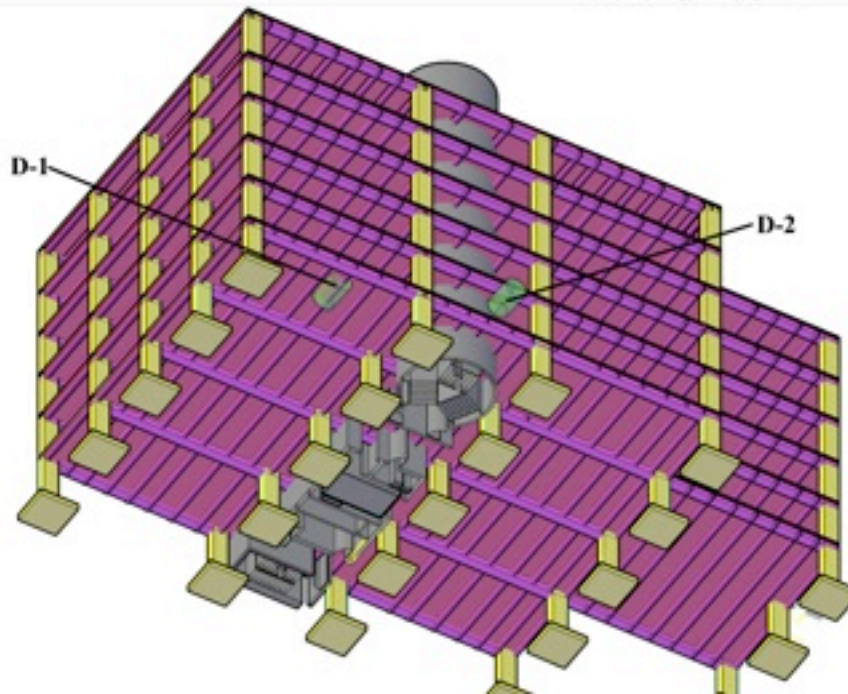
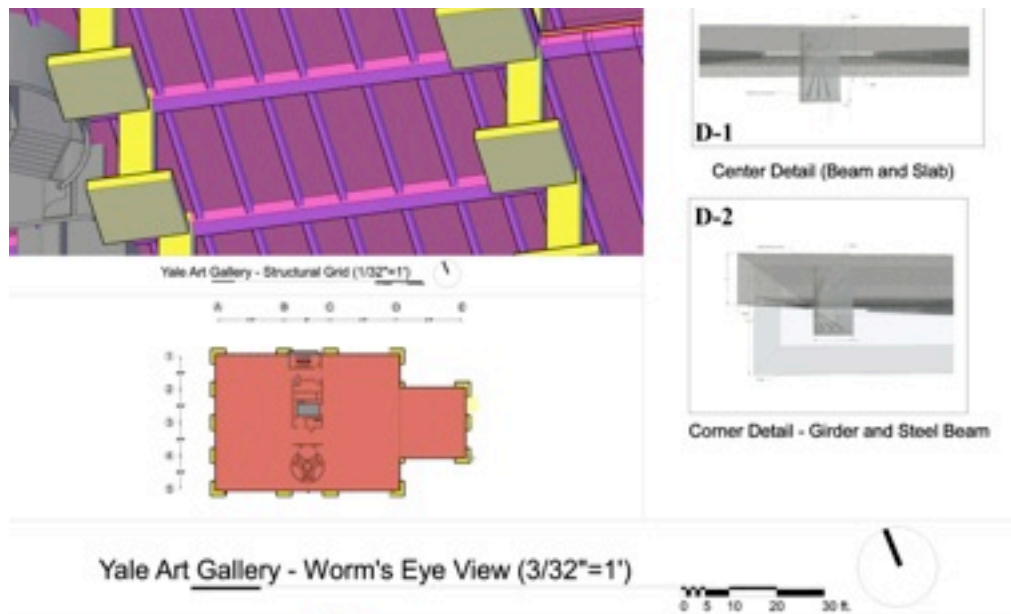


FALL 2013



REPORT: PERKINS PROJECT  
GEOGRAPHIC INFORMATION SYSTEM TECHNOLOGY (GIS)  
IN ARCHITECTURAL TECHNOLOGY

Perkins Project Report

## Summary:

This project has been guiding the course content of our first year Building Technology courses starting in the fall semester, 2011.

