California Polytechnic State University, San Luis Obispo

From the SelectedWorks of Thomas Fowler IV, DPACSA, FAIA

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Romberg Tiburon Center (RTC) Renovation of Classroom Building 2018

Thomas Fowler, IV

Available at: https://works.bepress.com/tfowler/36/
Arzhang is an Architectural Engineering graduate student graduating in Spring of 2018. He previously attended SFSU, for a B.S. in Civil Engineering. He participated in the 2015 Seismic design competition in Boston hosted by EERI. He has internship experience in the structural design. Besides engineering, he enjoys playing intramural sports including volleyball and soccer teams.

Leah is a graduate student of ARCE at Cal Poly. She has experience in structural design as an intern over summer 2017 where she then went to Tanzania, Africa to continue a project with school. She believes any interdisciplinary experience that one can get in school is very useful. Outside of work, she loves her dog Kayo and doing outdoor activities with her.

Amir is a graduate student of Architecture with a bachelor in Architectural Engineering from University of Tehran, Iran. He has research experience in virtual reality and augmented reality as well as artificial intelligence. Amir interested in UX (User experience design) which helped him with his projects as an architecture student and graduate researcher.

Cristian is a San Francisco State alumni with an degree in Civil Engineering and is currently pursuing his Masters Degree in Architectural Engineering at Cal Poly. He previously worked full time for two years for a Structural Engineering firm prior to attending graduate school.

Ryan is pursuing his masters degree in ARCE at Cal Poly where he also received his undergraduate degree. Moving forward, he will be entering the workforce with a consulting firm in Southern California after graduation. Ryan has intern experience in seismic research and structural consulting. One of his focuses on this project is building layout and Revit work.
The team that worked on San Francisco State University’s Romberg Tiburon Center (RTC) for Environmental Studies was composed of a talented group of undergraduate, graduate and visiting international students. We thank the RTC and John Kern for providing the opportunity to research and design this Head House Project. It will provide instructional support space for the future greenhouse structures that will be constructed adjacent to this newly designed structure.

The Design Collaboratory is an award winning (NCARB Prize, Auto Desk Grant and national student design competition recognition), multi-disciplinary group of undergraduate and graduate students, and faculty (from architecture and architectural engineering, joined occasionally by planning, construction management and civil engineering), that work directly with industry partners in developing building design projects. Professors Dong and Fowler have collaborated on these types of projects, which use interdisciplinary student groups, for more than 10 years. They bring more than 30 years of professional experience which provides avenues for insightful research and innovative design proposals, and leverage approximately 40 years of teaching experience to mentor and enable students to create holistic design solutions.

We have enjoyed seeing how much students learn in their interactions with one another, with the RTC, and with us. They have grown as designers, problem solvers, and innovators by solving “real world” building design challenges since they worked directly with the building users, John Kern and Kathy Boyer.

Sincerely,

Professor Kevin Dong

Professor Thomas Fowler

Professor Thomas Fowler, DPACSA, NCARB, AIA

The Director of the Graduate Program of Architecture and a Professor of Architecture.

Thomas’ teaching responsibilities include third and fourth year design and building technology courses, working with a range of four and fifth year independent study students and has been co-teaching as part of the Collaboratory Building Design Studio since 2007.

Prior to beginning his teaching career at Cal Poly, Thomas worked with a range of architecture firms in New York City and Washington, DC for over a 13 year period. His work was highly collaborative with a range of disciplines on small to large scaled building types.

Professor Kevin Dong, PhD, SE

The Associate Dean of Administration of the College of Architecture and Environmental Design and Professor of Architectural Engineering.

Kevin’s teaching responsibilities range from 2nd year technology classes through graduate structural systems and seismic engineering courses, and has been co-teaching the Collaboratory Building Design Studio since 2007.

Prior to beginning his teaching career at Cal Poly, Kevin practiced holistic design with Ove Arup & Partners (ARUP) for 13 years, starting as an Arup Fellow in London and then moving to the San Francisco office. During his tenure with ARUP he worked on numerous projects nationally and internationally that required collaboration and integration of all disciplines from design inception through construction and occupancy.
project research | site analysis

Tiburon, California
Site Visit

History

1877
Site came to existence when a packaging plant was constructed to dry, process and ship codfish.

1931-1940
The United States Navy loaned base to the state of California, which established the first nautical training school (California Maritime Academy).

1977
San Francisco State University acquired the remaining 25 acres and established the Romberg Tiburon Center for Environmental Studies.

Wind & Daylight
Natural Lighting played a large role in the restoration of the RTC. One of the first things we noticed on our initial site visit was just how dark the building was, so we set out to improve that. Some of the many benefits that come with natural lighting are improved energy efficiency and improved occupant productivity. The occupant productivity portion is due to a phenomenon called biophilia, which suggests humans have an instinctive desire to interact with, and be surrounded by nature. Bringing in natural light triggers that primitive side of us, allowing us to relax and be more focused.

While doing a preliminary sun study, we found that our primary sun exposure comes from the southern and western sides of the building. With this in mind, we wanted to take advantage of these sources and activate diffused light throughout the space. We were able to accomplish this with the use of light shelves, strategically placed skylights, and smart design. The new bridge is purposefully pulled away from the existing wall at the rear end of the building to allow a light “column” to pass down to the first floor. Skylights have also been positioned to allow natural light into the labs on the first story and throughout the newly designed portion of the second story.

