ABSTRACTS
SECTION X. BIOETHICS AND HISTORY AND PHILOSOPHY OF SCIENCE

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Paper Session I
Thursday Morning, *KHCC Ballroom A*$_3$
Clark Lundell, Presiding
9:30 am – 12:00 pm

1. 9:30 am FEAR TO FAIL, FEAR TO SHARE: NEGATIVE EFFECTS OF SOCIAL MEDIA ON THE DESIGN STUDENT. *Benjamin Bush*, Auburn University. Social media is one of the most pervasive forms of media that the world has ever seen. In less than 8 years Instagram has grown to have over 1 billion users. In the United States, approximately one in three have an Instagram account. With unparalleled access to user created content, there are bound to be surprising effects. The United States creative industry had another landmark year last year adding $764 billion to the economy. That's 4.2% of the GDP. And despite all of this success, artistic/creative education in secondary schools remains largely underfunded and underemphasized. Given this lack of priority, the responsibility of developing creative skills in young people is solely placed on the creative departments of higher education. Social media can deliver inspiration and give students access to a global network of peers and role models. It can also keep students up to date with the latest trends, movements, and emerging technologies. Unfortunately, access to this active, global community has also produced some unwanted outcomes. Outcomes like a lack of transparency, perceived judgement, and the weakening of 'delayed gratification'. Dieter Rams preached that good design is honest. A lack of context, process, and critique in online content has produced a certain kind of fear when students share their design work. This presentation will further identify issues generated by social media and propose approaches that can used to deflect these issues in the creative classroom.

2. 9:45 am REFRAMING OPPORTUNITY IN RESEARCH. *Christopher Arnold*, Auburn University. Addressing questions surrounding the role of academic research involving design, Dr. Richard Buchanan published the body of a conference presentation entitled "Design Research and the New Learning" (Buchanan, 2001). In doing so, he articulated the character and origins of the chasm between disciplines rooted in fundamental research inquiry (e.g. the physical and human sciences) and the generative practice of design which he traces back to the scientific revolution of the Renaissance. Two decades later, Dr. Buchanan's thesis remains relevant and yet his argument has not advanced within the context of academic discourse. To the detriment of the academe, the gap in funding for and the low perceived value of research on design minimizes the humanistic worth

ascribed to a wide range of disciplines and limits the practical value of basic scientific research. To encourage discussion about research on design, this re-introduction to Dr. Buchanan's work will highlight opportunities for alignment with design disciplines that can spark a rebirth in learning within comprehensive academic institutions. By re-framing the differences between disciplines of design and the sciences, not as conflicting values but as complementary perspectives, the strengths of each will lead to new opportunities for collaboration and understanding benefitting both.
Reference: Buchanan, R. (2001). Design Research and the New Learning. Design Issues, 17(4), 3–23. Retrieved from http://www.mitpressjournals.org/toc/desi/17/4

3. 10:00 am WHO'S AFRAID OF CRISPR BABIES? *James Bradley*, Auburn University. On November 26, 2018, Chinese researcher He Jiankui, announced birth of the world's first babies genetically edited by the powerful CRISPR technology. Ostensibly, the rationale for the work was to inactivate the CCR5 gene required for HIV entry into cells and to render the twin girls resistant to future infection with the AIDS virus. Gene analysis of the two embryos before implantation showed that only one had both copies of CCR5 disabled. The individual with just one copy disabled would remain unprotected from HIV infection. Analysis after birth showed genetic mosaicism in both babies, making it unlikely that either one is protected. An outcry from scientists and bioethicists condemning the work as unsafe and unethical ensued. He's work was certainly premature, but does his medical/scientific debacle argue against our choosing a future that includes CRISPR babies? How might the history of *in vitro* fertilization and the emergence of ATM machines give insight into our choice-making process regarding gene-editing the human germ line? Our attention ought to focus on the wise use of CRISPR gene-editing in humans rather than on preventing it.

