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Art and Medicine: A Collaborative Project Between Virginia Commonwealth University in Qatar and Weill Cornell Medicine in Qatar

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Virginia Commonwealth University–Qatar & Weill Cornell Medicine–Qatar

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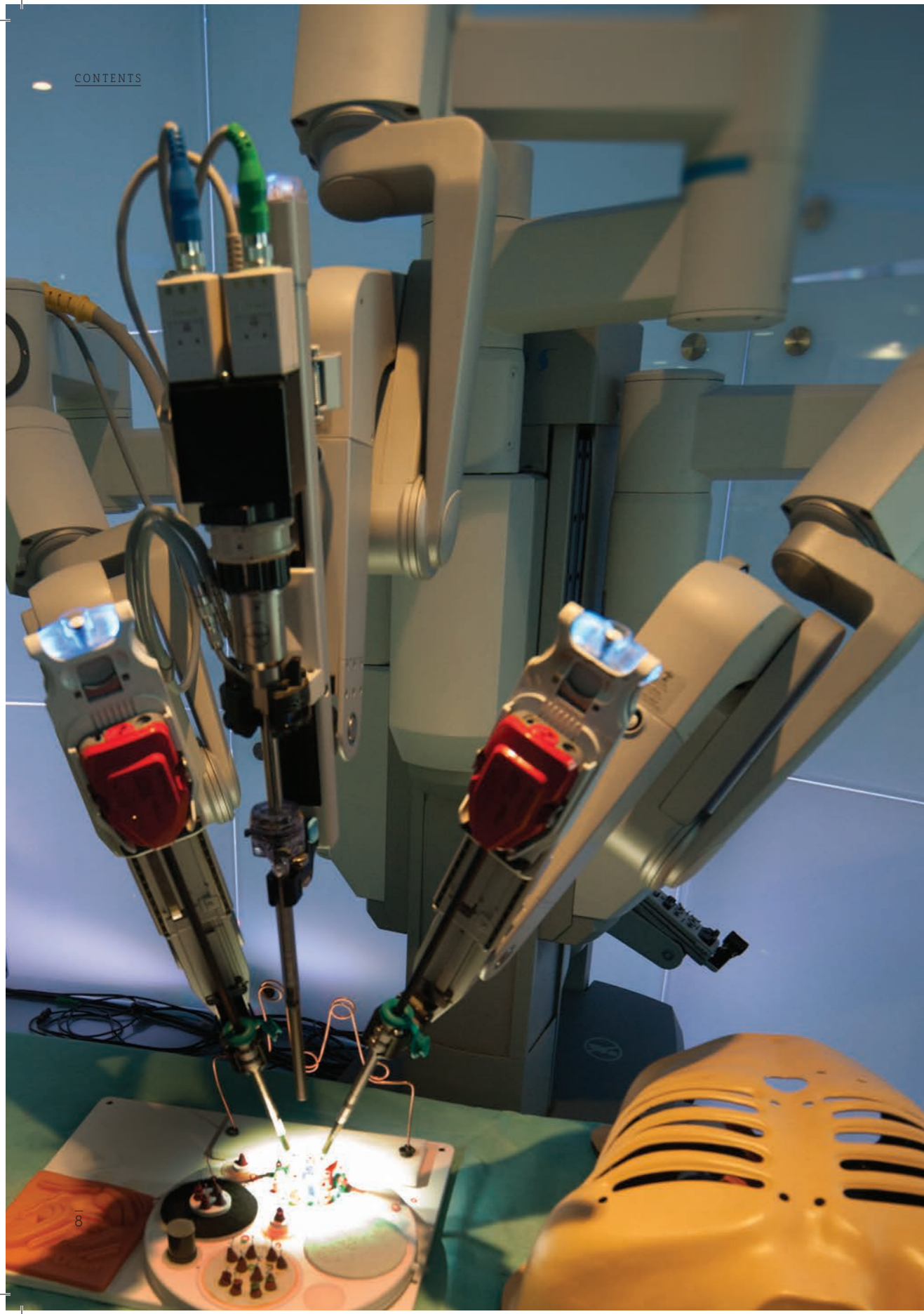THE FOLLOWING INSTITUTIONS FOR THEIR COLLABORATION
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Weill Cornell
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CONTENTS

Art and Medicine in Qatar — Global Perspectives on an Interdisciplinary Experience

In a 2011 editorial in Leonardo Reviews Quarterly, *Michael Punt asks questions about what happens when two cultures interface: What knowledge is transferred or constructed? And by whom and to whom?[1] While at this point there is no standardized arts-science practice, and no clear vision of what such a practice might look like, it is clear that much of the knowledge transfer and construction has been focused on bringing arts and design to the sciences and medicine. Artists and designers hold the skill sets that are viewed as beneficial for informing medical practice. Lacking in the conversation are the questions: What can science bring to the arts? What happens when art and design work is informed by scientific practice and processes?* Addressing these questions was one of the major aims of the collaboration described in this catalogue. In addition to cultivating a mutually insightful, disciplinary transfer of information and ideas, we designed a course and a set of experiences that would bridge the gulf between the arts and sciences by bringing medicine and science directly into arts and design. We strove to create scenarios in which the students from the medical sciences could bring their knowledge and skill sets to the conceptualization and design of art works. You will see some of the results inside these pages.

An innovative Art and Medicine collaboration between Qatar's art and design school Virginia Commonwealth University Qatar (VCUQ) and medical college Weill Cornell Medicine-Qatar (WCM-Q) was established in the Spring of 2015. The four collaborators working in the fields of Art and Design and Medical Education–Rhys Himsworth and Amy Andres of VCU-Q and Alan Weber and Stephen Scott of Weill Cornell Medicine-Qatar–developed a workshop-based cross-disciplinary Art

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and Medicine Project structured as an experiential learning laboratory for six art students and six medical students (www.artandmedicine.net). A related funded research study collected quantitative and qualitative data on interprofessional collaboration and changes in attitudes and practices of art and medical students after working together to develop major works of art.

Students participated in workshops, lectures and site visits to engage the concepts and practices of color theory, robotic surgery, medical imaging, and the medical gaze. Students additionally designed and built a light installation in the medical college called Chromosthesia, based on the work of James Turrell, Spencer Finch, and Rafael Lozano-Hemmer. This project developed in the unique context of Qatar which has witnessed explosive growth of the arts. Using the substantial revenue from natural resources exports during the petroleum boom in the early part of this century, Qatar has embarked on a planned developmental path that includes major investments in the arts, education, museums, tourism, and cultural heritage. Investment in the arts includes encouragement of local traditions as well as engagement with international experimental and avant-garde art developments. Education City, which includes VCU-Q and WCM-Q, is a consortium of nine mainly U.S. university branch campuses dedicated to innovation in research and education. The newly established Qatar National Research Fund has granted over 600 Million dollars of funding for ground-breaking research in the arts and sciences. Thus artistic expression, experimentation and novel research and knowledge production is highly valued in Qatar, in contrast to some of the country's more conservative Gulf neighbors with much lower R&D and education budgets. The director of Qatar Museums Authority, Sheikha Al-Mayassa Al Thani, considered by some to be the most powerful woman in the art world today, has led the development of two major Arabic art museums, and opened exhibitions of Shirin Neshat, Adel Abdessemed, Damien Hirst, and Richard Serra in Doha. The showcased student work described in this catalogue all interrogated some aspect of the human body and the relationship between medicine and art and design within these dual contexts of modern art and traditional Muslim society. The body was an area of enquiry about which both medical and art students appeared to connect spontaneously.

This project is just one collaborative effort, in one part of the world. No matter the approach, such steps must continue to be taken in all corners of the globe if we are to realize the full potential and benefits of interdisciplinary endeavors. The Art and Medicine Project can be contextualized within several other current trends in the practice of art in the postmodern and postcolonial world as well as within current art education and medical education theory. The unique and innovative nature of this collaboration–the first of its kind in the Arabian

Gulf–is underscored by the paucity of art instruction at any level in Gulf educational systems, and the lack of humanities offerings in the region's medical schools.

Although Qatar boasts a growing art scene with the iconic Museum of Islamic Art designed by I.M. Pei and the Mathaf Museum of Modern Arabic Art,[1] a discomfort with figural art (aniconism) is still common throughout the Gulf. Also, many health practitioners who have attempted to establish art therapy programs in the Gulf have reported difficulties with patients reluctant to draw the human face or figure.[2]

Over 85% of Qatar's population consists of expatriate immigrants, primarily from South and Southeast Asia, with a small number of western expatriates that tend to work as managers and professionals, who bring with them a different body politics, different cultural norms of modesty, and an alternate sense of public space. The fear of cultural erosion has spawned the 'appropriate dress' debate in Doha. A group of Qatari women founded the "One of Us" campaign to encourage modest dress in Qatar (avoiding bare shoulders, bare legs, shorts, and tanktops in public). Students at Qatar University additionally fought for a new dress code in 2012 banning 'visible tattoos,' 'clothes with inappropriate text or images,' and 'fad hair styles like dreadlocks and the unnatural coloring of hair.'

However, across the region young people are abandoning traditional dress such as the thobe, dishdasha, jalabiyyah, and abaya, and adopting a new body and identity politics, which has created inter-generational rifts. The art projects created for the Art and Medicine Project by the VCU-Q and WCM-Q students, which all question the personal and public spaces of the body (as well as personhood, the *nafs*) must therefore be critiqued within these historical and contemporary local conceptions of the body in the Islamic world. In addition, by exploring the relationships among medicine, technology, art, identity, and the corporeal world, the student projects situate themselves within a growing trend in international art circles to forge new relationships with very different disciplines also intent on understanding the body such as robotics, medical imaging, biotechnology, basic sciences, and engineering.

The development of arts education in the Gulf has been sporadic, and in particular arts collaborative initiatives have normally only been pursued by individual artists interested in science, technology and medicine. At the GCC education policy level, arts education has been recognized as important to general student development. At the 2002 Arab Regional Conference on Arts Education organized by UNESCO, Gulf educators agreed to "reaffirm the necessity to include, within the university programmes, compulsory and optional credits related to Arts Education and addressed to all students in all majors, in order to ensure a minimum of artistic knowledge among university graduates."[3]

In 2005-2006, UNESCO sponsored The Master Module on Arts, Design and Technology for the Arab States as an experimental educational program to explore the possibilities of multi-disciplinary educational programs in the Arab world connecting story-telling, visual language and technology. UNESCO published the results of this program, led primarily by Lebanese universities, in *Visual Narratives from Arabia*.[4] Also the Arab Bureau of Education for the Gulf States initiated the "Atlas Concepts for Art Education" program from 2005-2008 which developed an arts education theoretical framework for the GCC and some teaching materials.[5] Despite these efforts, even basic arts education in the Gulf is not currently the norm at any educational level, making the Art and Medicine Project particularly novel and outside the normative praxis of both Gulf artists and arts education programs.

In medical education, visual and performing arts such as sculpture, painting, literature, drama, and music are being increasingly incorporated into American and European medical school curricula. For example, Boston's Museum of Fine Arts "has partnered with Brigham & Women's Hospital since 2009, to present a two-hour workshop as part of the Humanistic Curriculum, an aspect of training for first-year residents focusing on some of the challenging human aspects and issues of medical practice. The MFA workshop uses objects from the Contemporary, Ancient, Asian, American, and European collections as springboards for exercises and discussions that connect to such issues as dealing with death, sharing different perspectives, professionalism, and self care."[6]

Much of the art and medicine educational experiments and programs have had as their learning goals the improvement of visual diagnostic skills among doctors, a key skill set for recognizing pathological tissue and physiological abnormalities. At the University of Texas Southwestern Medical School, the course "Art of Observation" has been established as a preclinical elective for first and second year medical students. "It is taught primarily at the Dallas Museum of Art, with sessions at UT Southwestern Clements Hospital, The Nasher Sculpture Center."[7] The Cleveland Clinic has established an Arts & Medicine Institute which engages with local artists to promote patient well-being and the Cleveland Clinic Art Program founded in 2006 curates over 5,400 pieces of fine art throughout the clinic. At Columbia University, "The Professional Eye," is a course designed for medical students at Columbia University's College of Physicians and Surgeons to increase visual observational skills. Similar programs at other universities include the University of Florida's Master Degrees and Graduate Certificates in Arts in Medicine and Arts in Public Health.

Weill Cornell Medicine-Qatar has been a leader in the Gulf in medical humanities that incorporate various creative arts into medical education including visual art, writing, and drama,[8] as well as medical information literacy and evidence based medicine information retrieval skills through the arts.[9] The premedical ethics module is taught primarily through literature, such as Kafka, Shaw and Chekhov. Emphasizing the importance of narratives in a doctor's training, WCM-Q has published four volumes of medical student essays covering such topics as art and film criticism, Islamic art, physician's professional identity formation, medical ethics, the patient perspective of disease, and sociological aspects of the medical encounter.[10] In addition, Dr. Alan S. Weber's course "Writing about Art and Medicine" in 2015 at WCM-Q incorporated an experimental interventional pilot study of the use of graphic narratives in teaching medical ethics.[11]

The Art and Medicine Project additionally adds to a growing evidence base for the benefits of Interprofessional Education and practice both internationally and in the GCC. Both VCUQ and WCM-Q and their parent institutions in Richmond and New York City have endorsed the emerging professional and pedagogical paradigm of interprofessional practice. The Institute of Medicine's seminal 2003 report entitled "Health Professions Education: A Bridge to Quality[12] argued for greater integration of interdisciplinary knowledge from allied healthcare members on the patient care team. Medical educators and the World Health Organization are increasingly advocating an integrated healthcare workplace in which various allied health specialists all contribute to patient care according to their individual disciplinary knowledge. The WHO Study Group on Interprofessional Education & Collaborative Practice produced the report *Framework for Action on Interprofessional Education and Collaborative Practice* in 2010. According to WHO, "collaborative practice happens when multiple health workers from different professional backgrounds work together with patients, families, carers and communities to deliver the highest quality of care. It allows health workers to engage any individual whose skills can help achieve local health goals".[13] At the core of WHO's vision is the recognition that different fields not only contain different technical skill sets, but also differing ways of approaching and solving problems – the ability to borrow, adapt and learn from the analytical tools developed in other disciplines was a key impetus behind the Art and Medicine Project. Instead of a role-based and sometimes hierarchical professional workplace in which medical problems are only solved through scripted workflow algorithms, WHO's interprofessional framework encourages the participation of "any individual whose skills can help" which opens the door to non-traditional sources of input, such as the artist who improves motor and communication skills of stroke victims through expressive arts therapy, the design-

er who improves usability and efficiency of technology through better medical device interface design or the architect who increases patient wellness through more biophilic hospital layouts.

In 2009, Weill Cornell Medicine-Qatar, Sidra Hospital, Hamad Medical Corporation, and Qatar University College of Pharmacy created the Qatar Interprofessional Health Council (QIHC) to advance the interprofessional paradigm.[14] In 2014, Qatar University's College of Pharmacy also formed its own Interprofessional Education Committee (IPEC).[15] WCM-New York has additionally introduced interprofessional education pilot programs into its new curricula. Cornell maintains an interest in the specific occupational health issues suffered by artists and operates The Center for the Performing Artist at New York-Presbyterian Hospital / Weill Cornell in Manhattan which treats problems such as dystonias and other neurological problems as well as repetitive motion injuries.

Similarly, VCU has developed a number of interprofessional initiatives between the arts, sciences and medicine. The da Vinci Center at VCU Richmond supports a STEM Scholars Program in collaboration with VCU's School of Engineering. The cross-disciplinary da Vinci Center offers Undergraduate Certificates and a Masters of Product Innovation degree at VCU: "integrating arts, business and engineering principles, students in the Master of Product Innovation learn advanced product innovation topics pertaining to conceptualization, development, and commercialization of new products/services."[16] The VCU Medical Center in Richmond has partnered with the National Arts Program for the past ten years to host annual employee art exhibitions.

The Art and Medicine Project in Doha can also be situated within a new, more integrated approach to science and technology education called STEAM which now has full National Science Foundation (NSF) support in the U.S. STEAM education adds the "Arts" to the traditional Science, Technology, Engineering and Mathematics (STEM) curricula. Until the late 20th century, interest in the intersection of Art and Medicine was often viewed simply from a practical perspective, i.e. textbook illustration. For example, the visualization of medical and scientific concepts has been practiced at Johns Hopkins's Department of Art as Applied to Medicine training programs since 1911. However, the original concept of helping both specialists and the general public understand abstract medical and scientific concepts, or things too small or too large for comprehension by the human senses, has now moved into a new theoretical framework in which artists assist scientists and medical practitioners in creating new knowledge by imagining new ways of looking at datasets, especially Big Data databases which have never existed before in human history, and which have proved highly resistant to traditional forms of statistical and mathematical analysis.

The Rhode Island School of Design (RISD) has been instrumental in STEAM initiatives. For example, under a NSF grant in 2011 led by Professors Shawn Greenlee and Kurt Ralske, "RISD students focused on the creation of screen-based, experimental data visualization that addressed gene expression in oysters responding to attacks from viruses or other parasites. Working in collaboration with scientist-in-residence Marta Gomez-Chiarri, students created interactive mapping programs that facilitated new experiences of multi-dimensional information."[17] Thus, the art students and professors shared their expertise in visual language and semiotics with a genetics professor to find new ways of looking at complex datasets to extract novel information.

