

# Giovanni Loreto

**Record Title - Do Not Delete :** Giovanni Loreto

**Linked Preliminary Proposal - Do Not Delete :** Giovanni Loreto

**Please share an overview of activities during the previous academic year. :** In this second year of the grant, the Department of Architecture at Kennesaw State University expanded upon the offer of courses that were originally part of the initial grant proposal. Our program in the 2020-2021 academic year involved, as planned, four courses (two in Fall and two during Spring) with precast-prestressed concrete-related contents. For the 2021-2022 academic year, we increased the offer by incorporating during Fall 2021, in addition to ARCH 2211 (Environmental Technology, precast tile assignment) and ARCH 4225 (Professional Practice 2: Cost Control), two studio courses (one-third year level studio design focusing on residential housing using precast concrete, and one first-year research studio focusing on advancing the integration of precast in tall structures while addressing panel production and innovation in formwork). Furthermore, in Spring 2022, in addition to ARCH 3212 (Reinforced Concrete, which the semester project focused on a total precast multifunctional parking garage), an elective focusing on advanced precast fabrication was added for the first time offer to the program. The course was taught by two instructors (one architect and one engineer) with specialized expertise in concrete materials, advanced fabrication, and technology. Below is a list of all the classes that were part of the 2021-22 academic year, along with information like the number of students impacted, credit hours, course description, and examples of activities.

Fall 2021 ARCH 2211 Environmental Technology I \* Instructor(s): Dr. Arash Soleimani (Course Coordinator), Prof. Elizabeth Martin, Prof. Peter Pittman, Prof John Savage \* Number of students: 120, 3 Credit hours \* Course Description: This course offers lectures and practicum. Starting in their second year, all students enrolled in the B.Arch program (approximately 120) will explore precast systems looking at enclosure, material properties, and methods and sustainability issues. It introduces selection criteria of materials and their properties relative to structural and enclosure systems. Emphasis is placed on wood, steel, masonry, and concrete structural systems. Enclosure Systems are explored in relation to various applications of existing and new materials and finishes that building systems entail within the context of sustainability. Parameters of design and constructability in precast will be explored by looking at structural and enclosure systems, material properties and methods and sustainability issues. This class will serve as an introduction to precast systems, which will include investigations through the use of forms and mold-making exercises, as well as and \* PCI-related activities: \* Invited presentations (i.e., G/C PCI) \* Plant tours (Metromont) \* Annual tile project

ARCH 3011 Design Studio V \* Instructor(s): Prof. Elizabeth Martin \* Number of students: 19, 4 Credit hours \* Course Description: This studio emphasizes the importance of conceptual architectural thinking, materiality, and the integration of building technologies. The design studio introduces total precast systems and emphasizes sustainability practices of environmental systems and materials research in support of design intent and constructability. The specific project is to design Next-Gen Eco-HOME(s) in an urban context. Students envision an urban house, or series of townhomes, informed by the materials and structures of 21st-century technology and ideas of domesticity in an urban environment. The first half of the semester is devoted to project design and sustainable systems (with a cove.tool workshop); and the latter half is spent examining precast construction tectonics through large-scale physical models and a 1:1 mock-up. \* PCI-related activities: \* Invited presentations (i.e., G/C PCI) \* Plant tours (Metromont) \* Annual project \* cove.tool workshop \* Student competition

ARCH 4225 Professional Practice II (Cost Control) \* Instructor(s): Dr. Jeffrey Collins \* Number of students: 19, 2 Credit hours \* Course Description: This course focuses on the implications of design decisions on building project costs by introducing various methods for strategizing and quantifying design proposals and creating and optimizing budgets for construction. Similar methods are used by architects and general contractors for feasibility studies, value engineering discussions, and comparison of design variations. In addition, knowledge related to precast construction (i.e., parametric design, façade

panelization, panel details) will be introduced to enable architecture students to understand and create estimates for precast building projects, specifically for a series of urban Eco-HOME(s) initially designed in ARCH 3012 + ARCH 3212; and thereby work as effective and valuable team members throughout architectural design and construction processes. \* PCI-related activities: \* Semester project on precast cost estimate ARCH 5015 Focus Studio CANVAS (Concrete Applications in Non-standard Vertical Architecture Structure) \* Instructor(s): Dr. Giovanni Loreto \* Number of students: 17, 4 Credit hours \* Course Description: This studio investigates the various ways in which buildings can be designed and constructed using advanced cementitious materials and fabrication techniques. The studio project looks at ways of using precast and prefabricated concrete systems to create responsive, dynamic, and engaging non-standard vertical structures. Cement-embedded fabric materials (usually referred to as CANVAS) are used to explore, research and design new tectonic languages. With the input from the KSU Department of Civil Engineering, Mechanical Engineering, and Precast/Prestress Concrete Industry partners, the project begins with the design of a small-scale structure using concrete canvas as materials. After a workshop on the use of advanced precast/prestress construction techniques, the course continues with a series of case studies of the work of artists, architects, and designers, in order to develop a conceptual framework for the design of vertical structures that explore the relationships between form and function. This final project focuses on the design of mix-use vertical buildings in the city of Atlanta with an emphasis on atrium, verticality and interactive spaces. \* PCI-related activities: \* Plant tours (Metromont) \* Site Tour (NYC) \* Workshop on the use of advanced precast/prestress construction techniques \* PCI annual convention in Kansas City, MO \* CANVAS competition \* Presentation at the G/C PCI Spring 2022 ARCH 3212 Architecture Structures 3 (Reinforced Concrete and Lateral Loads) \* Instructor(s): Dr. Giovanni Loreto, Prof. Jade Yang \* Number of students: 90 divided into 3 sessions, 3 Credit hours \* Course Description: This course builds on ARCH 3211 with a focus on the design and analyses of statically determinate and indeterminate concrete structure systems, mainly frames. Upon completion, students are able to apply design techniques in defining a frame system and selecting or sizing concrete members, particularly beams and columns, walls, foundations, and slabs. Precast learning objectives include the design and computation of a total precast structure. Students also address construction problems such as mix design, modularity, formwork construction, transportation, and final installation. Knowledge and skills are applied in a final team project. The semester project involves the design of a total precast multifunctional parking garage. \* PCI-related activities: \* Invited presentations (i.e., G/C PCI) \* Parking Garage Project Competition \* Mayor award ARCH 4490 Advanced Production (Precast) \* Instructor(s): Dr. Jeffrey Collins and Dr. Giovanni Loreto \* Number of students: 7, 2 Credit hours \* Course Description: Building upon ARCH 2311, ARCH 3012, ARCH 3212, and ARCH 4225, this new elective course focuses on methods of analog and digital fabrication techniques as related to the design development, explicit representation, and physical production of architectural components related to the eco-home. Through partnerships with local fabricators, students are exposed to expert manufacturing knowledge, explore novel project delivery methods, and assist in full-scale mock-up construction. Concentrating on a singular material system, this initial offering of the course focuses on architectural precast concrete façade panels. (architectural precast, precast production, digital fabrication, full-scale mock-ups, robotic production). \* PCI-related activities: \* Advanced precast fabrication \* PCI annual convention in Kansas City

