This past Summer the work of Studio Associate Professor Alphonso Peluso and his IIT College of Architecture students was featured at the first ever ‘Future of Composites in Construction’ Conference hosted by the JEC Group. Alphonso gave a presentation titled ‘Composites in Academia’ and conducted a tour of the IIT campus. You can find a description of each of the featured projects and Alphonso’s interview for JEC Magazine below:

**When did you start teaching composite materials at the IIT College of Architecture?**

**Alphonso Peluso:** My students and I began working with composites in 2014. I was teaching a design studio titled “Design as a Performative Material Practice” and the focus was to design and build a full-scale temporary structure out of carbon fibre. The project was named the FIBERwave Pavilion, and it was quite well received. The project was written about in several architectural blogs including The Architect’s Newspaper. I should add that my students and I have only worked with carbon fibre.

**What is the place of composite materials in the training programme?**

**A.P:** The topic is part of an ongoing elective seminar course that I teach each semester. Since the FIBERwave project, my students and I have completed a full-scale building facade panel made entirely out of carbon fibre called “carbonSKIN” and, last semester, they built a rolling sofa called “Rolling Vitruvius” for the annual SOFAexpo in Chicago.

**Do you think that incorporating composite materials in a project can change its nature?**

**A.P:** Absolutely. This material that starts out as cloth can be shaped to any form imaginable, then when it is infused with resin and hardener, it becomes as strong as steel and is ultra lightweight. The design possibilities that this opens up for architecture are unlike any material that has been used in buildings before.

**How do your students look at these new materials, for which there is little experience in architecture?**

**A.P:** Initially, they view the material as very exotic. Typically, their go-to material is wood and acrylic and these materials are mostly used for making architectural models. So the fact that they will build something full scale out of this material that they have never worked with before is very exciting and intimidating at the same time. By making small-scale prototypes, they learn very quickly that working with carbon fibre requires a great deal of attention and craft.

**What do you think is the main interest of using architectural composites but also the main obstacles?**

**A.P:** I think that currently the main interest is two things. The first is what do we do with it? Do we replace structural steel columns and beams with it? Do we make floors and ceilings out of it? Do we clad buildings with it? In these early stages of its use, the building industry does not know a whole lot about the material. The second is that the material is so lightweight and thin in relation to how strong it is. So what does that mean? Will this save money when building a building? Will it be easier to construct? How do we analyse the structure? As you can see, along with these interests comes a lot of questions. A few obstacles are fire safety, building codes and structural analysis. Once there are people dedicated to working on and solving these obstacles, the use of composites in architecture will grow at a fast pace.
IIT COA students assembling the ‘Iron Chapel’ in the COA shop

IIT COA Booth
CARBONskin on display

Rolling Vitruvius on display

IIT Campus Tour

Alphonso Peluso presenting Composites in Academia
Title: Revisiting Baroque: The Iron Chapel

Description:
Using carbon fiber as an architectural and structural material, this chapel explores the principles of the Baroque era through today’s tools of digital fabrication. From our research development of the Baroque, we composed an artistic language to coordinate our design development while obtaining some chapel aspects. The concepts focused on dramatizing light through the movement into the chapel. Inspired by the Baroque painting in Santa Catarina Church, we started to trace the symmetry of the painting which lead to the discovery of the shape of the panel. The chapel is a linear structure made of overlapping modules of two different angles. These create columns and then connect at the top to create its triangular profile. The overlap creates apertures that allow light into the structure, apart from which there is an oculus in the center of the space to allow light in.

Size: approximately 10’ long by 8’ tall x 4’ wide (Note: Project is still under construction. Photos below show partial project)

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Title: SOFA : Rolling Vitruvius

Description:
The aim of this work is to detect some basic ideas to generate a contemporary sofa that follows the principles used by Renaissance artists. The seating element is expected to hold a wide variety of uses, from laying to talking, by using a shape influenced by Renaissance. This adaptation to a modern shape and process is determined by the fact that the material of the chair will have, carbon fiber composite. The choice of this material makes it easier to use some kinds of shapes, such as curved surfaces, rather than using little, straight pieces that need more assembly. Seating must be adaptive and useful in a wide range of situations, in the same sense as Renaissance artists understood that our body could lay in several ways, and consequently analyzed the relationship between different parts of the body. That is the reason why we are proposing a rolling chair, which may vary in function suiting users’ needs.

Size: approximately 7’ long by 7’ tall x 4’ wide

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Title: Facade : CARBONskin

Description:
CARBONskin is a carbon fiber curtain wall panel. The project is a faculty led student exploration of the application of composite materials in architecture. In the IIT College of Architecture exists a relic, a 1990’s full scale two story glass and steel curtain wall mock-up that was used for teaching architecture students about curtain wall design and construction. The mock-up has fallen out of fashion and has been left untouched for a number of years. This plan was to retro-fit a portion of the facade mock-up with carbon fiber. Specifically, we were interested in how we could transform the flat static facade into a dynamic one full of motion. The curtain wall design successfully conveyed many of the conceptual design ideas of the Baroque, such as; dynamic fluid motion, sculptural subtraction, and autonomous volumes. The design also took advantage of the possibilities of working with a material that starts out as a cloth and can be formed to almost any shape.

Size: approximately 10’ tall x 5’ wide x 4’ deep

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