The Visualization Challenge (Vizzies) program was developed by the National Science Foundation and *Popular Science* magazine, formerly run by the AAAS journal *Science*. The awards recognize the creative dimension of scientific endeavour particularly at the discovery and hypothesis building stage. According to the NSF, "some of science's most powerful statements are not made in words. From Da Vinci's Vitruvian Man to Rosalind Franklin's X-rays, science visualization has a long and literally illustrious history. To illustrate is to enlighten! Illustrations provide the most immediate and influential connection between scientists and other citizens, and the best hope for nurturing popular interest. They are a necessity for public understanding of research developments."[18]

Interprofessional practice between the medical and visual arts and design has been actively supported at VCU Richmond's medical school, such as The Center for Interprofessional Education and Collaborative Care who offer training and research opportunities in IPE. The Center is developing a "Coordinated Care Certificate Program." Also, students at Richmond's medical school have spearheaded the Inter Health Professionals Alliance: "IHPA is one of the only interdisciplinary outreach groups on the Medical College of Virginia Campus of Virginia Commonwealth University. We have representatives from the Schools of Allied Health Professions, Dentistry, Medicine, Nursing, Pharmacy, Social Work, Biomedical Engineering and participants of the VCU Dietetics Internship program."[19]

The rest of this catalogue documents the process of discovery and learning as two groups of students and researchers from seemingly disparate fields were challenged to develop new work paradigms, new ways of looking at the world, and new problem solving techniques. As the following pages will show, collaborative and interdisciplinary work is not simply an abstract academic exercise. Student artists learned to view the body from a new and sometimes more physiological, biological and technical perspective; medical students grappled with visual lan-

guage, and learned to express multilayered and highly abstract concepts (central to their future practice) such as empathy, pain, hope, and suffering as communicative objects that reach out to the audience and invite them to reflect on illness and identity.

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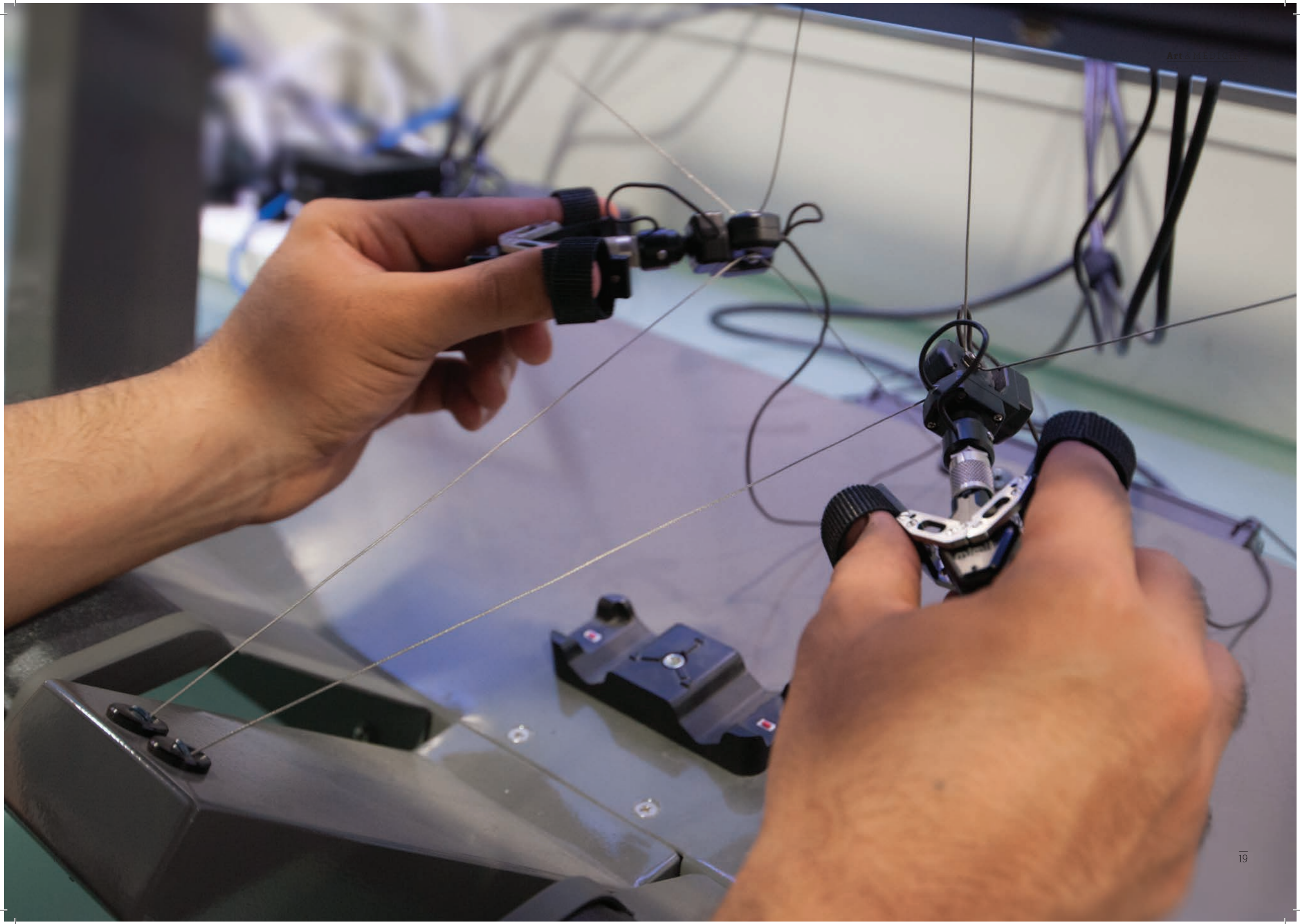
The Learning
Laboratory

The 'Art and Medicine' Learning Laboratory seeks to conduct research on the disparate but connected practices of art and medicine through an interdisciplinary collaboration between VCUQatar design students and WCM-Qatar medical students. The objectives of this research project are to develop innovative, interdisciplinary pedagogies that will provide art students with new understandings, materials and tools that will further develop their artistic practice, and will also allow medical students to rethink medical decision-making and patient care.

Students participated in a learning laboratory structured as a one-semester course consisting of workshops, seminars and lectures to investigate how each discipline solves problems, develops expertise, and utilizes creativity, analysis, synthesis, and evaluation to create new knowledge. After completing these faculty-led projects, students were tasked with producing interdisciplinary works of art that examine the relationship between art and medical practice in a contemporary context. The research process has been documented through photography, videography and an ethnographic-based research methodology. Specifically, the researchers have attempted to understand the collaborative process and record changes in attitudes and practices of student participants through triangulation of the following quantitative and qualitative data: pre-test / post-test, participant observation, interviews and questionnaires, reflective writing, and third-person observation. This publication acts as documentation of the student learning experience and the artworks that are informed by this experience.

Image from the 'Chromothesia' project

Introductory Lecture

The Art and Medicine experiential learning laboratory, also known as the Art / Medicine Project, was launched tonight in the VCU-Q Painting and Printmaking Department. The lead instructor Rhys Himsworth coordinated a variety of activities including an overview lecture, introduction to the course website on WordPress, and pre-tests for a research study conducted by Professor Himsworth and the Co-Principal Investigators Amy Andres, Director of the VCU-Q library, and Professors Alan S. Weber and Stephen Scott of Weill Cornell Medical Qatar. Designed as a one-semester special topics art seminar, the learning laboratory will also be used to experiment with new pedagogical approaches to arts and medical education curricula.

The Art and Medicine project grew out of the four faculty members' mutual interest in investigating how Art and Design and Medicine can intersect, create synergies and lead both art and medical students to more informed, more reflective, more collaborative and more interdisciplinary methods and practices to help them grow.

Rhys began the course with an overview lecture on some contemporary artists who are crossing the disciplines and incorporating biomedical materials, concepts and ways of looking at the material world into their artistic practice and vision. Examples of creative projects that incorporate technologies such as robotics, industrial machinery, electronics, the Internet, etc. were also introduced to the students. Rhys additionally introduced the class to seminal artists in the field who have found inspiration in medicine and biological materials, such as Marc Quinn, who sculpted a frozen likeness of his head out of nine pints of his own blood. The sculpture was exhibited at the National Portrait Gallery in London and later purchased by art collector Charles Saatchi (it was rumored in 2002 that the head had melted when power was cut to Saatchi's freezer). Rhys also screened several short videos of Stelarc, the Australian-Cypriot performance artist who experiments with robotic extensions of his own body in order to explore contemporary consciousness and the meaning of being human. His research at Nottingham Trent University in the UK and Curtin University in Australia

into artificial intelligence, robotics, and body modification has led him to implant devices into his body, including an ear surgically sutured into his arm.

Dr. Stephen Scott, Associate Professor of Family Medicine and Associate Dean for Student Affairs at WCM-Q, observed about the opening meeting: "in presenting examples of artists who engage the methods and achievements of science in their work, Rhys encouraged the class to think about fundamental questions: what is art? what is its purpose? how does the medium influence or illustrate the themes or questions raised by the art? It was fascinating to see how students not only reacted, and perhaps initially rejected some of the artists' ideas, but also engaged with the limits and opportunities of art and science."

Since the research team is additionally capturing the development of student learning and attitudes throughout the course, some pre-testing was incorporated into the first class. The entire class and the instructors as well took the Torrance Tests of Creative Thinking administered by Dr. Alan S. Weber, Associate Professor of English at WCM-Q. These two widely used Tests (a Figural test based on drawing, and a Verbal test based on words) were created by Dr. E. Paul Torrance to measure human factors that he considered universally described human creativity in both children and adults. The *Thinking Creatively with Words* test measures: fluency; flexibility; and originality. The *Thinking Creatively with Pictures* test measures characteristics such as emotional expressiveness, internal visualization, synthesis of incomplete figures, and the extending or breaking of boundaries to name but a few.

According to Yanal Shaheen, a WCM-Q medical student, the first session opened his eyes to a new world of seemingly disparate experiences which are now being brought together in both modern art and in the medical humanities: "It has only been one session and I've already started to realize, as a medical student, the beauty of art and its vitality to a humane experience of life…. I've never thought that such two seemingly different fields can have that large of an influence on each other in numerous ways and dimensions."

Farah Al-Sayyed, another WCM-Q medical student added: "I didn't really have any expectation prior to the course …the artists and their art pieces are speaking another language that half our class members seem to be fluent in, and watching the interaction is exciting because I feel like I'm being offered this great perspective, but I'm also not quite sure how to take it all in yet."

Emelina Soares, a VCU-Q art student, commented on her experience of the first session: "the course offers students in the Arts and Design the opportunity to explore possibilities when working with medicine alongside with their own practice. I am definitely excited to see myself move in a direction unconventional to my routine. The exposure of these achievements is also beneficial for us upcoming artists within the growing art culture of Qatar."

Off to an auspicious start, the class and research team look forward to developing and tracking this ground-breaking pedagogical and artistic experiment in the State of Qatar. Having situated itself as a learning hub in the Arabian Gulf and MENA region through Qatar Foundation, the Qatar National Research Fund, and WISE education summits (which awards 500,000 USD to an international education laureate each year), the State of Qatar has encouraged an environment of innovation in education.

Student working on the app, Interaction of Color (Joseph Albers)

Books featuring artists Olafur Eliasson and James Turrell, who often work with color and light as subjects

Color Theory

Marco Ameduri
Associate Professor of Physics and Associate Dean for Pre-Medical Education, Weill Cornell Medicine-Qatar

Michael Perrone
Assistant Professor, Painting and Printmaking Department, Virginia Commonwealth University in Qatar, and a practicing artist.

On January 18 the students participated in a class dedicated to both the scientific and artistic concepts related to color theory.

Dr. Marco Ameduri started the class by describing how physicists talk about color. Through his presentation, he explained concepts related to light, sound waves, and energy. He also explained how the human eye experiences and perceives color through various optic principles.

Michael Perrone followed the science-based theoretical presentation by showing the students a series of paintings, both historical and contemporary, that are inspired by color. These painters were also influential on Michael's own work. Paintings by the following artists *Edward Hopper, Ellsworth Kelly, Gerhard Richter, Giorgio Morandi, James Turrell, Paul Cezanne, and Piero della Francesca* were examined in class.

Michael also addressed how painters apply color by describing how colors can define depth or create mood. He also discussed Johannes Itten's Elements of Color and the Seven Contrast Colors. Students were then led in a series of color-based exercises including the use of Color-Aid Paper and the web-based app of Joseph Alber's Interaction of Color. A WCM-Q student commented on the class session:

"It was interesting to see how color is viewed as an important tool used to create (art) as opposed to a phenomenon to be studied and explained with formulas. I had never considered how much thought goes into color choice or the kind of subtle/not so subtle effect a combination of colors can have on an audience."

Another WCM-Q student summarized the class by saying:

"I thought med students would know a lot about color, but I have changed my mind because I now realize that the science is just a language for communicating about color."
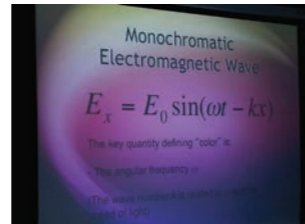
Slide from Dr. Marco Ameduri's presentation

Environmental Experience

Dr. Mohamed Cherif Amor
Professor of Interior Design,
Virginia Commonwealth University

Dr. Mohamed Cherif Amor was the key presenter for the Environmental Experience class. He first engaged the students in a group discussion about how science contributes to arts and design. He also introduced the Person-Environment-Behavior Paradigm (Moore and Golledge; 1976) explaining that behavior, and how a person behaves in their environment, is critical to interior designers. Dr. Amor explained social psychologist Kurt Lewin's 1936 equation:

$B = f(P, E)$
where B = behavior, P = person, and E = environment

In other words, behavior is a function of a person interacting with his or her environment. The EB (environmental/behavior) approach suggests that while it may be true that environments produce behavior, it is certainly true that behaviors produce environments.

Dr. Amor explained that the neuroscience approach relies upon more than behavioral studies as evidence (e.g., physiology). He described one of his own studies in which patients were put into controlled environments to see what happens in the brain when certain images are projected. The objective of the study was to see what affects the "active zones" of the brain. Images used in the study were categorized as:

positive image
neutral image
negative image
Sky composition

Study results showed that Sky composition and positive images had the most impact from a behavioral perspective. Dr. Amor's study also used neural mapping, comparing behavioral data to neural data.

The students were highly engaged during the presentation asking numerous questions and responding to comments from other classmates. The dialogue helped spark new ideas for future projects.

Labeling Exercise

After Dr. Amor's presentation, Amy Andres led the students through a labeling exercise that enabled the students to explore the stereotypes of their respective majors. Two pairs of students (1 VCUQ/WCM-Q) were asked to improvise a conversation. One student was "labeled" with a negative stereotype (unbeknownst to them) while the other student was instructed to treat them according to the descriptors of the stereotype (e.g., smart, geeky, naïve, child-like, rigid, boring). After the improvised conversations, the students who were labeled were asked what it felt like to be talked to in such a way, whether or not they tried to deflect the image, etc. After both pairs of students completed their conversation, the entire class discussed stereotypes, both positive and negative, and considered how their diverse skill sets might strengthen the class's future collaborative projects. The stereotype exercise was developed by Ms. Andres based on preliminary data that the researchers gathered in pre-course audiotaped interviews. Researchers found surprisingly similar mutual stereotypes about each other's respective field of study among the student participants.

A slide from Dr. Mohamed Cherif Amor's presentation

Students engaged in a round table discussion lead by Dr. Mohamed Cherif Amor

Chromothesia

Alan S. Weber
Associate Professor of English,
Weill Cornell Medicine-Qatar

Rhys Himsworth
Director of Painting and Printmaking,
Virginia Commonwealth University in Qatar

Amy Andres
Interim Director of Libraries, Virginia
Commonwealth University in Qatar

Stephen Scott
Associate Professor of Family Medicine in
Medicine; Associate Dean for Student Affairs;
Consultant, HMC; Weill Cornell Medicine-Qatar

Rhys Himsworth (VCUQ) briefed the students on a project that was informed by their lectures using color theory and the environmental experience: A lighting installation at WCM-Q. As part of the introduction to the project, Rhys presented the work of light-based artists including James Turrell, Spencer Finch, and Olafur Eliasson. Students then worked in groups to conceptualize ideas for the light installation project. Afterwards, each team presented their idea to the class for further discussion.

Brainstorming the Installation: Design and Experience

Students met with Amy Andres and Alan Weber in front of the WCM-Q light installation for a brainstorming session on the remaining tasks to complete the installation in the north corridor of the WCM-Q building. Last weekend, with students and faculty working in shifts, basic construction neared completion with the crews framing and covering the roof. Some further painting and light-proofing tasks remained. Amy facilitated the discussion and created a draft of a task list after the meeting to guide further the continuing discussions and aid in trouble-shooting the remaining conceptual and practical items. The videographer was present to film the brainstorming as part of the ongoing documentation of the process and development of the course. Alan took observational notes of the group dynamics and discussion points, since one of the goals of the project is to record cross-disciplinary decision-making and problem solving in action between two groups of students from very different fields and training backgrounds.