4. 10:15 am DESIGNING FOR SUSTAINABILITY AND RESILIENCE. *Rusty Lay*, Auburn University. Technology, automation, and the many systems that have been put in place to add efficiency and convenience to our lives allows modern cultures to live prosperous and "easy" lives compared to most cultures throughout history. Our lives of ease have many desirable attributes but, we have simultaneously developed a high level of dependency and a lack of resilience in the face of many common challenges. A desire for a life of "prosperous ease" and the desire for convenience has ushered a systemic and often unrecognized dependency on fragile systems into modern cultures. Even when our systems run smoothly, our dependencies have been proven to be a risk to the planet's environment and resources, as well as to the maintenance of knowledge. When the systems fail, our dependencies are a risk to culture, economic stability, and to life itself. There appears to be either a growing understanding of the true nature of the risks we live under in our modern society and an unrecognized convergence of differing cultural movements. There is a handful of counter cultural rejections of particular areas of risk by a growing population taking the form of movements and sub-cultural trends. Through intentional and strategic design, a connection between these counter cultural movements could be fostered and a philosophical shift of our society could be nudged toward a life of resilience, independence, and greater humanness.

5. 10:30 am EXPERIENCING THE POWER OF PLACE. *Brian LaHaie*, University of Georgia; Clark Lundell, Auburn University. Life takes place. Clearly the two are inseparable. We experience our lives connected both physically and spiritually in place. The places we inhabit are expressions of their geo-physical locations and our collective experiences and memories. Spaces evolve into places over time. Equally, places can erode over time. In the best-selling book, "The Geography of Nowhere" James Kunsler suggests that we increasingly live in a placeless world. Due to our increased mobility, increased technology and decreased sensory awareness, we are losing our sense of place. This paper presentation will explore what makes landscape places memorable and meaningful and will demonstrate that good design responds to meaning and place.

6. 10:45 am FUNCTIONAL AESTHETICS. *Randall Bartlett*, Auburn University. Today, many consumers continue to purchase products according to appearance over functionality. So, in favor of the majority of consumers, the manufactures shape or reshape their products to attract sales. This is known as styling. Styling is reshaping a products form of appearance only, no functional change. Don't mistake, the appearance of a product, the aesthetics, is important, but often that is the only change and the product is marketed as a "new" model. Aesthetics can be achieved at the beginning of the design process, let me say it this way, aesthetics should be a natural attribute of the designer during the design process. Changing the image of a product may enhance sells works, but improving the products function to enhance the use is a greater value. To give the title "designer" to someone who solely changes the appearance of a product to enhance sells is not a designer, but a stylist. Industrial designers have been looked upon as a stylist. This is a misconception, even though some designers are required to become a stylist. Industrial design is having an appreciation and understanding of the importance of aesthetics in product design, but this is an intrinsic attribute of the industrial designer. The industrial designer must consider the aesthetics during the human, technical and production functions of the development process. Could there be a new phrase, a movement or teaching theory called "Functional Aesthetics?" This paper will explore that possibility.

7. 11:00 am TECHNOLOGY TENSIONS WITHIN VISUAL ARTS EDUCATION. *David Smith*, Auburn University. Research has shown that use of technology can enhance education, conversely there are those that say technology can displace important hand skills in early learning development. Education within the visual arts—and specifically graphic design also has a tension between tasks completed by hand versus tasks completed with technology. We know that technology is important to visual arts because art which utilizes digital technology in its creation has found a place in contemporary fine art, and graphic design as it is practiced today could not function without the computer. Some would even say that all graphic design is performed on the computer. Therefore, it is imperative that learning to work with technology is part of student course work. Acknowledging the importance of technology in design education is a given, but how much is too much? When does technology become a hindrance rather than a help? Is it possible that a curriculum too dependent on technology can hurt the quality of a creative visual education? This paper examines the tensions of working on paper versus working with digital technology in graphic design education. The reality is that digital tools are

not easier or faster for every task, and they certainly won't generate ideas on their own—they are just tools. The head directs the hand, and the hand directs the tool. Part of the tension between hand and digital is the tendency of students to skip developmental steps in the creative process when using digital tools.

8. 11: 15 am THE STRANGLEHOLD OF THE 1910 FLEXNER REPORT. *Kenneth Nusbaum*, Clark Lundell, Auburn University. Part of American Exceptionalism continues to be "fee-for-service" health care, a system that even physicians may not find amenable. From the inception of the Colonies, medical care was fee-for-service, and medical training was provided through apprenticeships or private, free-standing medical schools, and subsequently, by medical schools attached to accredited colleges and universities. Clearly, the products of such a system would be of uneven quality. The Flexner Report was released in 1910 as a critique and corrective of medical education in the US and Canada. The report led to the "professionalization" of medical education and resulted in the closure of many private medical schools, to include all medical colleges for women and permitting only Meharry and Howard to provide medical education for African Americans. The increased rigor of medical education greatly increased the quality and practice of medicine in the US and for at least 5 decades following the Report, medicine remained the lucrative province of white men, women were nurses, minorities were aides and scullions. Demands for medical care, demonstrated competence of non-physician health care providers, and lessons from the European model gradually weakened the stranglehold and edged the US toward alleviating the social injustice that emerged from Flexner's report. Today, the format of American medical education extends deeply into those countries which provide health care workers to fill our physician gap.