A lighting analysis reveals the tremendous impact our design has on natural lighting levels throughout the western half of the building. The figure to the right shows the results of the analysis on the second floor. The right side is modeled as the building currently exists, and the left is the new design. The zones in red have insufficient natural lighting, while blue to teal is our target zone. The improved natural lighting gives 1 point towards a LEED certification.

Structure

A structural analysis was performed to ensure the safety and stability of phase 3 remodel of the ROTC. There is an existing structure, basically a roof envelope that we were stay within. With our two floors we incorporated new steel framing into existing columns and added some new columns. The columns were needed to complete the bridge span that connect the two sides and continue a walkway along the west end. The beams were designed to be as shallow as possible to allow for high ceilings in the lab areas on the first floor. The bridge has some deeper steel beams and were analyzed for frequency. This is so when walking across, vibrations are not felt to concern those enjoying the space. We chose steel because we wanted to prolong the life of the structure given the near ocean conditions that wear at materials like wood. The steel is also exposed to blend in with the architecture and hierarchy of the historical building.

Survey

Soon after our Mid Review we received four survey responses regarding the needs of the facility. The responses included a list of what was most and least important to the faculty and staff. Using these survey responses, we were able to conclude the top three common priorities among the faculty. These priorities consisted of: a need for more shared/core facility labs, wet labs, and graduate student desks/study area. From this point on, we narrowed our focus primarily towards these needs serving as the driving force for our final design.
Building 36 Phase 3
Concept Design
We placed all the lab spaces on the first floor of the westernmost portion of the building. The location of these labs were strategically determined to capture natural light coming from all the windows encompassing the back walls. We placed two shared labs on the north western side of the building, and two smaller individual labs on the south western side. The shared labs were incorporated due to the high demand in the surveys received, in order to also maximize bench space for the students.
Due to all the existing equipment located in the atrium, we recognized the need for storage space. We incorporated a storage room located on the southern side of the building by the individual labs. This storage space will house not only the equipment currently in the atrium, but also flammable equipment. We encouraged an exterior garage door for easy access as well as a centralized walk-in fridge/freezer space for samples.
We placed the graduate study area on the south eastern side of the building. We wanted to make sure we captured as much natural light as possible for this section knowing light is very much needed to ensure maximum productivity. We incorporated an open concept design for this space after studying a lot on what modern study areas were implementing in their design. We’ve noticed that the open nature of labs inspires collaboration, and when broken up by small partitions, also offers all the privacy needed. The top right photo is of the existing graduate rooms and below that is a precedent study.

Conference rooms can be used for a variety of things, but ultimately we wanted to provide a private space that can be used for meetings and presentations in the western, rear end of the building. Above is the existing conference room that would remain as it is.

This is a place for the faculty and staff to create home cooked meals as well as an area to eat and catch up with fellow peers. There is an existing kitchen (shown above) on the opposite side on the first floor, but with so many new students we deemed this as needed.

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The library was a previously existing space, but it was very dark and isolated. By improving circulation through the building and opening up the library, we have made the space more inviting. There is also a smaller study lounge tucked away in the library to offer a quiet place to read or study.
On the north facing side of the building we placed 11 new offices for the staff and faculty. Within these office spaces we incorporated a breakaway, kitchen, and a conference room. This space is centralized between the new offices to ensure easy access for all. The purpose of this area is to offer privacy, have an informal meeting, and serve as a definitive space for students and staff to come together to discuss and share ideas.

To bridge the north and south sides of the second floor together we created a common area where both sides can come and rest or take a break from their daily work. This location was optimal for a common area due to the high ceilings and the surrounding windows on the back wall. By keeping the open concept design here students and faculty can enjoy the natural light and scenery while they collaborate or just take a food/coffee break. The purpose of the common area is to create a large space where students, faculty, and staff can all catch a break and re-energize. The next page is an image of what the common space would look like.
Arzhang Derakhshani
A unique aspect to this project was the experience we had with the clients. The changes we had to make along the way to accommodate everyone's needs was an experience in itself we don't encounter much in an educational setting. I believe this was the biggest take away from this project as well as learning how to be able to convey our designs to clients who have no architectural and structural background at all.

Cristian Fernandez
This project provided several valuable reflection points. It helped me understand how important it is to communicate with the owner and their expectations, scope of work, and initial design considerations. It is especially crucial that the scope of work is defined so that both the client and designer are clear on what the final product would include. This experience is crucial for a young designer to understand going into the workforce and this experience will be a great precedent for us to utilize while in the workforce.

Leah Holleran
This project was unlike anything I have ever done before. There were a lot of challenges that we had to tackle as a team. Some difficulties were trying to construct a structure within an existing building and search through old plans and do a site visit and try to gather all the information needed. Another great learning aspect to this project was working one on one with clients. As students, there is a set project and few alterations. The clients opinions and input during mid-review really had us go down a different path afterwards. The team pulling together really makes the final product what it is.

Ryan Lefebvre
I found this experience to be extremely valuable on multiple levels. From a structural point of view, this was my first "retrofit" project within an academic setting, and it’s taught me how valuable your time on a site really is. From more of an architectural standpoint, I found the client interaction to be highly educational, for it is not something we encounter in our undergraduate degree.

S. Amir Mahmoodi
It was a great experience working with clients from variety of disciplines and interests. As an architecture student I had to make sure that renderings and architectural visualizations are crystal clear so clients from different backgrounds could understand the new renovation design. We used clients' feedbacks from our mid-review to modify the design which was really useful.