Students discussed and debated all aspects of the installation such as its more physical and tangible facets including construction and supplies, ordering, and deciding on what materials would be used to finish the interior. There was consensus that some testing of the interior lighting along with samples of the finishing materials would be necessary. For example, at the end of the session, Amelie showed the group some stretchy white fabric material that she obtained that could be used inside to modulate the colored lights. Students later tested shadows, design ideas, fabric placement etc. inside the installation using the LED lights from their cell phones. Most of the session was devoted to refining the conceptual aspects of the piece and what the group wanted to communicate to the person experiencing the installation. Themes included light, wellness, color, emotion and community experience (i.e. how could someone's experience in the installation be recorded and communicated to someone else?).

The idea of including music as an artistic element was proposed by Faryal, but some students felt that music could become too complicated with respect to integration with the lighting elements. Also, there is the practical concern that the hallway is a working part of the WCM-Q building and music might be distracting to day-to-day work and educational activities. As discussion developed, it became clear to all students that the further development of the installation was a complicated problem with many dimensions including the vision and conception, safety, logistics of construction and interior design and finishing, as well as the technological aspects involving the Internet, since there is an electronic component of the installation. CMU-Q Programmer Ossama Obeid and Rhys have been working with WCM-Q's Facilities Management and IT Departments to solve both wireless and wired networking issues in order to bring the installation to fruition. Some discussions were tabled because Ossama was not at the session and some conceptual ideas required further discussion with him about the technical capabilities of the available equipment and programming constraints. Thus the session was an interesting and sometimes conflicting mixture of desires, wishes, ideas, constraints, rules, and realities.

Amy also steered the group into a discussion of how to market, present, and communicate the installation to the public and some excellent ideas were rapidly generated about social media, postering, and drawing on the HBKU student center for assistance in promoting the installation. Safety issues also sparked a deep discussion, since they are intricately linked with interior design. Disabled access, and plans to assist physically challenged individuals experience the installation, were discussed as well. The following day Amy circulated detailed notes about the brainstorming session to the students and Co-PIs for further discussion.

After further brainstorming the group decided upon an interactive approach to the way in which the light of the space would evolve. Using programmable LED lights the team were able to change the lighting of the interior space remotely and due to inputs of information. The team decided to monitor people's moods by searching for hashtags on twitter that associated the place of Doha and particular moods from a pre-determined set. For example someone tweeting the word 'joy' would cause the lighting installation to change color to a color associated with that mood. Therefore the piece would be reacting to the world around it. The students discussed the fact that even with a strong social media marketing campaign many people do not have twitter accounts and some may want to interact with the work in a more direct way. After some discussion it was decided to have an iPad placed outside the installation where audience members would be asked how they feel and would choose a mood from a selection displayed on the screen. Having chosen a particular mood the installation would slowly change color over time to reflect the color of their mood.

Chromothesia

What happens when medical students and art students come together to conceptualize a work of art?

What happens when interdisciplinary perspectives are applied to the work's design and execution?

Chromothesia is the result of such collaboration.

Six students from Weill Cornell Medicine Qatar and six students from Virginia Commonwealth University in Qatar are now participating in an experimental, semester-long course that examines the contemporary intersection of medicine and art and the degree to which the disparate practices of artists, designers, clinicians, and scientists can inform and inspire one another.

By thinking, problem-solving, and doing, the twelve students participating in the course have created this interactive installation. Influenced by artists such as James Turrell, Spencer Finch and Rafael Lozano Hemmer, who either use color, light, or technological interaction within their work, the students have created an immersive experience for viewers. The students conceived the idea of using light and color as mediums to create an experience based on the emotions of the collective consciousness of the community of Doha. Using twitter hash tags sourced from around Doha, the installation takes an aggregate of the community's emotional status and translates it into a particular color hue that changes over the course of the installation.

You are encouraged to tweet your emotional status on the tablet screen before and after you enter the installation. By doing so, you contribute and collaborate toward the generative artwork over the course of the exhibition and define the experience of the artwork for future viewers.

So, What Do We Want To Do? Considering the Integration of Two Disciplines

Peter Martin, Assistant Professor in graphic design at VCUQ lectured on The Graphical Language of Scientific Practice. Peter holds a B.S. in Environmental Design and Analysis from Cornell University and an M.F.A. in Communication Arts and Design from Virginia Commonwealth University and he has a wealth of professional experience.

Peter introduced his lecture by offering that he could contribute to the class by exploring the mechanics of the two disciplines of Art and Medicine coming together. Peter then began his talk from a philosophical perspective. Peter introduced such concepts as "intention embedded within a capacity for action." He also discussed Self Determination theory, indicating that human beings have 3 basic needs – they have some competence and a sense of that, some autonomy, and relatedness. Peter then introduced the framework of:

> *Agency – intentional action*
> *Practice – assuming the role of an agency*
> *Discipline – conceptualizing and propagated agency*

Peter then showed a clip from the U.S. television show "Little House on the Prairie," showing the characters rejecting a talking machine (Edison phonograph): "I can hear my own voice." The clip raised interesting questions about the representation and reproduction of reality. Peter then discussed the important area of ignorance, which he conceptualized as 'not considering (ignoring) the value of alternative agencies.'

Peter Martin
Assistant Professor of Graphic Design,
Virginia Commonwealth University in Qatar

This section of the talk generated student questions and discussion: Faryal asked "what is ignorance? Is it not having knowledge?" Farah asked if ignorance equated to a lack of empathy. She related ignorance to the television clip and analyzed the characters not being able to see from another point of few (referring to the "Little House on the Prairie" video clip).

Peter continued his talk by telling the story of Akbar, whom he contracts for work around his house. Peter wanted to build a tiled patio and asked Akbar to find concrete blocks. When the delivery of blocks arrived, Akbar was concerned that not all the blocks were there – he could not count the blocks because he had not gone to school. However, despite his lack of formal education, Akbar built the entire patio with a 1% grade to funnel off rainwater (Qatar experiences occasional flash flooding).

Akbar's skills provoked Peter to think about individual agencies. Akbar could not promote himself on the Internet, or advertise his services – and what is he doing? Bricklaying? Engineering? So what is it that a discipline does? Peter suggested that this question of Akbar's liminal "professionality" could be a learning point for this learning laboratory.

Peter continued by introducing a parable about an archer. He showed a PowerPoint slide of an arrow with an orange bulls eye. A skillful archer had absorbed all the knowledge that he could. But he wanted to know more, so he started a quest, and journeyed to find a master archer. He asked in every village who is your best archer? Then he came upon a whole collection of bulls eyes in the forest, all with an arrow precisely in the middle. He made inquiries about this exceptional archer and was led to a barn covered with arrows and bulls eyes. An Old man came to the door. Who is the man who hit all the bulls eyes? The Old man replied that he was the one. "Can you teach me?" The man agreed and showed him his method. First he shot an arrow at the barn. Then he approached the barn and painted a bulls eye around the arrow.

Peter asked the class, 'what do you admire about the old man?' One student responded that 'the Old man is creative.' Rhys interjected about the importance of the craft, working with the material; you are a conceptualist, so what? So you can paint realistically, so what? Rebal added that the Old man is selling the idea that he was skillful in hitting the bulls eye, but that was not the reality.

Peter replied, is the archer made a fool of? Is that what he was really aspiring towards?

Peter continued and introduced how one could conceptualize Art and Medicine as a set of contraries:

Art:		*Medicine*
selfishness	⟷	selflessness
performance	⟷	practice
timelessness	⟷	timeliness
strategically honest	⟷	honestly strategic
replication of fact	⟷	establishment of fact
questioning	⟷	answering
verifying agency	⟷	expanding agency

Medicine in the end, Peter stressed, is finding the answer; art is about verifying its own agency, whereas medicine is about expanding its agency.

Peter noted that what is exciting about this learning laboratory is how these two areas which are so different can be integrated. Art uses the typical to restore the exceptional. Medicine involves healing someone, and returning someone to a normal state of being.

The next part of Peter's discussion focused on Design and the endeavor of design. Herb Simon's definition of design was that everyone who designs is trying to take an existing situation into a preferred situation. Why is this a preferred situation? One answer is to think about the future. Ray Kurzweil, Director of Artificial Intelligence at Google, has certain expectations about the future: in 2020 Nanobots will be smarter than our current medicine / Turing tests will begin to be passable / self driving cars will be displacing drivers / in the 2030s virtual reality begins to feel 100% real; eventually we will be able to upload mind and consciousness to the cloud / nanotech bots will be able to make any object, i.e. food. You will be able to link wirelessly your cortex to a synthetic neocortex.

Yanal asked 'on what bases are these predictions made?' Rhys pointed out that Kurzweil did predict some things like smart phones, and wireless access to the Internet. Faryal said that for the longest time, there was a search for what consciousness is. Habeeb had read a book by Steven Johnson, introducing the concept of 10 x 10 – now it is 1 x 1 – 1 year to master technology, and 1 year for it to be in everyone's home. Peter then showed the videoclip, "what do you want to do?"

Peter then offered the notion of 'platform' to the class as part of the sequence of "Procedure, Process, Platform." The elements of a platform include: a situation (coordinated for intersecting responsibilities), environment (shared dynamic awareness and experiences), and media (set of knowledge activated mediums).

Next Peter screened the TedTalk "Before I Die" by Candy Chang. She covered public spaces in New Orleans with stickers, chalk, etc. She revealed in the video that she always trusts a city that has music. Many of her public art projects involve abandoned properties. In the "Before I die" project, Chang paints "before I die, I want to…" on a public space, and participants leave their responses in the form of graffiti. Some of the responses shown in the video include "Before I die, I want to be tried for piracy." Chang emphasized that two of the most valuable things we have are time and relationships with others.

Peter took his platform model and showed how it applied to Candy Chang's "Before I Die" project. Peter also passed out a diagram for diagramming the platform. Rhys said that his diagram could help focus some of the ideas in the class. Rhys asked the class if what they had done in class thus far related to Peter's talk? Emelina said 'I see elements of our class in the talk.' Noor added that she liked the play on words "exception and typical."

Peter continued with his observations, noting remarkable symmetries between the two disciplines of Art and Medicine. Rhys asked if the class had any thoughts on the notion of ignorance, since there is a negative connotation to the word. Yanal responded that he didn't like ignorance linked to some universal absolute. Rhys countered 'is ignorance a value in a creative process?' Rebal added if you are not open to explore other experiences, ignorance is not good. Rhys said that ignorance has been a positive thing – not seeing the value of exploring something. Yanal interjected, when you think about the reasons for this, the fear of change, you are not being exposed to many perspectives. Peter said that ignorance can involve a deficit of knowledge versus ignoring the possibility of knowledge. Also, we are all ignorant; we can have passive or active or willful ignorance. You might dismiss someone from some discipline. Passive ignorance is the state where you have no idea of what someone else does. You weren't paying attention to the possibility that they were there. Yanal – the problem is when these two definitions are linked. Peter – we need courage to find out that there are some things out there. Social currencies and hierarchies are out there – we need courage to step out of that boundary. Farah added that the archer introduced earlier was the ignorant one. We are going in blind, which makes us not ignorant, because we don't know what is out there. Farah continued – we haven't found the platform yet. Emelina noted that the class could be the platform. Peter – it will form itself; that is where you will get authentic understanding. Faryal – we are ignorant about what will come out of this class, which makes me fear for the future where all is done for us. Peter asked – in the AI labs, what is the intention? Change is happening so quickly but we have to prepare ourselves. Stephen Hawking believes that AI will bring the apocalypse.

The Gaze

In two separate but interlinked lectures, Debra Hanson and George Awde explored the gaze both in art history (19th and 20th century depictions of American doctors and operating theatres) and contemporary photography. They both explored visual power relations in the context of Jacques Lacan and Michel Foucault's critical insights on the dynamics of viewing others in medical encounters.

Debra Hanson started the session by presenting on the concept of the gaze in Thomas Eakins's "clinic" paintings, *The Gross Clinic* (1875) and *The Agnew Clinic* (1889). Through an in-class activity the students were organized, by discipline, into two groups and asked to describe what they saw in *The Gross Clinic*:

Cornell Observations
· Operation or Dissection: Dissection doesn't have blood, but a dissection would take place in a lecture hall
· Show and tell
· Surgeon/doctor has confidence as if he has done this many times before; waiting for the right angle to prepare for explanation
· Woman scared of dissection - sexist that she is the one who is scared
· What is happening in the upper half of the painting?
· Interesting that the artist didn't focus too much on the body; the body looks like a 'slab of meat,' it doesn't look like a human body. Maybe the body wasn't the focal point
· It is a study environment

VCU Observations
· Reminded of Caravaggio's work with regards to light/dark contrasts
· Painting is bottom heavy, but Eakins has managed to capture entire theatre
· Symbolism in terms of male/female figures; male dominance, woman pushed to the side

Debra Hanson
Assistant Professor of Art History,
Virginia Commonwealth University in Qatar

George Awde
Assistant Professor in Painting and Printmaking,
Virginia Commonwealth University in Qatar

The Agnew Clinic

Thomas Eakins, 1844 - 1916.
Philadelphia Museum of Art. Gift of
Samuel B. Sturgis, 1973

George began the session with an in-class experiment: He asked two pairs of volunteers to come to the front of the room and face one another. He then asked one person from each pair to describe what they saw in the other person. The objective of the experiment was to demonstrate how "seeing" others is a form of power, how our descriptions and assumptions may be accurate (or inaccurate), and how it can feel to be "gazed" upon for several minutes without being empowered to respond.

George presented an array of photography to highlight issues related to the male gaze, the female gaze, the Oriental gaze, and the "colonial gaze." Some of the photographers and artists featured during George's presentation included Jen Davis, Collier Schorr, Lorna Simpson, Van Leo, Youssef Nabil and Shirin Neshat. As a way to explain the concept of the Oriental gaze, George shared the famous photograph by Steve McCurry of the *Afghan Girl* (1984). He also showed a fascinating *National Geographic* video (2010) of the search to find the woman, Sharbat Gula, who had no idea her image had become so iconic. The students were then led in a group discussion about the narrative of the original photograph taken in 1984 compared to the images of Sharbat featured in the more recent video.

George also suggested a couple of news articles for further reading: "The Female Gaze: Women Look at Women" *(Contemporary Art Daily)* and "Lorna Simpson's Photography: Gold Afros, Chess Players, and 50s Glamour" *(The Guardian)*. The notion of the gaze, as both Debra and George demonstrated, is an important concept for exploring human power relations, identity, and meaning in a wide variety of contexts, and the medical world cannot be separated from this intricate web of seeing and being seen.

Portrait of Dr. Samuel D. Gross (The Gross Clinic)

Thomas Eakins, 1844 - 1916
Philadelphia Museum of Art. Gift of
the Alumni Association to Jefferson
Medical College in 1878 and purchased by the Pennsylvania Academy
of the Fine Arts and the Philadelphia
Museum of Art in 2007

The Body

Rachel Koshi presented a lecture on Michelangelo Buonarotti (1475-1564) illustrating the Italian artist's knowledge of and preoccupation with dissection and anatomy. Professor Koshi is Professor of Anatomy in Cell and Developmental Biology and she worked for many years at the Christian Medical College in Vellore, India. Dr. Avelin A. Malyango from the WCM-Q Anatomy Department was also present.

In her own words, Professor Koshi describes how she became enamored of Italian renaissance art. Her story illustrates how a medical humanities requirement in college turned into a life long learning passion:

"My interest in the history of Anatomy began when I started teaching anatomy in 1984. The next year I enrolled for a Masters in Anatomy and had to do a bit of history as part of the course. At the same time I studied museum techniques and have developed a keen interest in Anatomy Museums. Since '97 I have had many opportunities to visit anatomy museums around the world. Almost without knowing it I became drawn to learning more about the history of Anatomy. Last year, I joined the group 'Italiana Anatomia', a professional development group interested in 'Connecting Art and Anatomy'. Now there is no turning back…."

Professor Koshi provided a detailed and learned lecture on the life of Michelangelo focusing on his major works, his passions and successes, and his fascination with the human body. She revealed how the artist was able to access and dissect corpses in the dead of night by befriending the Prior Bichiellini of the Church of Santo Spirito in Florence. Michelangelo was the creator of several iconic pieces of art recognizable to most people in the world: the statue of David, la pietà (famously attacked by Laszlo Toth in 1972), and the ceiling of the Sistine Chapel. He was also the architect for St. Peter's Basilica in Rome.

Michelangelo di Lodovico Buonarroti Simoni was born in Caprese in Tuscany. Like his contemporary Leonardo da Vinci, he was a true 'renaissance man' excelling in sculpture, painting, architecture and engineering, and poetry. Much of what we know of Michelangelo comes from a biography by Giorgio Vasari written while the artist was still alive.

Rachel Koshi
MBBS, MS, PhD,
Weill Cornell Medicine-Qatar

Source: Sonnet of Michelangelo describing his work on the Sistine Chapel with image of the artist in the corner. Source: Scott Horton, Michelangelo – Painting the Sistine Chapel, Harper's Magazine, 2 May 2010

His patrons were the powerful Medici family and he was apprenticed to Domenico Ghirlandaio who taught him fresco painting. He also wrote about 300 sonnets. Professor Koshi read the sonnet below that Michelangelo wrote describing his suffering while painting the Sistine Chapel. The manuscript page below in his own hand contains a rough sketch in the lower corner of the artist stretching upwards to paint the ceiling:

Here is the translated sonnet, probably written in 1509:

In this hard toil I've such a goiter grown,
Like cats that water drink in Lombardy,
(Or wheresoever else the place may be)
That chin and belly meet perforce in one.
My beard doth point to heaven, my scalp its place
Upon my shoulder finds; my chest, you'll say,
A harpy's is, my paintbrush all the day
Doth drop a rich mosaic on my face.
My loins have entered my paunch within,
My nether end my balance doth supply,
My feet unseen move to and fro in vain.
In front to utmost length is stretched my skin
And wrinkled up in folds behind, while I
Am bent as bowmen bend a bow in Spain.
No longer true or sane,
The judgment now doth from the mind proceed,
For 'tis ill shooting through a twisted reed.
Then thou, my picture dead,
Defend it, Giovan, and my honour—why?
The place is wrong, and no painter I.

