned to jobs within the communal structure (e.g., expeditor, education, maintenance, motivation) as part of the daily regimen. Members are given progressively more responsibility as they demonstrate consistent positive behavior.

The LOCUST Therapeutic Community works closely with Region Ten Community Services Board, Offender Aid and Restoration, and Community Corrections to provide comprehensive drug treatment and support services upon release.
2009-18 -- US-Brazil Capstone

Faculty Advisor: Stephanie Guerlain

Sponsor: US Dept of Education - Fund for the Improvement of Postsecondary Education
Type of Sponsor: Grant (e.g., NSF, NIH)
Expected Frequency of Direct External Client Interaction: The client is in Brazil. We will telecon w/ them @ 1/month

Is this project a continuation of a prior capstone project? Yes

Intellectual Property:
• Will students be expected to sign a non-disclosure agreement with the sponsor? No
• Will students on this project be expected to transfer their IP generated on this project to the sponsor (or otherwise not own it themselves)? I don't anticipate so, but am not totally sure

Project Description:
This is a multi-year capstone project, beginning in the 2nd semester of the third year, where students prepare for study abroad in Brazil, by taking Portuguese, and studying human factors in an industrial context. The fall semester of the fourth year is spent in Brazil, taking courses and meeting w/ the client on a weekly basis, along with a faculty advisor in Brazil and Brazilian student team members.

This is a project that started last year, students have already applied for this project and are currently in Brazil. No additional students will be added to this team (i.e., you can’t vote on it).