UBSD: University at Buffalo Solar Decathlon Incubation Project
Funded through SUNY RF Small Grant Sustainability Fund
Summary Report
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Project Summary:
This funding supported work toward an entry for the Department of Energy’s 2015 Solar Decathlon (SD) Competition. The work consisted of two significant efforts: a student design ideas competition during the spring 2013 term, and support for student internships in summer 2013 to develop work for a formal proposal to the Department of Energy in fall 2013. Each of these two efforts are discussed briefly below, as are the next steps of this project which have been facilitated through this funding.

Design Ideas Competition:
This portion of the project was also supported by the UB Department of Architecture, and was run through the department’s curriculum as a course, numbered ARC 404 and 599, entitled “Net Zero Buffalo”. The course was open to both second semester seniors and graduate students in the architecture program. 19 students enrolled in the course, exceeding the typical enrollment of 12 students in courses like this one.

This course was organized to create concept proposals for 600-1000sf net zero (or energy positive) house in Buffalo which relies exclusively on solar energy, and sought opportunities to create relevancy and significance specific to the city of Buffalo. The design challenge was not only to address energy consumption and production broadly within the US residential sector, but to situate a response in the unique place of Buffalo NY, thereby also addressing local issues of sustainability, energy, and dwelling. These challenges had to be satisfied within the constraints of the Solar Decathlon rules.

In the first segment of the course, students researched and analyzed the context of the city of Buffalo, and developed a library of architectural responses to these conditions. In the second segment, students researched and analyzed all 40 entries to the Solar Decathlon in the last two competitions. The products of these research projects was a printed encyclopedia of information which was shared with the class as well as the summer interns and subsequent studio students involved in the project.

In the third and final segment of the course, students in teams of two or three developed design proposals satisfying the given requirements. Final proposals were assessed by a 2-stage jury of invited critics from inside and outside UB. Critics for the final reviews included:

- Robert Shibley, School of Architecture and Planning Dean
- Omar Khan, Department of Architecture Chair
- Ryan McPherson, UB Chief Sustainability Officer
- Nick Rajkovich, University of Michigan
- Martin Casstevens, UB STOR
- Brad Wales, UB Architecture
- Ken MacKay, UB Architecture
- Annette LeCuyer, UB Architecture
- Nerea Feliz, UB Architecture
- Joyce Hwang, UB Architecture
- Ed Steinfels, UB Architecture
- Harry Warren, UB Architecture

The jury was given liberty of judgment to select the project(s) to move forward and be developed into a detailed project design. The seminar presented nine projects. Rather than selecting a single project, aspects of three were selected by the jury to be combined and developed further in the summer and through future design studios. The selected projects were:
Reflect House by Steve Parks and Ramses Gonzales  
Passive House | Active Landscape by Emily Warren and Vincent Ribeiro  
Solarium by Leah Kiblon and Maman Hammisou

The core concepts driving these three projects were:

- Deployment of photovoltaic panels through novel formal organization, giving rise to a new aesthetic for solar design as well as new engineering challenges to resolve in design development.
- Engagement of the site surrounding the house to generate positive ecological impact beyond energy production, in the form of greywater treatment and food production.
- Creation of a passively tempered, ambiguously programmed space which allows not only for constantly shifting domestic organizations, but also requires a unique approach to integration with HVAC systems and controls.
- Use of local materials, both through salvage of materials from existing Buffalo housing stock and through use of regionally fabricated building products.

The concepts will form the backbone of the work to be undertaken by the UB SD team. Each of these concepts suggests not only a series of subsequent design studies, but also a series of technical or engineering challenges in order to implement. Thus the development of these key concepts sets the stage for two years of interdisciplinary collaboration in order to compete in the Decathlon successfully.

Summer Student Internships:
These six internship positions built on the work from the competition course, and developed the initial structure for the Solar Decathlon 2015 project. This included consolidation of the three selected design projects into a coherent concept, refinement and articulation of design and technical aspirations of the project, development of mechanisms for funding the project, research into logistics for construction and transportation, creation of an overall organization and timeline, and development of plans for student recruitment, curriculum integration, and a communication. This summer work culminated in the production of a draft proposal to the DOE for UB’s participation in the 2015 Solar Decathlon, due in Fall 2013.

If this proposal to the DOE is successful, the internship group will form the nucleus of a team for the design, construction and competition.

From a pool of 37 applicants, six UB student interns were selected, each with a stipend of $1250. The interns were:
- Peter Byrley (Environmental Engineering): Technical Innovations Intern
- Chris D’Ambrosia (Architecture): Communications Intern
- Jacob Jordan (Urban Planning): Organization and Project Timeline Intern
- Nick Karl (Architecture): Concept/Design Intern
- Alanna Olear (Environmental Engineering): Fundraising Intern
- Chris Osterhoudt (Architecture): Curricular Integration Intern

The interns worked 20 hours a week from early July through mid August. Space, computing resources, and server space were provided by the UB Department of Architecture.

Key developments of the summer include:
Consolidation of key ideas into preliminary concept diagrams to explain both architectural and technological ideas
Development of a preliminary project budget
Creation of fundraising strategy and leads database
Creation of organizational diagram and project timeline
Development of curricular integration approach
Agreement from over 20 faculty members from multiple disciplines from UB and SUNY ESF to guide the curricular and extracurricular sides of the project.
These important developments then culminated in a draft of the proposal to be submitted to the DOE this fall. It is worth noting that the original proposal to the SUNY RF included a timeline for the DOE proposal submission that has shifted due to the Congressional delay in securing funding for FY 2014. The SD RFP was supposed to be issued in July, this was pushed back to August, and has as of this writing not yet been issued. Release is anticipated in October, pending Congressional activities, with its due date still anticipated to be November 4 with notification in January. However, it is worth acknowledging that these dates may shift.

**Next steps:**

**DOE proposal**
The draft proposal to DOE has been developed further by UB faculty and student volunteers since the conclusion of these funded internships. This proposal will be vetted through UB faculty and administration before submission to the DOE. If accepted, the UB SD team will receive $100,000 toward project expenses.

**Curriculum**
In fall of 2013 an Architecture Department studio course, taught by Clinical Assistant Professor Brad Wales, is directly following up on the work of this summer to develop the key concepts into a more developed design. The work as of the midterm from this studio will be included in the project proposal to DOE. Further, a curricular plan is in place in the department of Architecture for next two years, contingent on acceptance in the competition.

**Extracurricular**
Several of the summer interns have organized informational meetings and lectures to recruit additional students to work on the project in subsequent semesters, should the DOE proposal be successful.

**Summary:**
The efforts in spring and summer of 2013 achieved the goal of providing the foundation for the two-year effort of the Solar Decathlon. Work on this project continues to recruit team members, solidify development commitments, confirm logistical arrangements, and exploit the research and teaching opportunities that this project presents.