THE
INTERSECTION
OF ART & SCIENCE

Creative collaborations between Chapman University & the NASA Jet Propulsion Laboratory with Professor Lia Halloran
ABOUT THE COURSE

This studio class looked at the intersection of art and science through using the lens of creativity and problem-solving, tracing the origins with scientists who incorporated truth and beauty into their scientific practices, and artists that had a scientific understanding of the natural world in order to depict it. Today, scientists use the same invention and curiosity that fuel artistic practice to understand and explain the world around them and contemporary artists respond visually and conceptually to new discoveries in science.

Projects were fueled by concepts of contemporary astrophysics, scientific visualization, current missions at JPL, and various other themes of science as the source for subject within art projects. Our class met at NASA’s Jet propulsion Laboratory on alternating Fridays during the semester hosted by the incredible team building the satellite SMAP (Soil, Moisture, Active, Passive) where we meet with designers, engineers, artists, scientists, mission specialists, and even the twin ‘Curiosity’ Mars Rover. Our adventures took us to see the Space Shuttle ‘Endeavor’, out to the desert in Joshua Tree to the strange time-travelling machine and sound bath the Integratron and also an inspiring and magical night at the historic Mt. Wilson Observatory looking through the 60inch telescope at planets, nebula, clusters of stars and to experiment with long-exposure astrophotography of the night skies.

The result of these conceptual investigations by this immensely talented group of artists were rigorous works of drawings made with magnetic Ferro Fluid, optical illusions made in a scale larger than life, experimentation of the new technology of projection mapping, sound and installation pieces inspired by the crystal singing bowls of the Integratron, animated paintings, photographs created by growing crystal in the darkroom in negatives, zines, and video work that referenced the way color functions in various frequencies and in imaging of the Hubble Space Telescope’s amazing images among many, many other inventive works.

Professor Lia Halloran
"I see the intersection of art and science in my piece through my visual representation of the multiple sensory experience we had at the sound bath. Using the audio I recorded at the sound bath I am attempting to re-create the meditation experience by having the class look at my own visual interpretations of the sounds."
RACHEL BECKER '14

"I am you and you are me."

Right detail from "Feminae Cyclus" multimedia collage
Far right detail from "Vesica Piscis" collage
"There’s a gap between science and art. This class is the solution."
“Though many people consider art and science to be on complete opposite sides of the spectrum, art has been used to communicate scientific ideas for ages.

Throughout time scientists would jot down observations with sketches or illustrate concepts through diagrams. Before photography was invented, drawings and paintings were how many things were documented, including scientific breakthroughs.

This works the other way around too in that many art mediums involve and can be explained by scientific processes. For instance both ceramics and photography are forms of chemistry. The world of science has influenced the world of art just as much as art has influenced science.”
"I find that period of experimentation and discovery to be intrinsic to both scientific and artistic practice. With art, one must experiment with a medium for years before truly mastering it, and as soon as you truly "master" a particular medium, you must find some way to deconstruct it in order to create something worthy of interest."
“It’s history began when creator George Van Tassel was practicing weekly meditation in the desert when he claims to have been contacted by extraterrestrials from the planet Venus and given direction on how to construct “a high-voltage electrostatic generator that would supply a broad range of frequencies to recharge cell structures.” He began building the entirely wooden structure in 1957 with money he raised entirely from donations, and intended for it to rotate to create electricity to recharge the human body and conduct research on time travel. After his death, Budie Canning and Diane Cushing bought and preserved the Integratron and eventually opened it up to the public for sound baths, meditation, and spiritual healing. While the building does not spin, it is an extremely special place that functions similarly to how George Van Tassel intended.”

Julie Russo
"I think that Art and Science are inherently connected through curiosity. Good artists and scientists are curious about the world, and work to understand their environment more fully. They share an interest in the unknown and attempt to make it known. The main difference between artists and scientists in my opinion, is perception of the world vs. reality of the world. Artists deal mostly with understanding through the lens of our senses, whereas scientists primarily deal with objectivity and the laws of nature through any lens. I think professionals in either field should incorporate principles from the other to drive their ideas."
“I have a growing interest in perceptions, space and time. With this in mind, rather than relying on a large painting with significant detail to draw the viewer in, I am experimenting with various technologies, incorporating animation to create a moving painting and utilizing ideas of installation to bring the viewer into a greater submersive experience.”
The stars we see in our galaxy vary widely in age. Some are extremely old, some very young; most like our Sun, lie between those extremes. It follows that we ought to find evidence of stellar birth and death going on around us, just as in the human community we find that some persons are younger, some older, and that births and deaths are constantly taking place.
MADELINE LUCAS ‘14

"Experimenting, chance, science, and the spiritual."
In regards to science, one of the concepts I find most interesting is reflection. Growing up, whenever I would see light reflected on the wall from my glass cup or from a C.D. that was lying around I would wonder why and how that was occurring. I would enjoy looking at the reflection, especially if it was moving due to some sort of liquid, in which case I could find myself staring. Sometimes when these moments occurred I would grab other objects to attempt to create more reflections myself, and at times it would work and other times it wouldn’t because of my lack of understanding of the concept. I’m still intrigued by light reflection to this day, which is why I have created an installation using light and mirrors for my final project.
“The Jet Propulsion Laboratory began in 1936, when the first rockets were tested through the Guggenheim Aeronautical Laboratory at Cal Tech (GALCIT). A few graduate students tested an alcohol-based rocket for one of their theses. JPL began working on re-entry technology to successfully launch Explorer 1 on February 1, 1958. JPL was then immediately transferred to NASA the following December. They became the organization’s primary spacecraft center, and have produced the most spacecrafts for interplanetary exploration to date. Their accomplishments include the Ranger and Surveyor missions, which observed the moons before Neil Armstrong and Apollo 11 touched down safely on its surface. JPL is also responsible for the Mariner missions, which explored the planets Venus, Mercury, and Mars as well as Voyager and all our Mars Rovers.”