**Can you give a few examples of students learning outcomes?** : Evidence of the achieved learning objectives is reported in the link of student work. More than 20 projects and 200 photos are shared here (<https://www.dropbox.com/sh/dwbrev448er9w5a/AABLbRzufgaaX7SzZ3jrJT9ja?dl=0>) to address students' participation and learning outcomes. Below are a few examples of learning students' outcomes that were part of courses: \* Design and fabrication of formwork for precast use, both modular and structural. \* Advanced fabrication in precast systems. \* Application of advanced structural principles and use of advanced model-making techniques to investigate the structural behavior of precast structures. \* Identification of traditional and unconventional methods of architectural precast production with the discussion of strategies for the design

and construction of precast formwork. \* Employment of digital modeling techniques of custom components during design processes and methods for incorporating 3D printing into architecture and construction. \* Preparation for the development of full-scale physical mock-up.

**Please upload photos of students engaged in projects, tours, or other activities.** : 2022 PCI Report photos of students engaged in projects.pdf

**Please share a link to any student work you would like to share.** : <https://www.dropbox.com/sh/2llmtoo8ejs7h3t/AAAFcjTfYI6ARnz8Nwz-tczLa?dl=0>

**Can you share any opportunities that working with your local partner helped the students achieve something that would otherwise have not been possible?** : Opportunities are divided into four areas: \* Internship with our local partner. Working with local partners allowed architecture students to learn and apply for internships in companies that historically recruit engineering students. Through these opportunities, KSU Architecture students were \* Architecture firms connection. Current students and alumni of the program working in architecture firms are now reaching out to producers inquiring about the use of precast concrete solutions in the design of building that they are developing. \* Students recognition. Our local partners are an integral part of competitions in the department. They provide feedback on projects during the semester; they offer presentations on the latest developments; they sponsor students winning teams with work and provide travel opportunities. \* Scholarships and student success. Local partners are instrumental in our students' success. Visit not only precast produces but also material producers and professional firms was possible only through the work with our local partners.

**Is there anything you learned this year that you would like to share with other professors?** : Two lessons were important in the last year. \* Plan for redundancy. Our program is built around courses, not faculty. What it means is that we include our department curriculum committee in the development of courses with precast concrete content. In this way, no matter how many sessions we offer of the same class, we can address all the cohort of students in that year, ensuring they all receive similar experiences, regardless of the instructor teaching that specific session. It requires coordination, but it is highly effective. This approach also allows us to continue offering classes even if faculty that are part of the grant is not available that particular semester, providing a good strategy for continuity. \* Connect with your local PCI Community. We had the opportunity to have students present at the local PCI winter meeting. This experience was incredible as it strengthened our connection with the local industry members providing opportunities to students.

**Is there anything that the PCI Foundation can do in the future to be of greater service to you during the grant?** : \* Thank you. This second year has been an incredible experience for us to work on this grant. The PCI Foundation does an incredible job in providing opportunities, sharing information, and ensuring that everybody, from students to faculty, is included in the conversation. These are strong characteristics that make it enjoyable and rewarding to work with you. \* Plan a meeting with students and faculty. Maybe, and this is just an idea, at the next PCI conference, rather than a simple round table, we could ask students to be part of the conversation and have them presenting not their project but their experience while being at the PCI (how they communicate, what is effective for them, what tool they use, what they think works in making them ready for the industry). Ideally, this could be done anonymously to avoid redundancy in positive feedback.

**Please upload a list of any community partners, precast partners and other people who worked with your students during the year. Include their names and company.** : List of contact.jpg

**Did you attend the PCI Convention?** : Yes

**Did you attend the PCI Committee Days?** : Yes

**Did you attend the PCI Foundation Professors Seminar?** : Yes

**Do you have a student assessment of your program that you can share? :**

**student assessment upload :**

**Is there anything else you would like to add? :**

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*Record ID # : 39263531*

*Last change : 2022-06-15T20:12:21+0000*