Source: Michelangelo Buonarroti, "Sonnet V (to Giovanni da Pistoia)," *The Sonnets of Michelangelo Buonarroti*, tran. S. Elizabeth Hall, 1903

Professor Koshi emphasized Michelangelo's early interest in the human form. The young artist looked at workers in various trades, and their forms and musculature, and drew their bodies. Michelangelo reportedly said, *"How can I establish a figure, even the crudest outline, if I don't know what I am doing?"* (qtd. in I. Stone, **The Agony and the Ecstasy**, 1961). He questioned what was causing the movement in the human body and he decided that he must learn anatomy. But where would he get bodies? The obvious answer, due to the restrictions on dissection and the prohibition on desecrating the body at the time, were the unclaimed bodies of the very poor at the Santo Spirito Church hospital.

Particularly noteworthy according to Professor Koshi are recent scholarly attempts to locate concealed anatomical structures in the works of Michelangelo and a small academic industry in this area of inquiry has arisen. For example, F.L. Meshberger and others have located the major structures of the brain in Michelangelo 's Sistine Chapel fresco The Creation of Adam.

As Suk writes, summarizing Meshberger's theory about why Michelangelo may have juxtaposed his knowledge of the brain from anatomy with this biblical scene: "Meshberger speculates that Michelangelo surrounded God with a shroud representing the brain to suggest that God was endowing Adam not only with life, but also with intelligence. This shroud, he proposed, has the shape of the cerebrum with composite features of both midsagittal and lateral views of the brain (Figure 2). In Figure 2, we synthesize Meshberger's thesis pictorially by outlining and superimposing the anatomic landmarks of the midsagittal and lateral surfaces of the brain. If one accepts Meshberger's interpretation, one must conclude that Michelangelo had a profound understanding of the anatomy of the brain" (Suk et al., 2010).

In late life, Michelangelo collaborated with anatomist Realdo Colombo (1515-1559) of the University of Padua who published *De re anatomica* and claimed along with Gabriele Falloppio to have discovered the clitoris and fallopian tubes.

Students were fascinated by Michelangelo 's boldness in carrying out the secret dissections in the mortuary of Santo Spirito at a time when violating a corpse was a crime. One comment was "imagine them catching him doing it." Students were equally amazed at how accurate his human anatomy was as reflected in his sculptures and paintings considering that there were few guides or textbooks in the area that provided accurate illustrations to the level of detail seen in Michelangelo's sculptures and frescoes. Vesalius's *De humani corporis fabrica*, the classic illustrated human anatomy text that defined an entire field, would not appear until 1543. Although Greek anatomists in Alexan-

Libyan Sibyl, Sistine Chapel Ceiling frescoes, 1508-1512
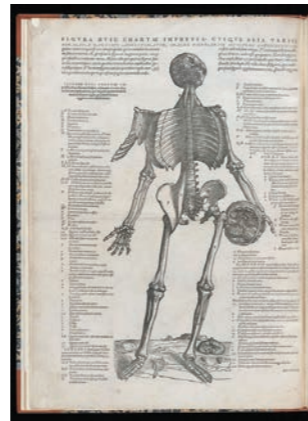
Anatomical drawing, Jan Stephan van Calcar, 1543
From: *Andreae Vasalii Suorum de humani corporis fabrica librorum epitome* (Andreas Vesalius)
Courtesy: Wellcome Library, London

Arteries and viscera according to Ibn Sina, 1632
From the Canon of Medicine, al-qanun Fi-T-Tibb (Ibn Sina)
Folio 126, rector, Arabic MS 155
Courtesy: Wellcome Library, London

dria had described in words much of the skeletal, nervous, and muscular systems of the body in late antiquity, illustrations of bones, muscles and nerves were rare and often based on Galen's dissections of dogs and the barbary macaque (an ape), and some representational drawings in Persian and Arabic medical manuscripts from the Middle Ages. Mondino de Luzzi (1270-1326) had restored ancient anatomy with public dissections and he wrote the first modern illustrated anatomy text **Anathomia corporis humani** in 1316, later published in book form in 1478 when moveable type printing became available. A comparison of a drawing from a 1541 edition of Mondino's **Anatomia Mundini, Ad Vetustis** with Vesalius's work and Michelangelo's anatomical drawings demonstrates the remarkableness of both Michelangelo's and Vesalius's achievements.

For the second half of the class, the students and faculty moved from VCUQ to the WCM-Q Anatomy laboratory. They viewed memorial tiles outside the lab that students decorate in order to acknowledge the sacrifices and generosity of the cadaver donors and their families. VCUQ art students asked numerous questions of the WCM-Q medical students about the experience of dissecting a cadaver. Noor was very interested in the medical students' emotional responses. Habeeb wanted to learn whether the experience of dissection had changed anyone's outlook on life and his or her relationship with the living. Faryal and Farah both emphasized that they didn't think too much about the cadaver and saw it as a learning tool, a concept that was echoed by Professor Koshi. Mu Ji expressed his excitement at entering the Anatomy lab course at this stage in his medical career. He indicated that this was one of the main reasons that he joined the profession of medicine, to be able to learn amazing and extraordinary things like the structure and function of the human body. The class ended with a discussion of the remaining elements of the art installation and the assignment of work tasks.

Medical Technologies One:
## A Visit to the Qatar Robotic Surgery Center

Students and faculty met with researchers at Qatar Robotic Surgery Center (QRSC). QRSC is located at Qatar Science & Technology Park and works on improvement of healthcare in Qatar by innovating new surgical technologies and offering training courses. QRSC researchers, Dr. Julien Abinahed, Dr. Nikhil Navkar, and Mr. Georges Younes presented short lectures followed by hands-on sessions demonstrating robotic surgery, medical imaging techniques, and surgical simulation. Dr. Abinahed provided an introduction to the QRSC research programs in instrumentation, image-guided navigation, modeling, and simulation. He explained that QRSC is not an academic institution, rather a Research and Technology Development (R&TD) facility that works closely with the local clinicians to identify unmet clinical needs and develop innovative technological solutions to address them. QRSC also works in coordination with local universities. Dr. Abinahed ended the presentation with a video of a robot-assisted partial nephrectomy operation and corresponding navigation technologies developed through QRSC and related to augmented reality.

During the tour at QRSC, students were encouraged to ask questions. Yanal inquired about robot accuracy. Noor asked, "How do you train the machine to recognize the tumors?" Eman raised an important issue that is a relevant concern to many physicians: "When a problem arises, who is liable, the surgeon or the company?" Dr. Abinahed emphasized that the surgical robot is not automated, and does not replace the surgeon. "If you are a bad surgeon, the robot will not make you a good surgeon." He also mentioned that if there is an incident there is always an option to go back to open surgery. Two surgical robots are currently in use at Hamad Medical Corporation and they are regularly used to perform surgical operations.

**Dr. Julien Abinahed,
Dr. Nikhil Navkar, and
Mr. Georges Younes**
QRSC researchers

Robotic end effector (grippers) training boards.
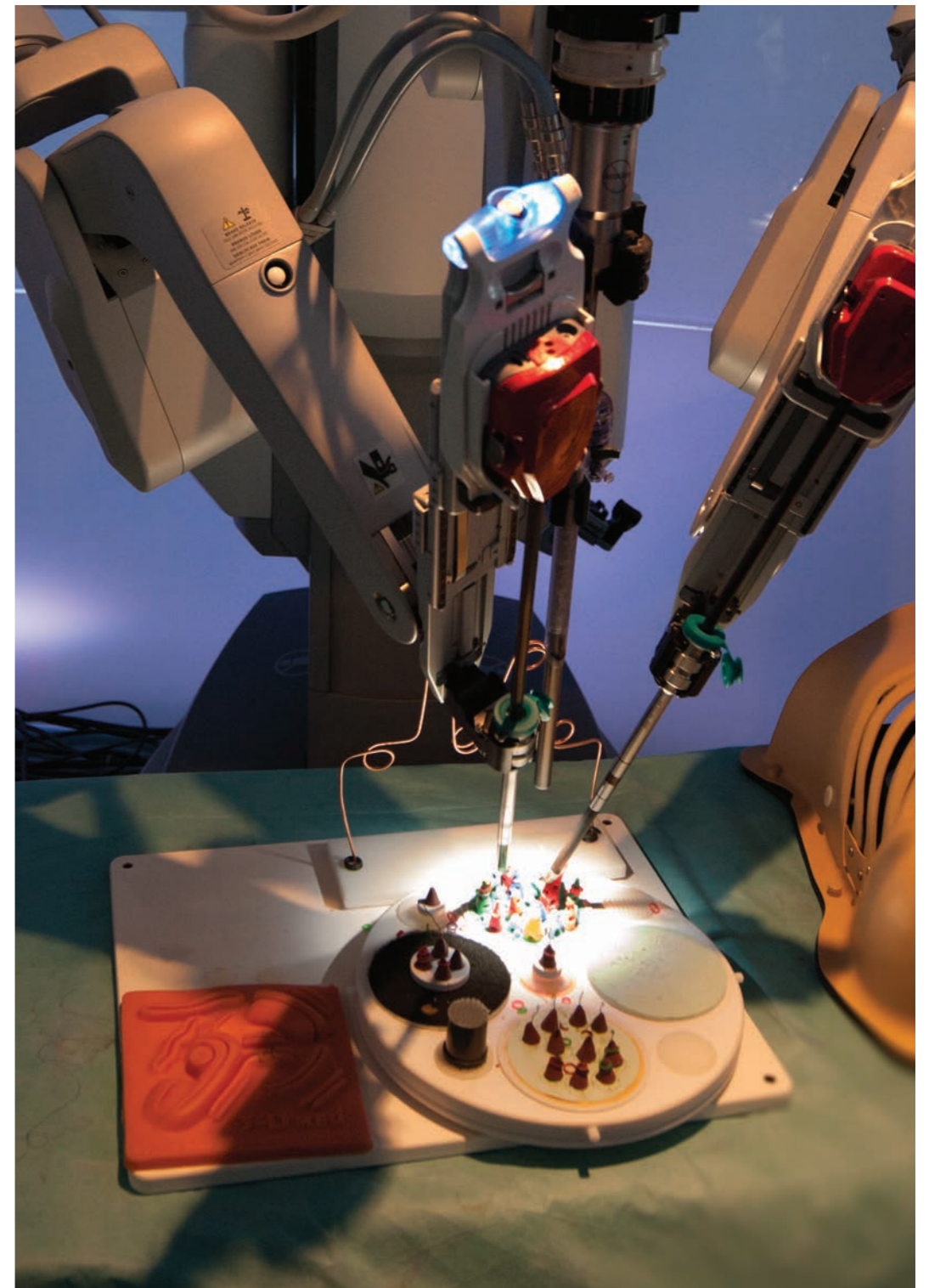
Nakhil Navki explains the functioning of the robotic arms and camera.

Art student Abdul tries his hand at virtual laparoscopic surgery.

(next page)

Art and medical students discuss the Da Vinci surgical robot arm training set up.

Art and medical students who visited the Qatar Robotic Surgery Center on March 15, 2015.

Dr. Navkar gave the next presentation. It was an overview on the history of medical robotics and evolution from open to laparoscopic surgery. After the presentation, everyone gathered around the da Vinci surgical robot (manufactured by Intuitive Surgical) located in the main tele-mentoring theater at QRSC. The students were able to control the surgical robot through a console and manipulate its arms on a rubber phantom situated across the room. The rubber phantom contained rings that could be gripped and moved among the posts. All students were able to take their turns at using the surgical robot and learning its advantages through the hand-on session.

Next, Dr. Abinahed gave a short presentation on medical imaging. The students went to imaging workstations where they viewed MRI and CT scans of different body sections. The software allowed visualization and manipulation of the medical images at various angles, colors, and magnifications.
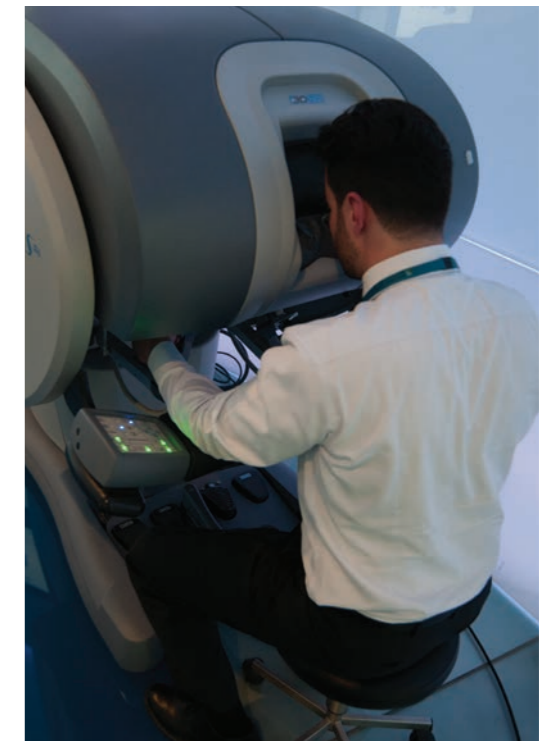
After the imaging session, Mr. Younes took the students into a simulation room containing laparoscopic simulators for training. He provided a history of simulation beginning with 1920s flight simulators. He also emphasized that software simulation for surgery is relatively a new field, about 30 years old. One of the students, Emma, mentioned that computer games are a form of simulation. Another student Faryal observed that physicians and medical students could use simulation to work on a virtual patient without putting a real person at risk. Mr. Younes added that using simulation techniques, clinicians could try new surgical scenarios rather than applying them on patients. Students moved to the computer-aided laparoscopic simulation workstations where they manipulated end effectors of the laparoscopic tools (such as electric cautery knife, stapler, cutter) and a camera to perform a virtual gall bladder removal operation. The students also got a chance to test a suturing simulator prototype built by QRSC. Mu Ji, a student, who was successful at rapidly detaching the gall bladder with the virtual cautery knife, suggested that playing video games is a good way to practice for mastering the hand-eye coordination required in laparoscopic surgery.

Med student Mu Ji working on the base plate while art student Mohammed supervises.

Medical Technologies Two:
Robotics Construction Workshop with QRID

Mouhyemen Ahmed Khan
Chief Executive Officer

Faiyadh Shahid
Senior Robot Developer

Saila Maham
Workshop Developer

Students and faculty returned to VCU-Q on the bus to participate in a robot workshop led by three members of the Qatar Robotics Institute for Development (QRID): Mouhyemen Ahmed Khan, Chief Executive Officer, Faiyadh Shahid, Senior Robot Developer, and Saila Maham, Workshop Developer.

The QRID team deliver robotics workshops across Qatar for educational purposes. The team showed students their kit for making and programming a small robotic arm. The first class of the two-part workshop focussed on the mechanical assembly. Mouhyemen asked the class "what is a robot?" and there was an interesting conceptual discussion about the exact meaning. Amelie thought a robot was something that copies something human. Mouhyemen mentioned Leonardo Da Vinci's sketches of a mechanical knight (automaton) drawn in 1495. The mechanical knight was later reconstructed in Berlin and Italy following Da Vinci's plans and it functions exactly as proposed.

Mouhyemen also stressed that robots do boring, dangerous, and repetitive tasks. One art student was paired with one medical student and tasked to build the robotic arm kit using the prepared model. The team guided the students through the process, but did not provide blueprints or design sketches. In the guided process, the students had to observe the model, think about the mechanical principles and then through trial and error construct the robotic arm. The workshop took about 1.5 hours and most of the students completed the full assembly. Students were very engrossed in the activity and few students even took a break.

The second class in the QRID robot arm workshop focussed on the programming and electronics of the robotic arm. According to the QRID website, which explains their mission:

"The Qatar Robotics Institute for Development was founded in 2013 by Electrical Engineering students at Texas A&M University at Qatar who are passionate about designing fine quality products in robotics and electronics. QRID is passionate about delivering knowledge about robotics through its self-designed workshops and seminars and develop an appreciation in this field for students across Qatar. We plan to promote robotics in this country by organizing various workshops ranging from a high-school level to university level so that students with next to nothing involvement in robotics can benefit from the workshops. QRID also designates teams among its members to participate and attend various international robotic competitions to benefit them by increasing their potency in robotics."

Qatar has embarked upon the field of education in various disciplines and aims to be a vanguard for productive change in the region. The aim of our organization is also to serve this greater vision of Qatar but specifically in the field of robotics. Through our mentor-based programs and participation in competitions we plan to create a network of highly enthusiastic roboticists in the region who will bring about a positive change to the engineering world."

Students were introduced to the UNO R3 circuit (mother) board built by Arduino. Arduino supplies both software and hardware for robot hobbyists and provides a Creative Commons licensed programming language and platform. As explained on the Arduino homepage, "the open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software."

Art and medical students begin constructing their robot kit with guidance from QRID workshop leaders.