### *Students Served:*

The courses and number of students served by the project are as follows:

2012 Fall:      ARCH 1130 Sections: 8  
                    Approx. Total Students Served: 160

                    ARCH 1230 Sections: 5  
                    Approx. Total Students Served: 100

2013 Spring:    ARCH 1130 Sections: 4  
                    Approx. Total Students Served: 80

                    ARCH 1230 Sections: 6  
                    Approx. Total Students Served: 110

### *Protocol:*

The essence of the project is the application of a protocol for the investigation of existing buildings. The protocol can be summarized as follows:

1. Document the Case Study Building's Geographic Context (using GIS software)
2. Conduct Site Visits to Collect Data on the Case Study Building
3. Represent Data in Two-Dimensional and Three-Dimensional Models of Case Study Building
4. Coordinate Drawings to Reflect Three Dimensional Understanding of Case Study Building
5. Develop Three Dimensional Details Analyzing Building Tectonics of Case Study Building
6. Prepare Data and Models for Integration and Storage in GIS format.

*Evaluation:*

Comparison of case study accuracy results students using GIS protocol:

Students will achieve 20% better accuracy following protocol on final case study compared to first case study conducted.

Rubric Applied:

GIS in Arch Technology EVALUATION RUBRIC 8/26/13

Course: Student(s):	Case Study #1	Case Study #2	% Improvement
Evaluation Categories from Protocol			
Document Case Study Building's Geographic Context			points description
Accuracy of Data Collection on the Case Study Building			10 exceptional
Represent Data in 2-D and 3-D Views of Case Study Building			9 very good/ exceeds expectations
Coordination of Drawings			8 good
Develop Three Dimensional Details Analyzing Building Technics of Case Study Building			7 some understanding shown, but needs work
Prepare Data and Models for Integration and Storage in GIS Format			6 or less below expectations
<b>total score:</b>			

\* Some projects are assigned to teams of students

**ARCH 1130 CASE**

<b>STUDIES:</b>	<i>CASE STUDY #1</i>	<i>CASE STUDY #2</i>
Fall 2012	Voorhees Entry Hall	Leffert's House, Prospect Park, Brooklyn
Spring 2013	Library, Brooklyn Historic Society	Leffert's House, Prospect Park, Brooklyn

**ARCH 1230 CASE STUDIES:**

Fall 2012	Yale Art Gallery, New Haven, CT	Ford Foundation, New York, NY
Spring 2013	Yale Art Gallery, New Haven, CT	Ford Foundation, New York, NY

### *Evaluation Results:*

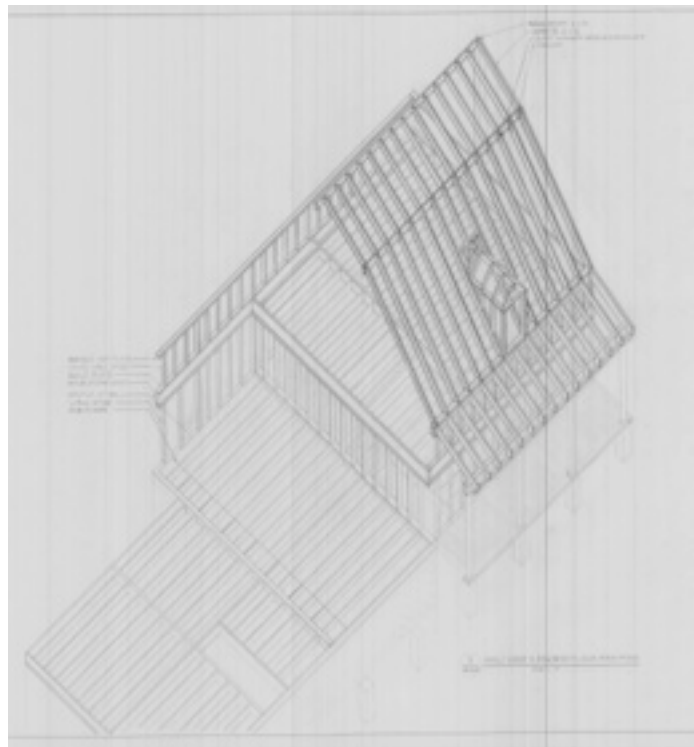
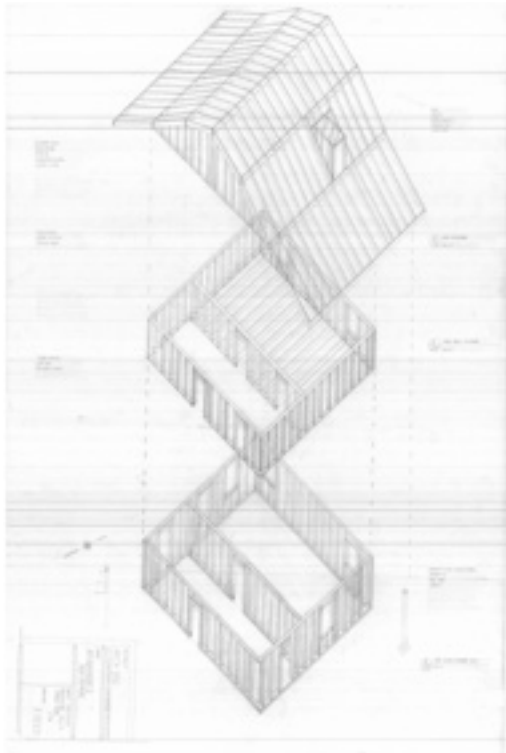
#### ARCH 1130:

Applying the rubric to a sample of student work that earned a range of grades for the course showed the students improved their application of the protocol to the case studies by **20.4%** over the course of the semester.

#### ARCH 1230:

Applying the rubric to a sample of student work that earned a range of grades for the course showed the students improved their application of the protocol to the case studies by **19.43%** over the course of the semester.

\*Evaluation based on applied rubric to a representative sample (high, low, and median grades) of student work. See evaluation samples for illustration of student improvement.



*Examples of Student Case Study Work*

The ARCH 1130 students projects focused on steps 2, 3, 4, and 5 of the protocol.

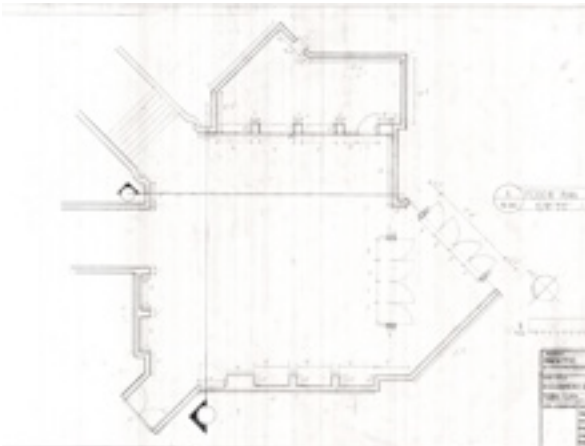
Voorhees Entry Hall:



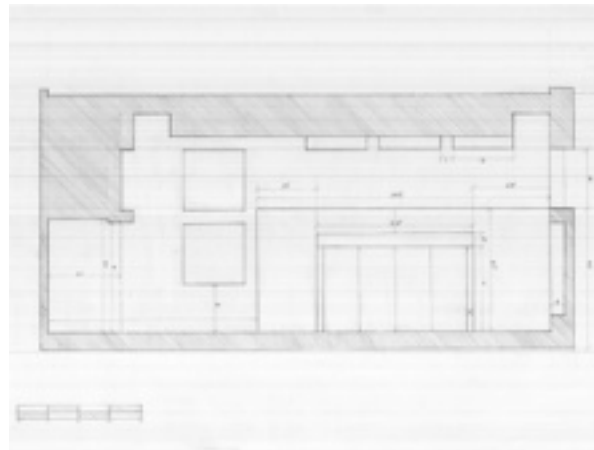
Three Dimensional Study of Space



Three Dimensional Study of Space



Plan Study

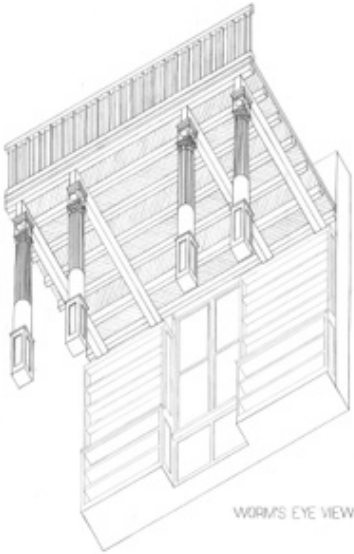


Section Study

*Examples of Student Case Study Work*

The ARCH 1130 students projects focused on steps 2, 3, 4, and 5 of the protocol.