SECTION X. BIOETHICS AND HISTORY & PHILOSOPHY OF SCIENCE
Paper Session II
Thursday Afternoon, 1:00 – 3:30 pm
KHCC Ballroom A₃
Clark Lundell, Presiding

9. 1:00 pm **g ALTERNATIVE AGRICULTURAL TECHNIQUES FOR DECREASING ENVIRONMENTAL DAMAGE. *Justin Murphy*, Auburn University. By the year 2050, it is predicted that food production must increase by 70% to feed the world's increasing population. Unfortunately, using current agricultural techniques would require a proportional increase in practices that cause documented environmental damage and potentially devastating adverse health consequences for numerous biological life forms. As a result, environmentally friendly methods must be found that either match or exceed current agricultural practices. One environmentally friendly method for increasing crop yield is the use of sound waves to promote plant growth. This method uses acoustic technology to apply sound pressure and frequency levels to crops in an attempt to increase crop yield and nutrient density. This researcher proposes to combine the use of

acoustic technology to an environmentally friendly system that is showing great promise, aeorponics. Aeorponics is a system that uses a nutrient rich mist to grow plants in a controlled indoor environment, without the use of soil or an aggregate media. Research has demonstrated that aeroponic techniques decrease water use by 90%, reduce fertilizer need by 60%, eliminate the need for pesticides, and has an ability to increase yearly crop yields by up to 75%. I will be testing the effects of acoustic technology on various crops grown in a high-pressure aeroponic system built using guidelines reported by NASA. This experiment will test the hypothesis that exposing plants grown in a high-pressure aeroponic system to sound waves of appropriate pressure and frequency levels will increase plant growth and quality.

10. 1:15 pm **u BOSS BABIES TAKING OVER THE MARKET: ARTFUL OBJECTS AT INFLUENTIAL TIMES. *Alexis Kennedy*, Auburn University. The elemental stages of life are full of momentous milestones characterized by artful objects. One of the most significant artful objects introduced to babies are their utensils. Learning to use a spoon and fork is a tedious task often accompanied by fighting to use their hands instead of fine tuning their motor skills. The design of infantile utensils become key in babies' developmental process. Over the span of five months, babies acquire the ability to see color. Suddenly the pastels are replaced by vibrant and saturated colors in order to maintain the baby's attention. Artful objects for youth are a complicated twofold field as the marketer must appeal to two contrasting consumers. The parents are catapulted into a new, colorful, and animated world which has little to no sentiment to them initially. The marketer is plagued with the difficult task of attracting the parents while still staying true to brand. Marketers often utilize the strategy of evoking fond memories of childhood through iconic cartoons; while still satisfying the infant's newfound crave for color. Thus, a marriage of color and emotion is then crafted onto tools such as spoons and forks. The vibrancy of the utensils increases the enjoyability of the task of maneuvering utensils, and act as a flashback to childhood for the parents.

11. 1:30 pm **u BALL BEARING. *Josh Buchholz* and Clark Lundell, Auburn University. The ball bearing was invented in 1794 to reduce friction on spinning objects. Ball bearings are used in everyday items such as skateboard wheels, DVD players, washing machines, and fidget spinners. The ball bearing is an engineered object that it is not made to be seen and is only made for the function that it serves. It is designed to sit inside of a spinning object to make the movement smoother. Ball bearings are mesmerizing to watch because there is little friction that impacts the bearing. This means that it will spin for an extended period of time. Due to the fact that they are intriguing to watch Catherine Hettinger invented the fidget spinner which is a single ball bearing surrounded by three plastic arms. These spinners function by pinching the ball bearing and then flicking one of the arms. Fidget spinners are made to reduce anxiety and to help the users focus. While ball bearings are very effective they continue to evolve with improvements such as better lubrication. With lubrication, the life of the ball bearing is extended which will lead to less maintenance and a longer spin life. The main source of lubrication that ball bearing use is grease. Ball bearings started out to improve the function of tools and evolved over time to include objects of entertainment as well as useful items.