VUCQ and WCM-Q students continued working on the robotic arm that they had started in the last class. Not all of the mechanical parts of the robots had been attached in the last class. Mouhyemen reviewed all of the parts that were used in the previous robot construction session and discussed their functions. Students had first put their arm together in the previous class by simply observing the paradigm model without necessarily knowing the function of the individual parts. Next came the programming phase in which Mouhyemen showed the beginning code of the robot program, describing each code line by line. He talked about the programming syntax and its symbols and conventions. Students launched the Arduino software on their computers which they had downloaded from the Internet. They connected the board to their computer and compiled the code. Students then used pinMode to talk to one of the pins. The QRID team then showed the code for blinking an LED light on the Arduino board. Mouhyemen explained the code step-by-step and then students typed the code into their program.

Mouhyemen explained the basic concepts of electricity, including positive and negative poles, grounding, and voltage. He also explored the concepts of digital and analog with the students. Next the QRID team illustrated the concept of a breadboard and how to set it up for the robot wiring. They also introduced the importance of avoiding short circuits while wiring. Then the QRID leaders explained how to wire the board and students wired the board with jumper cables.

Then Saila explained the Servo coding and how to manipulate the robotic arm through different values. Mouhyemen then explained what is a common ground and then traced the servo wiring for the students. The workshop directors next presented the students with a series of challenges. The last challenge was to program the robot arm to move to the beat of a popular song. Students were quite engaged with the project even at the end of the workshop at 9:30 pm. This interactional and experiential workshop was truly a collaborative process as students needed to analyze, discuss, and negotiate at each step of the robot building process in order to reach the final goals.

Art and medical students begin constructing their robot kit with guidance from QRID workshop leaders.
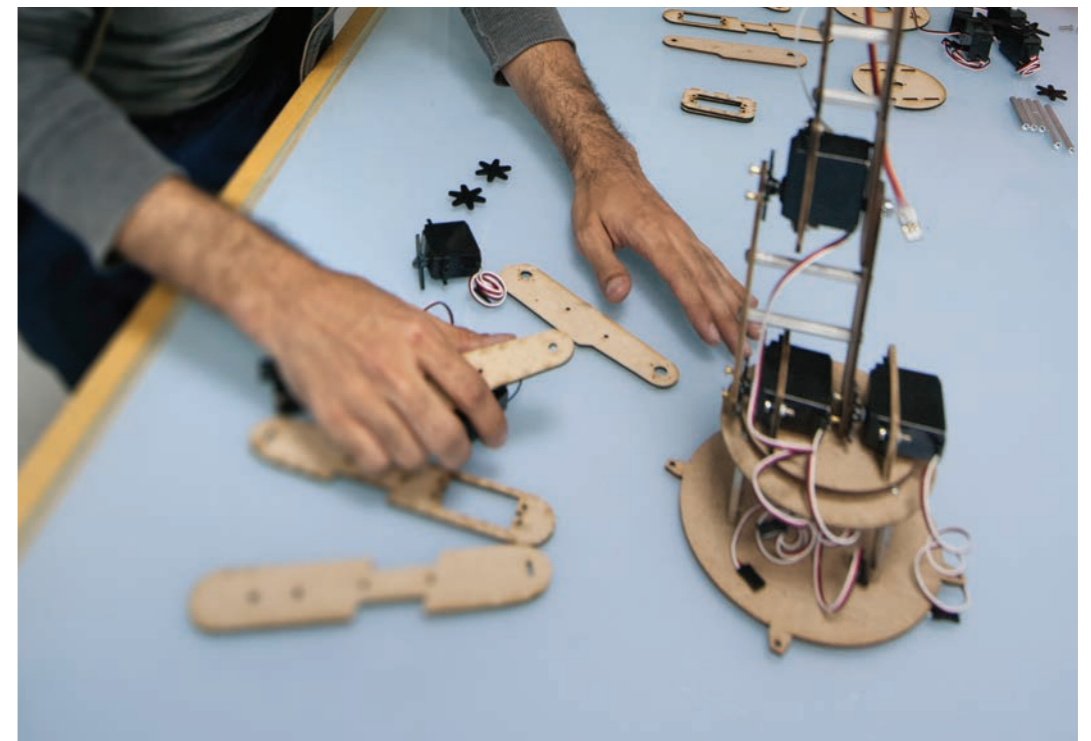
Visiting Artist Marilene Oliver

British artist Marilene Oliver lectured to the class via Skype. She explained her training at the Royal College of Art and according to her artist statement:

"My material is digitised bodies. Concepts such as Hans Moravec's 1988 call to 'download our consciousness to the datascape in order to survive' serve as springboards to create artworks that speculate how we might survive, refigure and evolve in the Digital Age. During the time that I have been working with scan datasets (I made my first work using scans in 2001) the impact and nature of digitisation in both the medical world and the quotidian has changed dramatically. From first being a tool for email communication, it has now become interwoven into almost every aspect of our lives from work to socialising and leisure, from shopping to body maintenance and from remembering our pasts to planning our futures. As an artist my focus is to be particularly attuned to these changes and challenge them in my artworks."

She told the class how she was interested in anatomy and became inspired by technological innovations in MRI and CT scanning, such as the Visible Human Project. In 1994 and 1995, a male and female cadaver were frozen and cut into 1,871 one millimeter thin sections and were filmed with conventional film and digitally scanned with computed tomography (CT) and magnetic resonance imaging (MRI).

She did digital scans of her father, mother, herself, and her sister and had them printed on Plexiglas. She also did a scan of herself and husband in a scanner in a four-minute kiss. She demonstrated to the class the MRI scans that made up the images of the kiss. She also showed how the electronic noise on the scans affected the images. She showed her work "Sleeping Beauty" (2005). She used strings and beads to create a sculpture like digital dew.

While describing her work "Radiant," she pointed out how in the early years of her work with medical images that she tried to get as much data as possible. She has also employed Positron Emission Tomography (PET) scans – patients are first injected with a radioactive tracer isotope. She made "Radiant" with an ink jet printer. This was the first time she worked with anonymized data and she enlarged the scans by 30% since the body seemed small. The body had been scanned by radiologists and was found to be free of any tumors. Her "Ice Man" project took seven and a half years to obtain the final data and several trips to Italy. Ötzi the Iceman was a 4,000 year old Copper Age mummy discovered well preserved in a glacier in the Alps in 1991. She also created an 'Ice Maiden.' Six years after she requested the scanning data related to Ötzi, officials said that she could use the information (the Iceman has been the source of numerous legal disputes). She visited the museum where Ötzi is displayed and they preserve him by spraying his body with water, which creates tiny ice crystals.

Marilene often uses CT data – this kind of data is post-processed. MRI data takes longer to obtain. With CT data, the artists can cut up images in all different directions. She indicated that this technical feature transformed her practice. "Dervishes" was a process piece that she used to learn the technology. In CT data you can put in an axis and rotate images around that axis. Depending on where the axis is, you can make different bodies, she added.

Ötzi the Iceman as discovered in the Tyrol in 1991

Section through Visible Human Male – thorax, including heart (with muscular left ventricle), lungs, spinal column, major vessels, musculature.

Source: Visible Human Project, National Library of Medicine

Iceman Frozen Scanned and Plotted Drillholes in acrylic and flourescent light, 170 x 60 x 30cm, edition of 6 plus 2 artist copies.

Marilene Oliver. "BangBangBlue" (2011).

Fallen Durga
Twin walled plastic
220 x 80 x 45cm

Now she normally uses only one body for her work – most of her work is based on this data. She described this particular anonymous body as 'like her muse.' She pointed out that 'When you use data of someone you know, it limits what you can do with it.' Marilene then introduced quotes from N. Katherine Hayles's seminal *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* to explain the theoretical basis of her work.

When she moved to Brazil, South American themes became influential on her work. "Dream catcher" (2009) was inspired by the dreamcatchers that she saw in the form of fish (these traditional talismans catch and filter out bad dreams). "Orixa" (2010) was inspired by a religion which arose from the fusion of African folk culture and religion and Catholicism in Brazil. Adherents in order to call back ancestors dance all night and spin. At one point in the ritual, one of the dancers receives the ancestral spirit. "Orixa" was created from seed beads all sewn by hand. "Protest" (2010) tells the story of an illegal immigrant who disemboweled himself to protest his legal problems with the UK immigration services. "Fallen Durga" (2010) was an intensely personal piece based on her loss of a close friend in a plane crash between Rio and France. This piece depicts the Goddess Durga upside down with several limbs dangling – she has lost her children and can not protect them.

When she was in Calgary and Montreal (2009-2012), she created "Keep me Safe from Harm" (2010). She had the unique opportunity to work with scientists, and ethicists working at stem cell research facilities. She remembers talking to a scientist who used blastocysts that are eventually destroyed in his research. In "Melanix Execute" (2011), a dancer interacts with an image generator. This work will be touring in Edmonton, Alberta.

She then described her move to Luanda, Angola (2011-2015) and how this impacted her work. One of her first realizations when moving to Africa was that access to medical scanning technology is a privilege that is not found all over the world. She could also not find many art materials that she was used to using. So she returned to an earlier interest in black and white photography and bleach.

Oliver's practice has been informed by this constant search for new media, new materials and dramatically innovative ways of expressing her vision using medical technologies and data sets that were once only available to medical imaging specialists.

Medical Imaging: Hamad Hospital

Students and three of the mentors met at Hamad General Hospital for a tour of the medical imaging departments. Hamad Hospital, built in 1982, is Qatar's main public hospital managed by Hamad Medical Corporation. Radiologist Maneesh Khanna led the group through the various departments of the hospital tasked with imaging, such as the Radiology, Computed Tomography Scanning (CT), and Magnetic Resonance Imaging (MRI) units. First Maneesh demonstrated a Computed Tomography (CT) scanner in action and explained its mechanism and physical principles. Specifically, students viewed the Somaton Sensation 64 built by Siemens. Students could witness live scan images on the monitor in the viewing room. Maneesh indicated that CT scanning uses high doses of radiation, and therefore is only used in situations for which it is most suited. Technicians first take a conventional x-ray of the area to orient the machine, so that only the exact area of interest is scanned, reducing radiation exposure to the patient. Naturally the medical students had many questions about the technology related specifically to medicine, but art students such as Emelina also gathered around the monitor and were fascinated by the images created, which the technician zoomed and resized, and changed the image angle from sagittal to coronal (frontal) to axial (transverse) to show the students the capabilities of the machine.

Maneesh then led the students into a Magnetic Resonance Imaging (MRI) suite and explained this particular technology, which unlike CT scanning, relies on magnetism and the change in orientation of protons (hydrogen atoms) in a strong oscillating magnetic field. This medical imaging technology, like CT scanning, often uses injected contrast fluid to distinguish various anatomical structures. The process suffers from haziness from moving organs, such as the heart and lungs, but the machine corrects for this kind of digital noise. Maneesh explained the process of MRI scanning and the patient experience – particularly the loud noises. The technician turned on the speaker positioned inside the MRI to communicate with the patient, to give a sense of the level of the machine noise experienced by the patient. Maneesh then took the students into a separate viewing room where images can be viewed and interpreted.

Power Outage!

Abdul wanted to experience an MRI scanning, so he prepared himself (all metal must be removed) and entered the machine. However, after only a few minutes in the machine, power was cut to the MRI department, later discovered to be a hospital-wide outage. Students and staff were left in total darkness, but cell phone lights soon broke the gloom. Qatar is undergoing rapid infrastructural development, and power, water, and telecommunications cuts are not uncommon due to road and building construction which can often sever trunk and feeder lines. Qataris also have some of the highest water and electricity usage rates in the world, since utilities are highly subsidized by the government causing overconsumption and occasional shortages. Maneesh used the time to entertain questions. Mu Ji asked about what happens when metal is present near the MRI machine? Maneesh explained the strength of the magnet and that simple objects like coins or belt buckles can accelerate at high speed in the room and injure patients and technicians. He told the story of one patient who forgot to take off a metal leg bracelet and whose leg became stuck to the machine. The only way to get the metal and patient off the machine was to power down the magnets, by letting the supercooled helium heat up. This process demagnetizes the superconducting magnets, but the helium expands and must be released, so the victim must be protected from oxygen loss in the room. The process is expensive, time-consuming and dangerous, so technicians first check MRI patients carefully for ferrous metal objects, surgical implants, cardiac pacemakers, and even tattoos (which often contain heavy metals in the ink and can cause skin burns).

Maneesh was intrigued about the class project and asked students about what particular projects they were working on. Rhys and the students gave summaries of their works-in-progress. Rhys stressed that many students were exploring the intersections between technology and medicine and the social implications of this nexus which could be expressed in various artistic media. Faryal said, referring specifically to the works of Marilene Oliver who had lectured via Skype to the class, that in medical school they were accustomed to viewing the body literally and educationally, but realized after seeing Oliver's work and the imaging devices at Hamad, that the medical body actually had a beauty attached to it.

Since all machines and computers were offline due to the power outage, Maneesh booted up offline MRI imaging software on his laptop called Osirix DICOM Viewer which he sometimes uses at home to view images. The group then moved to the hallway where emergency generator lights were functioning. Yanal asked about ultrasound and colored images that he had seen of dermal conditions. Maneesh explained the physical principles underlying sonar and ultrasound. Both art and medical students left with a greater understanding of the underlying mechanical, physical, magnetic and optical principles of medical imaging as well as with the interesting experience of a major power outage in a medical facility.

Student
Projects

FARYAL AND AMELIE

Faryal and Amelie described their proposed project: "Underneath: Within." They are interested in "tracking the movement and use of our ball and socket and hinge joints, which are located in our shoulders and hip bones and would become visible through the use of light in long exposure photography." They will explore these movements through dances from different cultures as well as the body as it moves through the states of prayer. They will use the technique of long exposure photographic shots. In their PowerPoint presentation they showed some of their preliminary experimental studies. Faryal indicated that they came up with this idea because when you are praying, your body is not the main objective; it is a tool to worship God. 'In most prayers, you bow down and you are in submission, whereas dance is about the body in a state which is the opposite of prayer.'

Amelie explained that they were inspired by the work of Marilene Oliver, and even though she uses generic CT scans, she makes her images very personal. The group was also influenced by Julien Breton who was at VCU-Q. They hope to achieve an interpretation of light painting, such as light reflecting on sand. According to their proposal: "As our project intends to reflect the movement in a spiritual and passionate state, the surrounding space of the recorded action should mirror its "spirit" appropriately. In order to achieve this, yet to also have a neutral space that does not overpower the light movement, we propose to photograph the prayer and dance movements in a desert themed environment. We believe that the LED lights will softly reflect on the texture of the sand and add a softness to the frame."

Amelie and Faryal projected images of Pablo Picasso, who created long exposure light portraits with a flashlight. Faryal stressed that they wanted to be the observers. Amelie added that their project would give insight into what is personal and intimate. Amelie also showed photographs of someone doing Hindu prayer with lights attached to their joints. The Red color was very significant due to its symbolic ramifications. Amelie noted that 'We hope to get up to 10 seconds for time lapse photography.' This goal would involve further experimentation. Rhys then opened up the presentation for questions.

One question involved the specific colors in the images – Amelie explained that different colors could be used to see who moves more and in what way. Emmy asked 'Is there a reason you are focusing on religion and dance and not just everyday movement?' Amelie replied that the movements they were investigating are so personal and individual. Amelie then suggested that 'maybe we could pay attention to something more ordinary, I don't know.' Rhys offered the suggestion that they could expand more on the aspects of art and medicine. Faryal offered the

insight that in the real world, you don't see religion and science interact, so their project would explore this relationship. Faryal added that they were documenting the way people move when they pray. Rhys said: 'for me, that link needs to be expanded – it feels a little tenuous to me. I can see the inspiration for acting out the prayer, spiritualist acts, but can you talk further about the body, talk about the muscle structures and so on?' Rhys also offered a technical critique of the written proposal – 'in a paper, an abstract gives a summary and introduction; you should have an introductory image that summarizes the work; that would have been helpful because I was processing everything while you were saying it.' Amy asked about the sand that will be used in the piece. Amelie replied that the sand gives some depth, but will not be overpowering to the piece; She added 'I tested it, and it softens it.' Amelie offered 'I think the sand will help contextualize the work, where it is located.' Habeeb expressed that using sand as a background might lead to the danger of orientalizing the work. Habeeb suggested that 'When you said sand, it said serenity and calm to me.' He continued "We have heard about people doing dances in the desert and musicians doing music in the desert.' Amy asked what dances that they had identified? Amelie explained that they had only looked at 2 dances in depth and they hadn't figured out the other dance that they would use yet. Rhys cautioned that there is always a danger in creating new art that artists might be going into totally new territory that there is the possibility that there will be obstacles, but this project didn't seem like it was out of the range of skill and capacities of Faryal and Amelie. Rhys added that the project seemed very realistic, and that they could spend more time to do more of the theoretical work. To continue the development, Rhys suggested that they do some more test shots, and get critiques from colleagues to develop it further.

YANAL AND EMELINA

Yanal and Emelina presented their project proposal "Thermal Stimulations." Emelina first gave some background on her artistic development: 'let me explain what I do as an artist and how it led me to this project. I am interested in carpeting and cross-cultural identity – my work involves many aspects of identity and how I see myself and how others see me.' Yanal then provided his motivation and vision in choosing the project theme: "what interests me is the thermal imaging. I am a medical student and it's a part of my career – there are professionals called radiologists who look at images. When a radiologist looks at an image it is an entirely different way of looking at the image than an ordinary person. We tried to find a way to merge these two ideas in a digital way so that the external and internal identity merge."