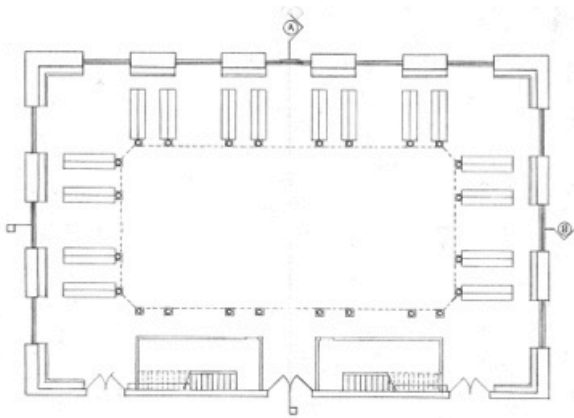
Brooklyn Historic Society:



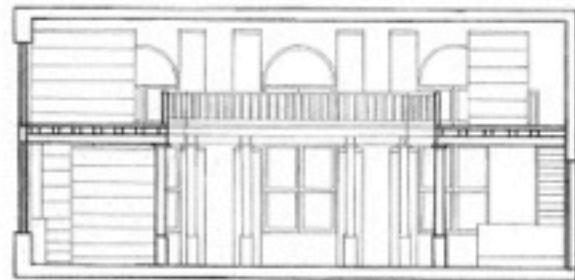
Three Dimensional Study of Module



Three Dimensional Study of Space



Plan Study



Section Study

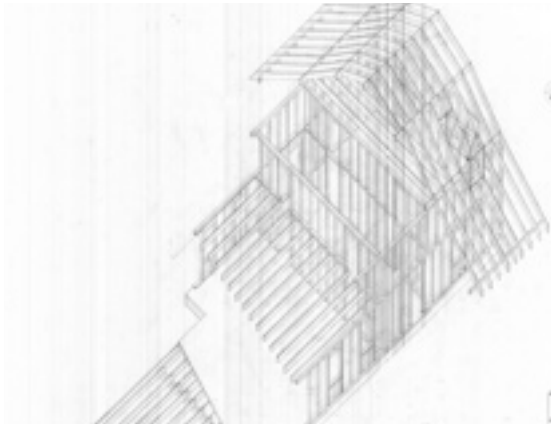
*Examples of Student Case Study Work*

The ARCH 1130 students projects focused on steps 2, 3, 4, and 5 of the protocol.

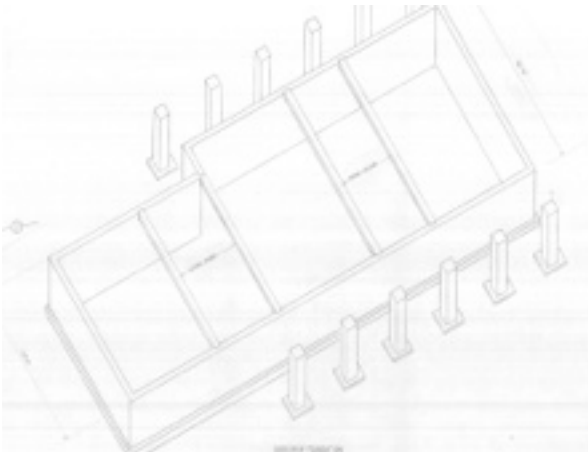
Leffert's House:



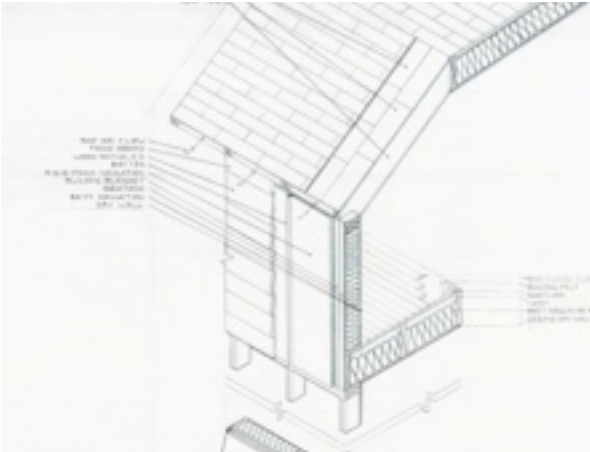
Students on Site collecting Data



Three Dimensional Study of Framing



Three Dimensional Study of Foundation



Three Dimensional Study of Exterior Wall

*Examples of Student Case Study Work*

The ARCH 1230 students projects focused on steps 1, 2, 3, 4, and 5 of the protocol.