Ethan Young
Dan Goods, the Visual Strategist at NASA’s Jet Propulsion Laboratory, sets out to translate the essence of scientific concepts into visual representations. Through his creation of artistic experiences, Goods allows people to understand concepts about the universe through a different light than usually presented. According to Goods, if he can create an opportunity for people to experience a moment of awe about the universe, then he has been successful. Many of the scientists that work closely with him usually approach him about an issue if they are in need of viewing something from a different perspective.

Allison Rask

For Goods, it is the ability to visually communicate these vast and intangible concepts to the general public to allow them to experience these scientific theories they may not otherwise understand that is most important. He takes his role as a designer, a visual communicator, to a whole new level. Not only offering the audience digestible information, but an experience to remember.

Ryley Schlachter

In an effort to better understand our planet and its resources, NASA has developed a fleet of satellites to scan and analyze the earth’s surface and atmosphere. SMAP, set to launch in Fall 2015, will be able to measure the top two centimeters of soil moisture around the earth in 3 days. This information is incredibly beneficial to geologists, biologists, farmers, and the general population around the world. Meteorologists will be able to utilize the data to better predict weather and climate changes, as well as the threats of flood and drought. Links between terrestrial water, energy, and carbon cycles will be easier to observe for scientists. The fluctuations in these cycles are important to understanding atmospheric changes, especially in boreal landscapes, some of the most important carbon reduing areas on earth. Before SMAP, analyzing soil moisture was done by hand, sticking a meter into the ground and getting individual readings foot by foot. To map the entire globe would take years, but SMAP is able to do it in three days, sharing it’s information with anyone who seeks it.

Seth Josephson
"Our exasperating inability to know the world directly is one of the central existential dilemmas in the human condition. Integrating art and science will kindle a more synthesized awareness which begins in wonder and ends with wisdom."

Leonard Shlain
"The artist is an explorer or inventor who has posed problems which mere collections of data cannot solve."
"'Constructed space for means of documentation' is a piece that revolves around the science and space community and the happenings that are going on. SMAP has been an eight to ten year time lined project and with the October projected launch date it is of high interest to a lot of the science and space community."
"The concepts that inform my research and work from a Western perspective involve particle/wave function with quantum connection instead of the more static classical. I also am considering the interconnectedness of consciousness and look at Eastern philosophy for explanation to the substance of things not seen. Energy is seen in many cultures to reflect consciousness resonating and creating our own electromagnetic field."
Art and science used to be viewed synonymously. With the same approaches in research and methodology, these two disciplines should not be viewed in such different areas of study now. Both art and science further the discourse of our world. They are both in pursuit of discovery, whether that is societal, astrological, or psychological. The more immersed I become in various fields of science, the more connections I draw between. I think it is important to address the concept of viewer authorship. In a world that is riddled with a copy-and-paste attitude, the idea of ownership as a whole begins to fade. By creating artwork that relies on the viewer, I distance myself as the author, and allow the work to exist and evolve on its own.”
"As a young kid, I used to visit a family friend on Mulholland drive and always wondered what those big antennas were on the peak of the San Gabriel Mountains overlooking all of L.A. I finally got to encounter these immense antennas that point straight up the sky, and the telescopes that neighbor them. Mount Wilson Observatory is an astronomical observatory that was built in 1908. It holds two historical telescopes that we had the privilege to visit. The Hale telescope, which has a mirror blank of 60 inches, and the Hooker Telescope, which has a mirror blank of 100 inches. Our whole group took turns looking at the M81 nebula, Jupiter, a ghost planet, Mars and last but not least Saturn. Seeing Saturn so clear through the telescope was something else like I had never experienced. The beauty of its rings, and the clarity of its gas filled colors left me speechless and in awe. While all of this was going on, everyone had their cameras set and positioned around different areas of the telescope while doing long exposure astrophotography. In all, this experience was one that will not be forgotten, so a space nerd I hope to go back up there with more equipment to capture different ideas I developed as I was up there.”

Theo Niarchos
ACKNOWLEDGMENTS

Thank you to the incredible folks at the Jet Propulsion Laboratory and SMAP for hosting us and showing us the creativity behind all our NASA missions and especially Susan Callery, Stephen Edberg, Kent Kellogg, and Shawn Goodman for hosting our class and introducing us to such amazing people who share our spirit of creating something new and incredible.

This class was generously supported by enhancements through a Personalized Education Grant from the FRDC awarded to Professor Lia Halloran. Additionally, Dr. Janna Levin’s visit was made possible through the Office of the Chancellor, the Department of Art and The Dean of Wilkinson College of Humanities and Social Sciences.

And lastly much appreciation goes to our fantastic BURN research assistant Jennifer Seo who searched for hidden and wonderful connections of art and science and well… also made sure everyone had a map for all our adventures.