The abstract of their project explains the goals of this artistic creation:

The research initiates the metaphorical interpretation of a culture's social behavior through thermal surveillance. The project will utilize a thermal infrared camera such as the FLIR Scout PS24 Heat Sensing Thermal Imaging Camera, connected to a program to loop the recorded reactions of individuals visiting the space, visualizing their presence in the piece. Using digital media as an art form, and medical technology, the project will generate discussions regarding the inner-identity of a person, through an outsider lens. The work is created through the existence of an audience, and continues developing as the piece is viewed.

Emelina then explained in detail what this investigation might yield – 'we are trying to show how behavior illuminates culture. For example, people in Qatar are conservative and we will watch how they react when experiencing the thermal images of themselves. When they look into the heat sensing camera, they will see the previous thermal image.' We will use the FLIR Scout PS24 Heat sensing camera. Yanal provided some technological background: 'heat sensing was first used in the military context. Thermal imaging is used to show different temperatures in different parts of the body. This can be a very valuable diagnostic tool that can show inflammation, and is even used in breast examinations. Using thermal images, we can better predict with ten times more reliability if a woman will have cancer rather than relying on family history.' He showed some thermal images – 'you see that the right and left parts have different thermal patterns.' Emelina explained that in terms of the psychological aspect, drawing on work by Vallacher, Robin and Wegner – what people see themselves doing is different from how others perceive them doing the same thing. 'So if I see a thermal image of someone walking around, I know that I too am being observed as well through the same technology.' Emelina further explained that 'our purpose is based on how people react in being surveilled – we will have a wide variety of people. It allows someone to react to someone's image. And it does away with race since we don't see what race they are in the thermal image.' She showed their artist's rendering of the project as it might appear in a gallery space. The thermal images of the viewers are projected onto a wall in the room. She then showed the project timeline. Yanal and Emelina discovered in their research that the thermal camera is pricey (about 1600 USD). They shared their plans for dissemination – they wanted their exhibit to travel around so they could see how different people react.

Eman asked – 'when you the take thermal images, there is no border for the images and the people will be overlapped. Is this a problem?' Emelina explained that there will be spaces opening up when they move – people might see the same heat sources. Yanal added 'you will

see the previous image.' Emelina stressed that it was an internal identity that viewers would be seeing. Eman asked if you would press a start and stop button? Yanal conceded there would be a certain limit to how many images could be displayed. Rhys asked for more clarification – 'tell us about your studies in surveillance and behavior from your sociology research.' Emelina replied that the social scientists that they looked at had studied behaviour under surveillance to show the character of the community. 'Different places think surveillance is ok, and they like it, while others think that it breaks the privacy bar,' she added. Emelina further explained that the big difference between their work and previous attempts to elucidate this relationship is that they were using the concept of surveillance to further explain general behavior. Rhys – 'sometimes artists will take what takes place outside the gallery and place it inside the gallery.'

Rhys provided a serious critique of some potential barriers to realizing this work of art: 'this feels at times more like an anthropological exercise than a critique.' Emelina said that the experience of imaging might be very different depending on the person; they would have to go by what they actually do after they develop the concept further. Yanal suggested that maybe they should make viewers fill out a survey after experiencing the exhibit in order to capture the audience's experience. Rhys suggested that if you go down the route of a survey, this becomes science and the next question is of course 'is this valid science?' Rhys indicated that Damien Hirst had used a survey for one of his works. 'We could have a debate about surveys and what it means.' Artists ask questions and do not necessarily solve problems.

Rhys created an analogy with one of the previous course activities: "When we went to the MRI suite, we had a chance to test it, but in some ways we are exposing our body and doing what is comfortable for us and in other ways, we aren't comfortable with certain things.' Emelina added "for me, if I saw a previous thermal image and I was the only one there, it would really affect me." Yanal joined in: "I feel the same way; people tend to subconsciously compare themselves to others around them." Rhys asked, 'how do you feel about photographing people without their permission?' Yanal countered that there would be an explanation about what was happening. Rhys pointed out that there are artists who might do things to make us morally uncomfortable and this was ok. Noor, alluding to the cultural context of Qatar, suggested that "I could imagine that an image of a woman that shows her shape might be uncomfortable if there are men present." Emelina explained "we need to test the camera and what images it produces; the clothing also gives off different heat signals." Habeeb contributed these thoughts: "despite it being a thermal camera and you can't see anything, what is the problem? – is it your presence or your appearance? But what if a

person still has a problem with it….?" Yanal jumped in: 'but that is part of the study, in that a person who doesn't want to be surveilled would tell us something.' Rhys added some background on the invention of the camera, scientific photography and pornographic imagery. In the early days of photography and the development of obscenity laws, if an image had a grid, it was defined as scientific and was not seen as pornographic, so many nude photographs appeared in that format so to subvert the law using the guise of science. The historical example serves to illustrate the disruptive nature of technology and how it can bring up moral questions where art and medicine often provide different perspectives and prompt different kinds of reactions.

FARAH AND NOOR

Noor and Farah asked the group 'to walk with us' through their idea and vision. Farah and Noor are interested in investigating phantom limbs and the Zoetrope. In their proposed work of art "Proprioceptive Allodynia" – 'you will feel your limbs even when they are not there.'

They describe their plan for realizing their vision as follows: "VCUQ PAPR student Noor Al Thani and first year WCM-Q medical student Farah Al Sayyed wish to create an artwork that will allow the viewer to experience Phantom Limb Loss, a psychological disorder caused by the amputation of any of one's limbs. The post ghost-like sensation remains to this day somewhat enigmatic. Both students want to create an artwork installation that will expose viewers to the pain and idiosyncratic sensation of losing contact to a physical part of their body. The zoetrope and infrared imagery will be the unique combination in which the experience will be simulated."

Noor presented a history of the Zoetrope, which was the first form of the cinema. There are many theories behind the Zoetrope and how it developed, how it was used, how it affected film and animation, and how it affects the brain – Noor explained that originally a toy for children, its history actually goes back to the camera obscura and artists like Leonardo Da Vinci used it. Noor and Farah further explained that illusion is the basis of the Zoetrope. The thaumatrope was an early form of Zoetrope. They then showed a variation called the phenakistoscope. Noor likened the technology to a .gif image. She explained that now we use strobe lights instead of slits through a rotating drum to produce the illusion of movement. Noor and Farah then showed a video from Pixar about how animators there had built a 3-dimensional zoetrope. Noor stressed that there were so many recreations and variations of the zoetrope.

Farah continued the presentation by providing the physiological background and history surrounding phantom limb sensation. One of the first persons to report on the phenomenon was Ambroise Paré (c. 1510 – 1590), a 16th century French military surgeon. He reported that amputees sensed that their missing limb was still there and that the pain could not be treated by any analgesics. William Porterfield (ca. 1696–1771) conducted studies on his own phantom limb. Herman Melville's Captain Ahab makes a reference to phantom limb in Moby Dick: "A dismated man never entirely loses the feeling of his old spar… And I still feel the smart of my crushed leg, although it be now so long dissolved" (Melville, 1851). Only in the 1980s and 1990s was the neuroscience behind the phantom limb fully understood and various theories have been proposed. Farah explained the mechanism of the sensations. First Dr. Ronald Melzack in his paper "Phantom Limbs, the Self and the Brain" (1989) proposed that phantom pain originated in neural structures of the brain. Subsequent work by Vilayanur Ramachandran hypothesized that the somatosensory cortex, part of the postcentral gyrus, reorganizes itself after limb loss and this is the origin of the pain. Other scientists such as Marshall Devor have introduced evidence, however, that phantom pain arises in the peripheral nervous system.

Farah made the point that "We know that phantom limb sensation is in the brain, but is it any less of a medical disorder?" Noor and Farah emphasized that this point is what they want to explore in this project. 'So we need to look further at the depiction of mental disorders in art.' In their PowerPoint presentation, they reviewed some of the important artistic expressions of mental illness that had influenced the development of their own vision. Vittore Carpaccio's "The Healing of the Possessed Man at the Rialto" (c. 1496) shows the representation of mental illness during the middle ages as a religious experience, under divine control. "Later, there was more engagement between the perceiver and the sufferer with Theodore Gericault's painting the "Portraits of the Insane" in 1822, set in the romantic ages, where the suffering of mental illness was more poetic and artistic, eliciting sympathy from the viewer; there were ten of these paintings depicting a woman who was suffering from a gambling problem and depression." Vincent Van Gogh also struggled with mental illness and depicted it in his art.

Noor stressed the vagueness of mental illness; 'it is still a borderline phenomenon, she explained, being debated today, and all mental illness is experienced in a unique way.' 'We want to explore this vagueness and its relationship to the zoetrope.' Farah then introduced the class to the work of Alexa Wright who took pictures of people with phantom limb syndrome, and recorded the person's stories in her collection "After Image" (1997). Farah asked the very valid question (and alluded to an

interesting paradox that loss was part of the wholeness of a phantom limb individual), that as a future medical practitioner, when we are treating this syndrome, are we detracting from their wholeness when they experience the lost limb? Noor and Farah also introduced such artists working on similar questions as Suzanne Anker, Steven Holl and Linda Roy, including their works Chiasmic Crossing and Tonustal.

Noor explained that the zoetrope in its looping action is like the memory looping back and 'we want to show the frustration of the experience of phantom limb.' Noor added that the key word in approaching the zoetrope is motion, which, like the limb, is also involved in motion. For example if you are left handed and it is your strongest hand, then there is nostalgia in losing it. Farah emphasized that most work on phantom limbs were paintings and feelings associated with the loss of the limb. 'Ours is different,' she said, 'because we are exploring the movement of the phantom experience.' Noor said that she had made her own zoetrope, and she talked to VCU-Q professor Simone Muscollino who expressed interest in the project and inspired the pair. Noor stressed that when someone sees movement, it transfixes the viewer. They showed the timeline of their project. 'Our project can go in so many directions and fit within the budget,' Noor and Farah pointed out. They were at the stage of investigating the many different ways of rotating the zoetrope. 'We might use a record player and it can only hold a certain amount of weight. We will also use a 3D printer.'

One question from the group was 'why use luminous paint?' Farah responded that it empowers and emphasizes the sensation. Rhys commented on the idea of using a strobe light – will they use luminous paint if they use a strobe light? Rhys suggested black light as a possibility. Farah stressed 'our idea is simple enough that we can go in many directions.' Noor speculated 'we could use motors in robotics, but it might go too fast.' Rhys pointed out further that the strength of the motor is key – a motor can be controlled or geared for speed. Rhys's critique included the comment that the project was well researched in terms of the influences, which was really positive and he clearly saw, based on Noor and Farah's presentation, the relationship between the zoetrope and phantom limbs. Rhys wondered about phantom limbs and how much they were in the public consciousness. Amelie suggested that since schizophrenia and other mental diseases are being more and more discussed among the general public, they might be more effective to support the project's artistic vision. Farah countered that in phantom limb sensation, there is a mind and brain working together, not just a malfunction as in mental illness. 'We are using something that is not obvious to challenge people's perceptions of themselves.' Noor added that phantom limb should be acknowledged, although we don't fully understand it. 'The whole mystery and enigma should be explained.'

Because of the many auto accidents in Qatar, there are many people who have lost limbs, so it is a common occurrence here. Amy asked Noor and Farah "can you comment on each other's disciplinary process? We all have a morbid curiosity about accidents, disease, etc. – your project on phantom limb piques my curiosity that we all share when confronting unpleasant events. Why are we still interested in some of these things, like gruesome car accidents – it's like we are in the 18th century." Amy also pointed out that there is a circus connection between the zoetrope and the phantom limbs. Rhys concluded that 'what will make it come together are the images that you choose for the project.' Noor and Farah agreed that this would be a key aspect of the project.

MU JI AND JAWAD

Jawad and Mu Ji both expressed their interest in addiction. Mu Ji provided a succinct definition of addiction from a medical perspective. Mu Ji pointed out that often addiction is portrayed as difficulties associated with a substance abuse like alcohol or cocaine. They wanted to explore behavioral addiction in their piece of art, such as social media addiction. Jawad explained that they had narrowed down their concept to bringing the virtual to the physical world. The kernel of the idea is to take clinical tools used in medicine and reconceptualize them using social media realizations. Some of the artists who inspired them and provided conceptual guidance for their proposal were Damien Hirst, who struggled with alcoholism in his career, and Banksy who has critiqued modern cell phone usage humorously in his graffiti. Mu Ji and Jawad showed a picture of a conceptual piece of art consisting of a megaphone broadcasting tweets into nature. Jawad said that the outcome of their project would be an experiential installation. Mu Ji added that they would create such objects as an IV drip bag used in hospitals, but in the drip are the 140 allowable characters from Twitter. An injection might be represented like a notification on a web site which sustains us, he added. Rhys asked the group to help him visualize the project, so he asked the team for more details. Mu Ji and Jawad succinctly summed up their idea as exploring how virtual addiction is realized in the real world. Emelina asked 'how exactly are you going to do your final installation?' Mu Ji explained that at first glance, the set up is going to look typical, like a typical bed, syringes – they will all look similar to what you would see in a hospital. But each would be modified into some statement about virtual addiction. Rhys asked if they had done any research into the budget, such as soliciting quotes for some of the items that they would use. Rebal pointed out, and Mu Ji agreed, that 350 dollars for a hospital bed in Qatar was probably unrealistically low since these are specially built medical devices. Amy suggested that they should look into renting

a hospital bed from a supply store since there are many companies who deal with home health care. Mu Ji volunteered that they were looking into borrowing a bed from Hamad or WCM-Q. Amy reiterated that renting some of the equipment might be feasible.

EMAN AND ABDUL

Abdul began the presentation of their project idea by explaining both the technologies that they would use as well as the artists who had influenced them. The team will take medical image scanning data and use 3d sculpture techniques and laser cutting. They were specifically inspired by artists such as Angela Palmer who in their work 'attempt to peel back the outer layer.' Abdul and Eman were also inspired by Rogan Brown who is merging science and Art and whose vision is inspired by nature and organic growth. Marilene Oliver also uses CT scans. Eman stated 'we noticed that these artists took a picture to create an image, but no one showed the exact details inside a person. We explore differences in MRI and CT scans. MRI scans are more detailed and can use different dyes, but they are very expensive and some people can't have them done if they have metal implants or tattoos. We didn't want to distinguish who the person is. We will probably go with CT scans because they are simpler and allow you to see your insides.' In fact, Eman's interest in the concept for this piece derived from her interest in educating patients about the interiors and exteriors of their bodies. As she elaborates in her Artist Statement:

"Through this piece of art, I hope to get people to research and seek to know more about medical equipment and procedures used for early detection of illnesses. I also hope that through people being able to view their inside as easily as their outside it would influence them to see how similar we are as humans and discard exterior differences."
– Eman Al Mosleh

Abdul added that another objective of the piece would be to get the audience to see the interior of the human body that they have never seen before. Abdul presented the timeline and their budget. Abdul and Eman also had prepared some laser cut paper examples that he passed around to the group of how they might present the images using cutting and engraving. Noor was impressed, and commented 'I think it is great that you are going back to something traditional like paper – most people want to represent technology in a technological way.' Rhys asked if they had found a quote for the shipping cost of the papers? Rhys pointed out that it sometimes costs more to ship the paper to Qatar than the cost of the paper itself. He stressed that these are some of the kinds of details that

artists sometimes easily overlook. Eman pointed out that artist Marilene Oliver used the exteriors of body images and they wanted people to see the interior; 'yes, people know that MRI and CT scanning exist, but do they know what they are used for?' Emelina asked, 'so in terms of achieving this knowledge, how are you going to help the audience understand the knowledge that you have about MRI and CT scanning?' Amy asked additionally 'did you discuss the possibility of discovery in the piece – is there an opportunity for the viewer to discover something?' Eman replied: 'I was thinking of using an abnormal person's CT scan, but that would defeat the idea that we are the same.' Emelina added that Dr. Maneesh had said during their visit to the Hamad medical imaging department that when you rotate an image to a certain angle, it will look like an alien image.

REBAL AND HABEEB

Rebal began the presentation with a summary statement of their overall intent – "we are trying to use holograms and investigate concepts related to bodies. We will project an image of a 3-D body and make people think about the soul and body." The team explained that their objective was "to challenge the audience to question the notions of belief in the physical and metaphysical. This involves provoking thought about life vs. death and the soul vs. the physical body. We intend to use 3-D medical imaging software and projecting it in the form of a hologram for the audience. It is important because it raises uncommon questions and perhaps even starts the viewer on a personal journey of self discovery / elicits a better understanding of abstract ideological concepts that motivate human behavior. This is a social, confrontational experiment and doesn't mean to convey a particular idea or solution."

Rebal outlined some of the background thinking that led to their proposal, including the holographic Michael Jackson and Tupac virtual concerts in 2012 and 2014. Both Rebal and Habeeb were fascinated that so many people paid money to see holographic representations of two dead music performers. Habeeb explained the genesis of their ideas as follows: "it all started when we were standing next to the anatomy lab at WCM-Q and Rebal told me a story about one of his relatives who was in a car accident and he was brain dead, but they kept his body alive with a machine. They told the young boy that your Uncle will never awake, but the boy talked with a religious scholar and the scholar said that if his heart is still beating, then he has a soul and he is alive. The doctors said, no, he will never wake up. This is what doctors face in the medical field all the time." What do we really know about soul? Dr. Scott and Rebal had discussed whether MRIs were ever done on dead bodies, but this was rarely, if ever, done (since if there is a question about the

death, doctors will perform an autopsy). Habeeb was very moved by the realization that as soon as the life or soul goes away, it makes the body worthless to the point that you can dissect it or bury it.