Yale Art Gallery:



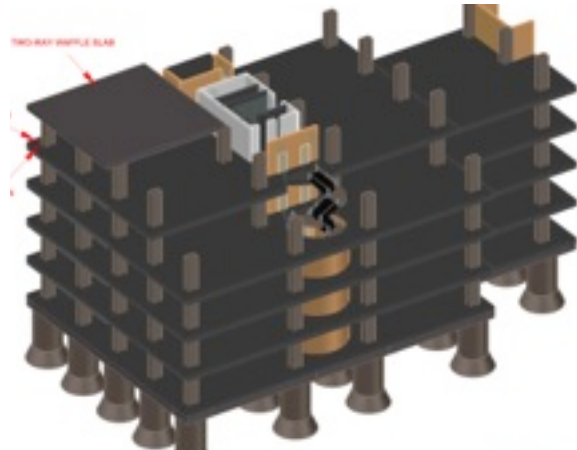
Students on Site collecting Data



On Site Sketching



Documenting the Geographic Context



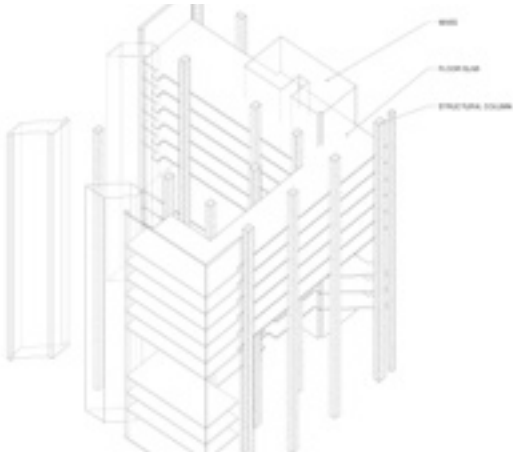
Three Dimensional Study of Building Structure



*Examples of Student Case Study Work*

The ARCH 1230 students projects focused on steps 2, 3, 4, and 5 of the protocol.

Ford Foundation:



Three Dimensional Study of Structure



Plan Study

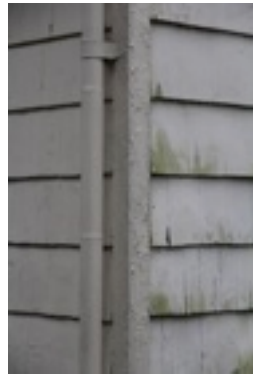
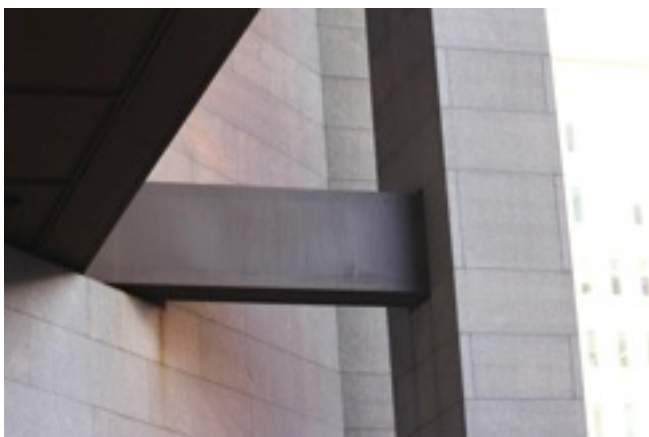
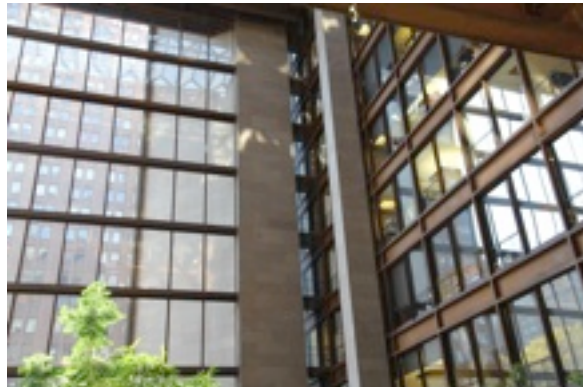


Three Dimensional Study of Building Details

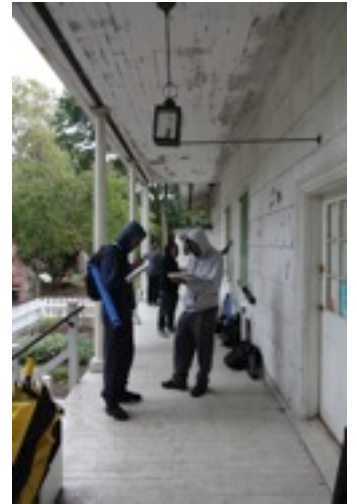


Section Study

Examples of Student Photography at Case Study Building Sites:



Examples of Student Data Collection at Case Study Building Sites:



Jason Montgomery, AIA LEED AP Assistant Professor

Perkins Project Report

## Background:

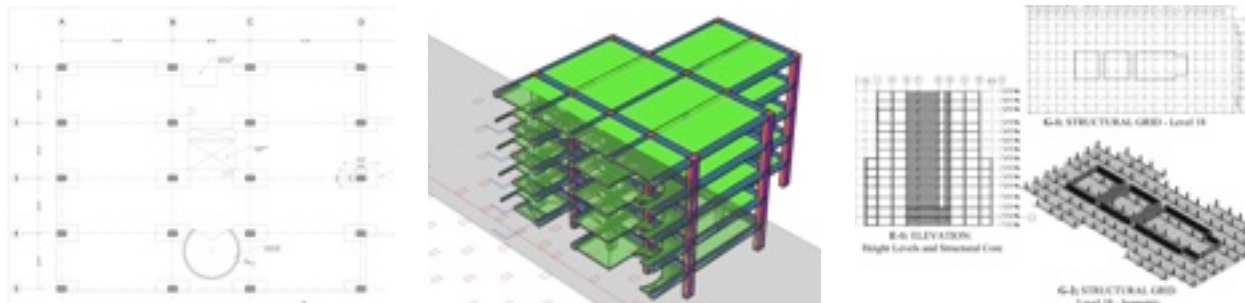
### **Project Proposal (from Postsecondary Grant Information Major Effort Format Fiscal Year 2011-2012)**

#### *Need for Project:*

The combination of the current job climate and economic volatility as well as the major impact new technologies are having on the architectural field results in the need to offer our students an expanding range of skill sets and training in emerging technologies and fields. Geographic Information System (GIS) hardware and software are the tools that are changing the way information about the natural and built environments is recorded, archived, managed, and made useful for research and analysis. These tools can be particularly useful for documenting and analyzing existing structures. Whether documenting existing conditions for construction projects, or archiving information for the use of historic preservation, GIS based data is emerging as a type of library of the future. As a growing field that crosses many disciplines, training in GIS data collection, documentation, and analysis offers our students both an enhancement of their architectural skills as well as a new career path alternative. GIS spatial data can be embedded with intelligence that make it a required tool of architects, landscape architects, urban designers and planners. The ability to successfully integrate large data sets in the design process has become significantly more important for young architects.

#### *Major Effort Objectives:*

This proposal seeks to integrate GIS technology into both a learning community that joins our ARCH 1100 Architectural Drawing I and ARCH 1140 Materials in Architecture. ARCH 1100 and ARCH 1140 teaches students the techniques for documenting buildings, understanding the materials of structures and their properties, and how these materials are assembled. This learning community will be a model for our new proposed Building Technology I and II courses and the project will build a structure to support further departmental use of GIS. Learning Communities for both fall 2011 and spring 2012 will serve ~50 students. Three sections each of ARCH 1100 and ARCH 1140 will have approximately 150 students total for both semesters.



Samples of Student Work\_Arch 1230 Spring 2012, Fall 2012

### *Activities to Achieve Objectives:*

Activities will include creating and providing case studies on local NYC structures to train students in use of GIS equipment and software; students will collect and analyze data such as topography, building massing, elevations, and material types from sites. This data will be the basis of generating three-dimensional models of the sites and structures of the case studies. The three-dimensional models will be embedded with linked information relating the construction techniques and assemblies of the materials and will serve as a basis for further drawing and analysis of the sites. Cameras will be linked to devices in field and students will use to obtain detailed photography documentation of materials, assemblies, façade and environment around site. A consultant will be brought in to establish the protocol for the GIS data collection and storage as well as the focus of the analysis and the output format. He will set up the case study sites, the protocol for the data collection, prepare examples of the format of the output and introduce the process and guide the students through the first case study. A research assistant to help get the hardware and software coordinated, loaded tested and calibrated and support to the students with case studies.

### *Major Effort Evaluation:*

Comparison of case study accuracy results students using GIS protocol:

Students will achieve 20% better accuracy following protocol on final case study compared to first case study conducted