First Annual Northwestern International Architecture Symposium
Seven Northwestern civil engineering students in the architecture, engineering and design program were fortunate to attend an architecture workshop in Berlin, Germany under the direction of world-renowned architect Helmut Jahn. The Rise Group, Richard Halpern and the McCormick School of Engineering generously funded this trip. In addition, the group was awarded an ISEN grant to extend the experience in the form of sustainability tours in Berlin, and share the results in the form of an architecture symposium comparing German and US sustainability techniques. The trip, tours and symposium were a great success, and will hopefully be carried out next year in a new location. The case studies below detail the highlights of the ISEN funded sustainability tours in the greater Berlin area:

**Case Studies**

**Solon SE Headquarters**

Solon SE is one of Europe's leading manufacturers of solar panels and solar power plants. The company's headquarters, completed in 2008, exemplifies their professional commitment to sustainable, intelligent energy solutions. By incorporating Solon's own technology, as well as innovative heating and cooling strategies, the HQ uses only a quarter of the energy of a comparably-sized office facility. The building was named Best Office 2010 by Orgatec in Cologne, not only for it's energy-saving innovations, but also for the attention to aesthetics and livability intrinsic in the design. The interior design is sleek, spacious and flexible; Solon wanted an office space that encouraged creativity, collaboration and lateral thinking. A sloping green roof cuts down on the facility's stormwater runoff, and is a visual aesthetic gesture towards the company's ecological mindset. Employees are encouraged to be accountable for their energy usage through personal lighting, heating and ventilation controls in each office. The building, like the company itself, attempts to address sustainability through every available means, whether they be high-tech or natural. The headquarters of Solon SE is a built expression of the company’s philosophy, design approach, and product; in this way, it can be a powerful example for future buildings in the United States.

**Physics Institute of Berlin**

The Physics Institute of Berlin, part of Humboldt University, was designed as an architectural competition in 1997. In 2003, the building was open to house the Physics Department of the school. It was built under the Berlin Programme for Urban Ecological Model Projects, funded by Berlin Senate for Urban Development. Architecturally interesting, the building boasts interior courtyards and an aesthetically interesting facade with steel columns running vertically at
random angles to facilitate vertical growth of plants. The building was constructed as an experiment of sorts with certain innovative sustainable aspects. With the green facades, courtyard gravel, and rainwater management system being routinely monitored, scientists can figure out the best ways to make this building environmentally conscious. Several different types of vertically growing plants are used around the nine facades of the building to see which ones are better at absorbing the heat in the summer months. Acting as solar shades, the plants lower the temperature on the inside of the building, which cuts the need, and cost, of air conditioning. Three interior courtyards are covered with gravel used for drainage into cisterns underground. Patches of a variety of types of gravel are used and tested for effectiveness of drainage. The cisterns under the courtyards are decentralised and water is reused throughout the building. This eliminates the need for waste water lines completely. Walking around the building in September, a warm month, we noticed a hot interior. The climbing plants had not done their proposed job of shading the glass-covered building very well. While in theory, the building contains an extremely sustainable design, it’s important to note that it is an on-going experiment. It’s also interesting to see how the architecture of the building aided in the sustainable development from the start of the project.

Heinrich Boll Foundation

The Heinrich Boll Foundation building demonstrates innovative use of heating and cooling systems resulting in an incredibly low energy consumption of 55.7 kWh / m². The German requirement is 130 kWh / m². This 57% reduction is then supplemented by photovoltaic panels on the roof, which further reduces the energy needed from the central grid. Adiabatic cooling is used to cool the building in the summer and the building’s computer servers are used to help heat the building in the winter. The central atrium is coupled with heat exchangers so that no heat is lost by exhaust air. The contractor hired to build the project was retained for 15 years in order to ensure that the building is operating according to design specifications. Proper calibration of the innovative systems is essential to ensure comfort for the workers in the building.

Block 6 Apartment Complex
The Block 6 Apartment complex in Kreuzberg was a government funded research project which became a "technical monument" and was years ahead of its time in terms of sustainable ecology within a built environment. The highlight of the project is a man-made wetland and greywater management facility that recycles apartment tenant's effluent and has a capacity of up to 10000 liters/day. Furthermore, even after constructed, the project was monitored and researched regularly so that it could be further improved and optimized. The research was a learning experience and was adapted to the changing economic and social constraints of Berlin throughout its 23 year existence. In addition, the project pioneered the use of many ecologically-conscious methods which are commonplace in today's sustainable building systems.

In conclusion, these five case studies collectively help form a base knowledge and understanding of architectural design and sustainability in Berlin. The sustainable approach is present through the implementation of cooperative living models, quantitative results of energy efficient office buildings, sociocultural aspects of corporate practices, widespread support provided by the government, and practice of experimentation. Three overarching themes that can be drawn from these examples are 1) experimentation, 2) government funding versus private funding, and 3) sustainability as necessity vs. commodity. Experimentation is a driving force for Berlin’s architectural progress in finding new means for improved sustainability. Along with this inherent willingness to take risks, the government actively funds environmentally responsible building projects. This advocacy from the government, rather than solely from private funding, is a key factor in the infusion of sustainability in the culture. In Germany, sustainability is a necessity rather than a commodity, as it has and continues to be embedded in the culture, especially through the massive post-World War II rebuilding undertakings. Architecture tells the story of Berlin’s history and of its culture, and through this dialogue, sustainability and the sense of environmental responsibility is demonstrated both visibly and culturally.

**Symposium**

We presented our case studies and conclusions at the First Annual Northwestern International Architecture Symposium. The symposium, open to the entire Northwestern community, had a successful turnout of faculty, advisors and students interested in the AE&D program and architecture in general. In addition, we were fortunate to have two prominent architects from the Chicagoland area join us for a panel discussion after we presented the results. The pictures on page 5 detail some highlights of the symposium.

We thank ISEN for granting us the opportunity to tour the selected buildings and present our results to the Northwestern community.