Habeeb further stressed, 'We do not have a really solid question or answer, but we want a virtual body representing something physical. In the first use of holograms they used it in entertainment, and people went wild and even though they weren't there they brought back their persona." Rebal and Habeeb then showed a video clip that they had made of a running man by experimenting with some software. They next showed a short video of the project "I The Enemy". The artist has created face to face virtual combatants. People can walk next to the combatants, and some will move away. Rebal added – 'what we liked is that each experience is shaped by the person; whatever ideology they come from, that would cause their reaction. We wanted to try different things like a faceless body lying on a bed." Rhys asked: 'can you explain how the artists you based your work upon were reflected in your art piece?" Rebal replied: 'we are using virtual reality as similar to reality – does it really matter if that thing is really there or not – this is not a physical examination of the body.' Habeeb also offered that 'it is not really there, but people still react to it.' Rhys asked what will that image be? 'The image that you choose will be really important,' he stressed. Rebal explained 'we will have different layers – with the software we have we can click on different layers of the human body.' Noor said: 'you started talking about the soul and I think that is one of the biggest medical questions that has not been explained.' Amy entered the conversation: "I have a technical question –what if the piece is up for a month, how will it work?" Habeeb explained that it is just like a projector and it will be on all the time – it will need to be enclosed. Rebal also added "we need to make sure the audience doesn't get past a certain point and we will have to situate the position of the bed. Mostly it will need to be extremely dark." Rhys suggested that the team look at Richard Wilson who plays with different perspectives on space.

Final

Projects

As students began work on their final projects and attempted to translate their ideas and artistic vision into completed pieces for the April, 2016 exhibition, the nature of their projects inevitably evolved. New materials were selected, and discussions among the student groups about what they wanted to say specifically about the relationship of art, science, medicine, and design in the Qatari and Arabian Gulf context necessitated refinements in the original proposals and in some cases, new directions stimulated by their original experimental work and background research. As the mentors led them through thought experiments and scenarios, and guided them to clarify both their working methods and concepts, each group grappled with innovative ways of seeing and creating in an unfamiliar context, and new methods of working collaboratively with other disciplines. Below are the final projects as described by the artists themselves.

Inside Out

Abdul Rahman and Eman Al-Musleh

In this exploration we are seeking to research and investigate the different layers of human form in order to understand the interior and the exterior of the body. The result of this investigation is transformed into illustrational information through the assistance of modern technology into a 3D sculptural form. The sculpture visually demonstrates the intricate details and the immense complexity of the human form. Paper was used as the core material for the finished render of the project, as it captures the seamless fusion and combination of the fragility and toughness of the human physique. The final outcome represents an ethereal fossilized realization of the extensive procedure of the concept journey from its initial stage of the digital scanning, laser cutting, into the final outcome.

Artist's Statement - Abdul Rahman
As a graphic designer my work emerges from the combination of simplicity and complexity, which often involve elements inspired from the past. These elements mostly consist of my childhood memories and experiences that inspire me towards the understanding of the art and design process. My work is highly influenced by modern materials and technology that allows me to think beyond what is usually required. I strongly believe in taking risks. This risk taking attribute inspires and challenges me to push my work further, which allows me to find and pioneer different, yet unique, routes to reach my final goal. This quality helps me create some of my best ideas and work. While I use a variety of materials and mediums in each project my methodology remains consistent.

Through this collaboration with the Cornell medical students, I aim to achieve a good understanding in both the art and medicine in context of how they can inspire and generate new ideas. I plan to use this collaborative experience to investigate my passion for art and medicine in detail and hopefully inspire others through my research and the idea execution.

Artist's Statement - Eman Al-Musleh
Bullet proof as they may be, fighting for ideas has always been a driving force within me. As a developing physician, my first and foremost reason for pursuing such a career is to be able to advocate for my patients to make sure that not only are they treated, but also that their voices are being heard. I found within medicine the comfort of knowing that my strength lies within my limitations: one does not achieve excellence on their own; it is a shared journey. I am passionate about working with a team, and now being given the opportunity to put my thoughts and knowledge as a medical student in the form of a physical structure allows me to do so.

I hope that through the final project with my VCU partner we would be able to capture the essence of a tiny part of medicine and turn it into a tangible object. I also hope that through people being able to view their inside as easily as their outside it would influence them to see how truly similar we are as a human race, and discard their differences based on exteriors.
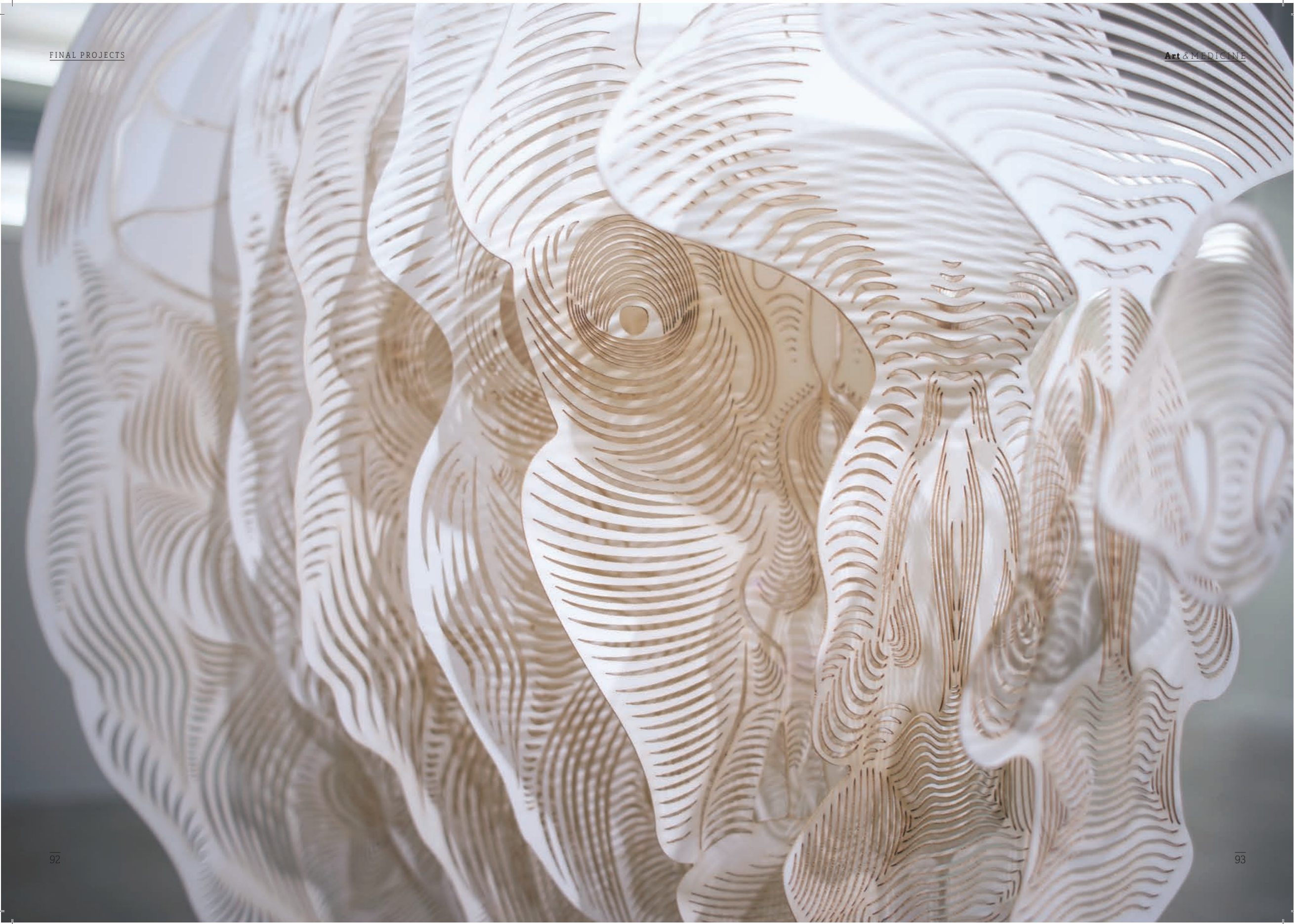
Passing Away. Demise, Irreversible Cessation

Habeeb Abu-Futtaim and Rebal Turjoman

Consciousness, physicality and absence are the core concepts of the installation, which involves instigating thought about death as absence and death as expiration; and the soul-body question. Contextual removal situates the viewer in a self-reflective position, eliciting alternative understanding of abstract ideological concepts that define death. What does it mean to be alive and present, beyond proper functioning of one's body? What does death mean, if the body of the deceased is physically present?

Artist's Statement - Habeeb Abu-Futtaim

I have always been interested in the question of consciousness and its undeniable impact on the idea of 'living' and death in religion, philosophy and science. Not only has the 'Hard Problem' been unresolved, it has been ignored until recently and has created numerous opposing opinions that have at best remained theories or ideas. The Cartesian Dualists, Rationalists, Empiricists, Panpsychists, Sufis etc. all differ on the idea of consciousness in varying degrees but have never sufficiently explained it.

Being a part of a course with medical students and professors allowed the initiation of the unusual conversation on death from the perspective of medical practitioners. What is the value of the body, before and after it is alive? Could consciousness be the soul in the body and what does it mean to acknowledge the soul? How can death be explained? These are some questions that inclined me to explore this extraordinary notion.

Artist's Statement - Rebal Turjoman

I am a 3rd year medical student, who was interested in learning some new perspectives from practitioners outside the medical field. Throughout the course, I realized the sheer number of approaches to creating an artwork without any particular one being regarded as superior, as well as the different motives that artists hold. I hope our piece will hold some value regardless of the backgrounds of the individuals approaching it in the audience. While creating this piece, we were hoping it could invoke thoughts in some, challenge preconceived notions in others, and appeal aesthetically to who was left.

I undertook this project to challenge the way I look and interpret different issues by learning from artists outside the medical field. I learned to appreciate the malleable role of artists and their important relationship with society. I saw how an art piece itself, once finished, can take unintended forms in the minds of its audience and continue to transform with every viewing according to context. We hope, with this piece, to recreate the aspects of our experience with the clash and reconciliation of our perspectives that lead to better introspection and self-awareness.

Crafting the Virtual Into Reality

Mohammad Jawad and Mu Ji Hwang

Our project seeks to examine the intoxicating allure of social media and how even in the absence of a physical or chemical stimulus, this abstract notion can envelop us and invoke a sense of addiction. In particular, we wanted to examine what can come out of giving the virtual a physical form. The project sought to create a series of objects that would become the physical manifestation of social media and embody its very essence in three-dimensional space. The piece intends to provide a commentary on how social media addiction is threatening to humans, to provoke the audience to think of the mental and physical consequences of social media and highlight social media and addiction in a clinical perspective.

Artist's Statement – Mohammad Jawad

My design process focuses on the metamorphosis of a social problem in order to develop innovative and sustainable solutions through human interaction. As a visual communicator, my design philosophy revolves around the subjects of sustainability, functionality and adaptation.

My interest lies in the re-contextualizing of design language to develop responsive, functional design that creates new meanings and relationships between the user and the environment. Through this unique collaboration between art and medicine, I aim to understand or imagine what is not present physically yet there. I intend to investigate the perception of the human brain and better understand the medical aspects behind it: how information is received, analyzed and translated to create behavioral addiction. How imagination can reach a realistic point where the body can receive physical manifestation of one's thought process. Through the human psyche I intend to study and investigate into the psychological effects of social media addiction and portray a series of works that create a commentary on how this phenomena is very addictive. I have chosen this topic as it is hype in today's world and frankly we all are victims of it.

Artist's Statement – Mu Ji Hwang

During my study of the human body in medical school, I faced the struggle and frustration of trying to study a complex idea in its abstract form. In preparation for each anatomy lab, where we would dissect and study each organ system in a systematic manner, we as medical students would pour over countless images and descriptions about every muscle, nerve and artery from textbooks. With these images at hand we would then try to assemble these pieces together into a coherent holistic picture in our mind. But each and every time there was something amiss and something that two-dimensional images and our creative imagination just couldn't fathom or capture in its glory. It was only by seeing the actual human body in its physical entirety with my own eyes and being able to interact with it, that I was able to gain a deeper appreciation and understanding of the human body. It is from that struggle and experience that I've realized that there is something that one simply cannot understand without actualizing an idea and perceiving its physical form.

Consequently, this project is an extension of that yearning whereby I wished to actualize a concept or an idea and provide it a physical form that I can feast my eyes upon – because I believe that it is with this creative process that we can discover something unexpected and unprecedented. Naturally my mind turned to technology, an ever present being in our day-to-day life with no prototypical physical manifestation to speak of. With the steady onslaught of development in digital technology there has been increasing awareness and research devoted to understanding how the digital realm can mold our plastic and malleable minds. A personal interest of mine is to examine how this intimate relationship with technology can influence impressionable minds, especially children and adolescents who have far greater capabilities to adapt and show physiological changes in the wiring of their brains. Hence, I wished to explore this concept through an artistic medium in lieu of the traditional scientific research because it provided an alternative avenue and perspective on the matter. In fact, what intrigued me most about this project was seeing the idea take shape in front of our very eyes and become something we hadn't anticipated.

Proprioceptive Allodynia

Noor Al-Thani and Farah Al Sayyed

VCUQ PAPR student Noor Al Thani and first year WCM-Q medical student Farah Al Sayyed have created an artwork that will allow the viewer to experience Phantom Limb Loss, a psychological disorder caused by the amputation of any of one's limbs. The post ghost-like sensation remains to this day somewhat enigmatic. We created an artwork installation that exposes viewers to the pain and idiosyncratic sensation of losing contact to a physical part of their body. The zoetrope through its mobility will simulate the experience.

Artist's Statement - Noor Al-Thani
Second year Painting and Printmaking student Noor Al Thani is a Qatari art student who first found interest in medicine through a psychology elective in high school. From then on she has thoroughly been interested in the mind, brain and nervous system. At the moment in her second year in the Painting and Printmaking department, she is focusing on experimenting and discovering different media as well as finding her own artistic style to submerge herself in. Noor is focusing on producing art that interacts and starts a conversation with her viewers. This is why animated films, character and storyline development is a field that has informed her work frequently. Noor hopes that in the future she will be creating emotionally vivid artwork that implements physiological instruments and studies to connect her concepts to her viewers in a more personal and relatable level.

Artist's Statement - Farah Al Sayyed
Farah Al Sayyed is a first year medical student at Weill Cornell Medicine in Qatar. Although she is pursuing and is passionate about a medical career, she has always had an interest in the arts. Being from a family of designers and architects, she has always been surrounded by art; however, it was always in the context of less abstract things such as building designs and concepts. As an aside, she was also interested in the mind, a generally more abstract field. This interest stems from a high degree of introspection and a constant reflection on her own mind. Research in the field of mental disorders, both scientific and philosophical, as well as some dabbling in the arts propelled her to be interested in this particular project to create an artwork about mental disorders.

Throughout this course there were many options to be explored. A particular interest was anatomy and art especially after being introduced to the works of Michelangelo. To try and move away from a literal representation of anatomy through art, she was thinking about involving the aspect of self-perception and anatomy, introducing the mind into the equation. She is very interested in the relationship between the abstract mind, its self reflection as well as its relationship with the body in its physical form. This preliminary idea evolved to mental disorders, a product of the mind and brain, to be expressed through motion of the human body.

Underneath Within

Amelie Beicken and Faryal Malick

The objective of this project is to combine Arts and Medicine to give an insight into mental illnesses through the medium of photography. More specifically we hope to give our personal interpretation of what it must be like to deal with various mental illnesses such as depression, borderline disorder, schizophrenia, anxiety and ADHD through the use of nature.

Through long exposure photography and the strategic use of light, we want to create an emotional landscape that reflects how we imagine it must be to deal with these mental issues. It is our intention to create a reflection of the inner life of a person dealing with these mental illnesses, and the difficulty to express and reflect their struggles.

For this project we decided to use the opportunity to work with a lesser known medium to us: photography. The collaboration of a medicine and art student enabled us to understand the possibilities of how one could artistically interpret or represent not only the outer but also inner workings of the human body and mind.

***Artist's Statement - Amelie Beicken***

As an interior designer I aspire to combine interiors with human interaction. My motivation is understanding the impact an interior space can have on the human psyche and a person's behavior and vice-versa. Throughout my work I aim to understand the psychological and socio-logical motives and interests of the client I design for.

Through exploration of our behavior I wish to create an emotional reaction, and challenge the way we inhabit or use our spaces. I intend to maintain this approach in future projects too. Experimentation, an open mind and accepting failure have proven to be the best way for me to improve my designs. Upon these foundations growth inevitably ensues.

Artist's Statement - Faryal Malick

Throughout the history of modern medicine, the study of the human mind has been made possible by the careful investigation of neurolog-ical and psychiatric disorders. As a medical student, I was fascinated by the subject matter when I encountered it and sought to understand how these disorders manifest themselves. Our perception of the world, our senses and feelings all depend on neurological circuits in our brain. Minute differences in these circuits are the reason why some people may love Pepsi while others love Coca-Cola. These differences account for the fact that we all see colours differently, that we like different types of music, etc. While looking at these photographs, I wish for the viewers to see the world as someone who thinks and perceives the world in a way that is very different from them. I wish for the viewer to put themselves in the shoes of people with neurological and psychiatric problems, to better understand their behaviour, their problems and struggles and remove existing biases.
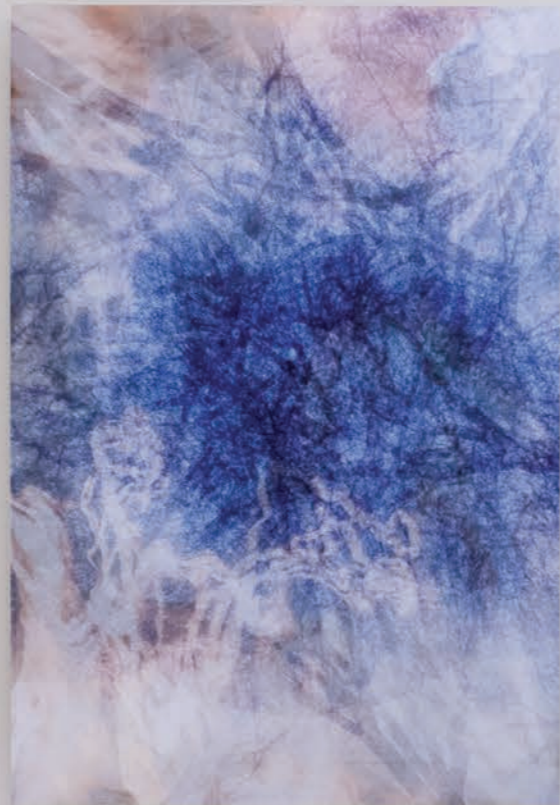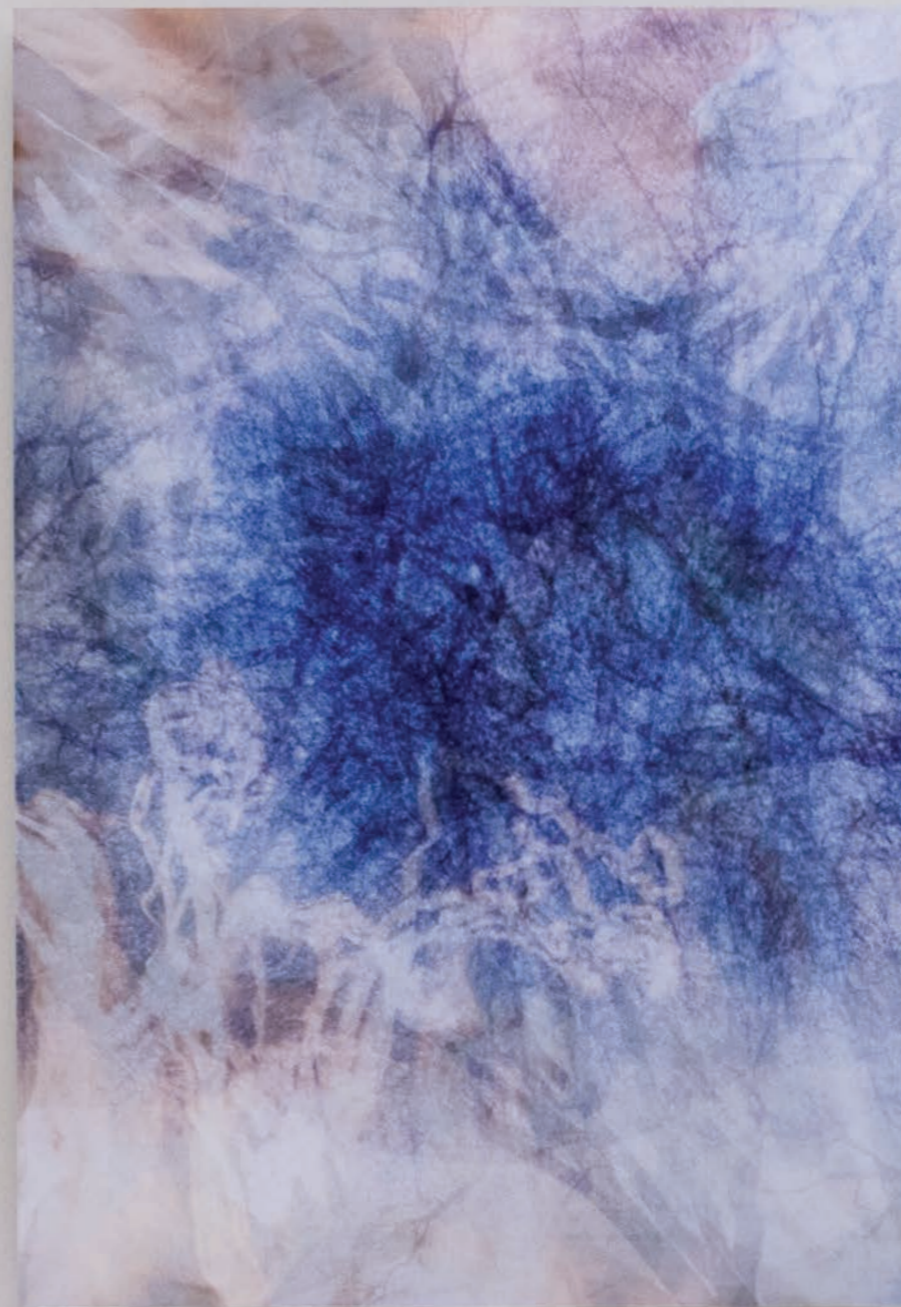
An Essence of Presence

Emelina Soares and Yanal Shaheen

The title briefly summarizes the intent of what the project intends to elicit from its audience. The pieces of work will be created using an individual as a mold in order to make a loose impression of what once existed. The loose figures will be an open invitation to the audience's interpretation and reactions to the aesthetics of the piece. The research initiates the metaphorical interpretation of a culture's social behavior through witnessing a ghostly existence of what was made using a life. The project explores materials that depict a characteristic of fragility and frailty similar to us humans. The thought of using an earthly decomposable material to generate a form that resembles a human, reminds us of how we humans are also eligible to have a time line. The work will eliminate external appearances and discover humans differently. The aim is for the project to consider conversations about culture, examined with cultural behavior through their reactions of witnessing themselves as fragile figures. It also builds a personal perspective of oneself, by realizing the anatomical similarities shared within a community.

Artist's Statement - Emelina Soares

My work as an artist focuses on the cultural montage of religion and society through large format digital manipulation. I use my research with carpentry to discover differences in countries in relation to their influences of being colonized. I portray myself as religious characters important to the Middle East, India, and Portugal, since my identity incorporates this third culture perspective I possess. The works involve a performative aspect behind the creation of each piece, and I work with the idea of the gaze that a subject has with its audience. My research examines how contemporary mediums and decisions use semiotics to assist the cultural anachronisms in the work.

Artist's Statement – Yanal Shaheen

As a medical student, my future career revolves around understanding the human body both in structure and function. Medicine has influenced many of my perspectives and philosophies regarding the complexity of our biology and its persisting impact on our social interactions and shared constructions. It is of great interest to me how people with non-medical specialties perceive and express their ideas about the human body. Visual art is one of those fields that is capable of bringing abstract ideologies into the tangible realm with limitless creativity. Our project is definitely a portrayal of certain dimensions of human nature. We chose to create multiple human sculptures using tape, which renders facial and fine body details obscure. This abstract depiction of the body can leave a variety of different, and possibly contradictory, impressions on the viewers. For example, one might interpret the translucent, fragile yet flexible and adhesive characteristics of the tape sculptures to be reflective of the people's need to belong to a group from which they draw strength and derive a sense of purpose. We hope that the responses to our work will challenge everybody to think about and attempt to better understand their bodies whether by agreeing or disagreeing with the message the work is trying to convey, as this is a great exercise in and of itself.

Virtual to Real
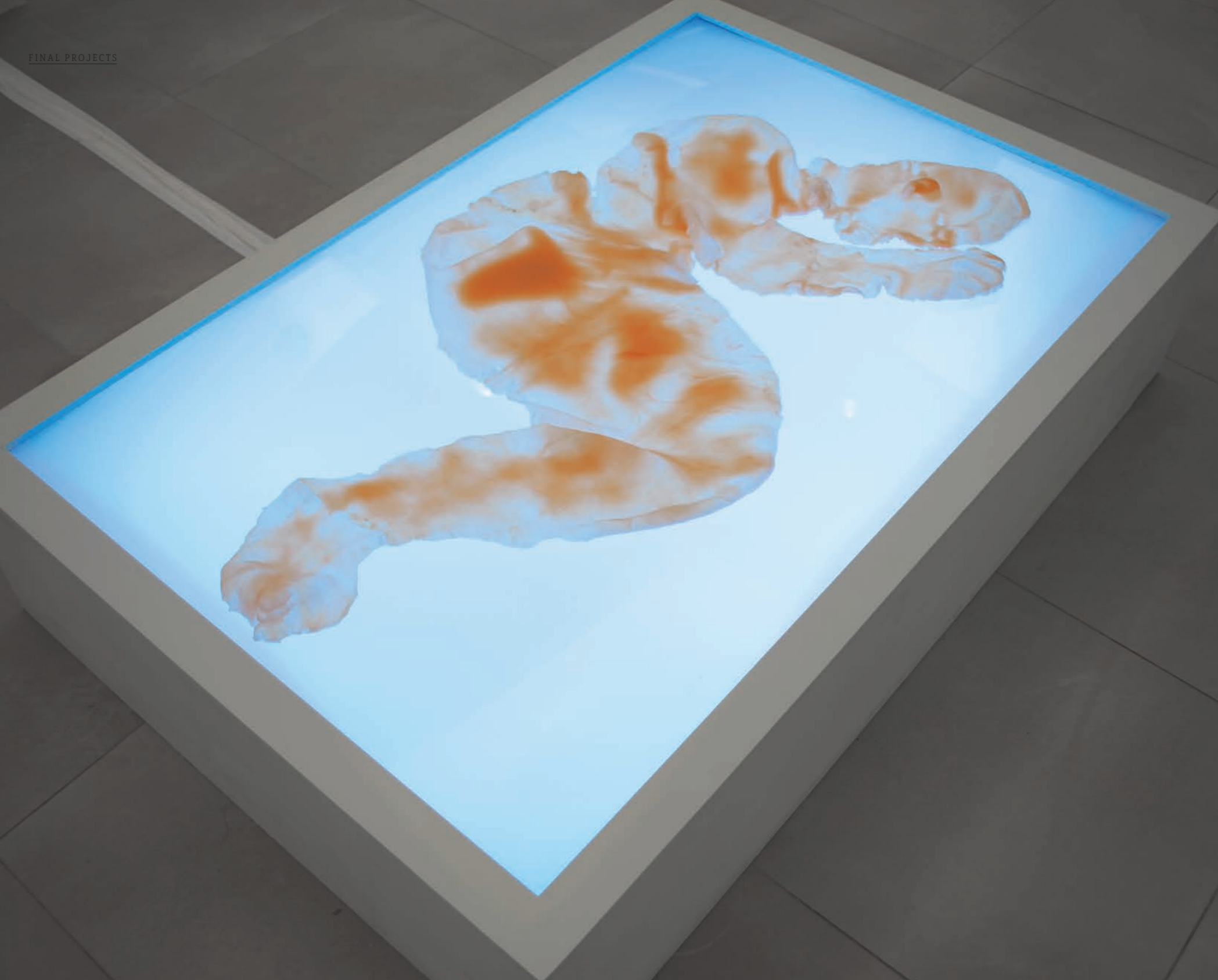
ART & MEDICINE

VCUQ MENTORS
Amy Andres
Rhys Himsworth

WCMQ MENTORS
Dr Alan Weber
Dr Stephen Scott

VCUQ STUDENTS
Noor Al-Thani
Abdul Rahman
Emelina Soares
Amelie Beicken
Mohammad Jawad
Habeeb Abu-Futtaim & Ayaz Rauf

WCMQ STUDENTS
Farah Al Sayyed
Eman Al-Musleh
Yanal Shaheen
Faryal Malick
Mu Ji Hwang
Rebal Turjoman

vcuqatar

WEILL CORNELL MEDICAL COLLEGE
CORNELL UNIVERSITY

Underneath Within

Amelie Becker
Faryal Malick

Project
Analysis

In addition to the Art and Medicine Project lectures, workshops, discussions, and hands-on experiences, the course was designed as a quasi-experimental intervention in its own right. The faculty researchers were interested in studying aspects of the interdisciplinary experience that had not been explored previously, especially in the Arabian Gulf context. The majority of existing studies discuss the affect that exposure to the arts has on the medical student's ability to "see" (visual diagnostic skills) or to impart empathy through patient care. Far less attention has been paid to biases, stereotypes, creativity, and in-class behaviors, and no published literature has examined how these factors play out in a multi-cultural, primarily Muslim, classroom in an Arab-speaking country.

The data collection plan involved both pre and post-course activity. The researchers employed a mixed methods study design, involving psychometric tests and observational ethnography, to capture information and data about the students' attitudes toward art and their perceptions of diversity and stereotypes. The students' cognitive processes and behaviors, as well as classroom activities and social dynamics, were observed through both audio and video capture as well as through in-class observational field notes recorded by the researchers. The data gathered through these methods will be used to measure different aspects of the student's interdisciplinary experience.

In an effort to measure potential differences and similarities between the student groups, the faculty research team aimed to capture additional empirical data about individual levels of creativity and the students' overall comfort with ambiguity. The Budner's Tolerance of Ambiguity Scale was administered pre-course and the Torrance Tests of Creative Thinking were administered pre- and post-course, along with other psychometric tests (detailed below) designed to measure similar variables.

Since this course was the first of its kind in the Gulf region, the faculty researchers were also interested in contextualized action research. How would the two student groups respond to the use of the human body in art? To what extent would religion be a factor in their attitudes toward the human body in art? To what extent would the students reference the human body in the creation of their own works of art? These questions were addressed through some of the methods described above as well as through in-class observations and student critiques of art in which the body was the prominent theme.

Below is an outline of the research methods and tests used during the project:

Qualitative Data

pre- and post-course audio interviews (semi-structured)
observational field notes
audio capture
video capture
student blogs
in-class exercises (diversity, stereotypes)
end of semester student class evaluations
student art proposals

Quantitative Data

Demographic variables
Psychometric tests:
Budner Scale (Tolerance of Ambiguity)
Geller Scale
Gerrity Scale
MSTAT II
Torrance Tests of Creativity

At the time of this publication, data analysis was ongoing. But the following preliminary observations have been made about the student experience:

- In pre-course interviews, few medical students were able to articulate a detailed conceptual link between medicine and art; the majority of art students, however, recognized design as an element in medical technologies and clinical spaces.

- In pre-course interviews, the majority of art students defined creativity as the ability to solve problems; the majority of medical students associated creativity with drawing and they did not make associations with the value of creativity in non-arts fields. In post-course interviews, the medical students re-defined creativity and more strongly associated it with problem-solving and they described creativity as being an important part of all disciplines – not just art and design.

- In post-interviews, medical students could distinguish creativity from "fine art."

- The two student groups held similar stereotypes of each other's field of study.

- Students frequently self-segregated themselves during activities.

- Religious beliefs were peripheral in discussions of the visual representation and scientific use of the human body.

- There is significant literature on how art informs medicine (e.g., "seeing" and "compassion"); less is written about how medicine informs art/design.

In post-course interviews, a set of issues related to the credits awarded for the course as well as student expectations and motivations was mentioned by the majority of art students. Due to institutional rules, medical students were not awarded credits and the course did not count as an elective for their program, while art students took the course as a full credit course. In the opinion of the majority of art students, and some medical students, this situation led to uneven levels of input into the course activities.

Although acknowledging that the student sample size is small, the faculty researchers hope that further data analysis will create new insights into the interdisciplinary experience of art and medicine pre-professionals working collaboratively and prompt more questions and exploration into the very important world of interdisciplinary education and collaboration.

Art and Medicine Research Presentations Based on this Project:

Andres, A. (2016, February). STEAM curriculum in an Islamic context: A case study from Qatar. Presentation at Liberal Arts International Conference. Doha, Qatar.

Andres, A. (2015, March). Art + medicine + library: Enhancing student creativity through interdisciplinary collaboration. Poster presented at the Association for College and Research Libraries Annual Conference. Portland, Oregon.

Andres, A. (2015, March). The case study of an arts librarian in a medical school. Poster presented at the Art Libraries Society of North American Annual Conference. Fort Worth, Texas.

Himsworth, T., Weber, A.S., Scott, S.M. (2016, February). Contested spaces of the medical body in the Islamic art world. Poster presented at the College Art Association. Washington, D.C.

Weber, A., Scott, S., Andres, A., & Himsworth, R. (2015, December). An art and medicine experiential learning laboratory in the Middle East to measure interdisciplinary problem-solving. Presentation at the IX Malta Medical School Conference. St. Johns, Malta.

Weber, A., Andres, A., Himsworth, T., Scott, S., Hwang, M.J., Turjoman, R., Malick, F. (forthcoming 2016, September). Art and medicine student interprofessional learning in the Middle East. Poster to be presented at the European Association for Communication in Healthcare (EACH). Heidelberg, Germany.