12. 1:45 pm **u *UOMO UNIVERSALE*. *Jessica Elridge*, Auburn University. During the Renaissance a rebirth of ideals was brought about and one was the idea of the Greeks that well roundedness was essential. *Uomo Universale* was a person of the time who conquered knowledge in both art and science because the two go hand and hand. A designed product embodies this concept of art and engineering science intertwining. To design a product, functionality along with aesthetic appeal are taken into consideration. For instances kitchen ware is made from materials that are suitable to withstand high heats, cut through materials, and be durable. Kitchen ware also is made to have an attractive look. A sleek, appealing appearance attracts customers in collaboration with capabilities of an item. Looking good and operating effectively are the key components of anything being well-designed because it will be very marketable to the public. The unique job of bring together the artful and engineering world into one package is done by ensuring the product works properly and are not an eye sore in its intended environment. Packaging and presentation matter to a great extent in the production world. Buildings, cars, tool, gadgets, electronics are all designed objects. So, the Greeks and those of the Renaissance period had the right idea about the arts and the sciences being in harmony to design a new world.

13. 2:00 pm **u BALANCE IN OUR LIVES. *Alexandra Byrd*, Auburn University. From the moment we are born until the moment we pass on, we have a deep desire for balance in our lives. Our brains are split by hemispheres, the right and left, which operate two distinctly different aspects of the human mind – both of which unite in control. The left brain seeks to find logical answers, allows us to speak, and controls the right side of our body; meanwhile, the right brain uses creativity, seeks to understand the abstract, and controls the left side of the body. These two opposing concepts – logic and abstract – work together to help each person achieve a cognitive balance and produce stability in everyday tasks. In a well-designed object, our minds look for and recognize the equilibrium of beauty and usefulness. Every day, our two hemispheres compromise and work together to make decisions. This combination of logical choices with gut instinct result in fantastic design collaborations for all kinds of objects: transportation, kitchen appliances, writing utensils, and more. For example, if someone was looking to buy a car, the engineered would be considered while the artful is, in the end, what inspires you to see yourself driving the car. No matter the situation, the result of any well-made decision stems from the efforts of both sides of the mind.

14. 2:15 pm **u "DESIGN" A BEAUTIFULLY FUNCTIONAL COMPROMISE. *Jonathan Funk*, Auburn University. Design is comprehensive; function requires precision and beauty requires art. Design is all-encompassing. The left and right brain join together in a bipartisan manner to satisfy scientific laws while simultaneously appealing to the emotion of the human beholder. Of note: design is a compromise, not a confrontation. Function and beauty are integral parts of design; without either it ceases to exist. Just as left and right hemispheres are joined by the corpus collosum, design facilitates communication between the technical and the abstract. An example of a designed object with particularly strong roots in functionality and beauty is a watch. Watches appear to represent the epitome of rationality. Their function is to tell time down to the hour, minute and second. Mechanical innerworkings are expressed by the ticking and tocking

of gears and hands. Without watches, time is devalued. Without time, chaos erupts. Watches maintain order and ensure efficiency down to the second. And yet, a watch is not purely functional. Considerable time and money have been spent perfecting watch design. The face should be legible, but not too big. The band should be sturdy, but not too wide. Analog or digital? Traditional or smart? The answers to questions such as these are subjective. When selecting a watch to be worn daily, beauty is important. It should be comfortable and attractive. It should accomplish its purpose with minimal disruption to everyday activities. Designed objects are beautifully functional compromises, uniting precision and art in a way that engages and evokes emotion.

15. 2:30 pm **u THE POWER OF COLOR. *Logan Ellison*, Auburn University. "Color is determined by light and it's interaction with surfaces. Wavelengths are either absorbed or reflected, with our eyes perceiving these reflections in values of red, green, and blue. The first principles of a color theory emerged in 1435 through the writings of Leone Battista Alberti. They also showed up in the notebooks of Leonardo da Vinci in 1490. But it was Isaac Newton who categorized this in 1704 through his color wheel. This recognizes that all colors are a combination of three primary colors; red, blue, and yellow. Mixing these will form secondary colors, with further mixing yielding tertiary colors. Colors can be split into the warm and cool temperatures, with the warm colors reminiscent of sunlight and the cool colors of water. Another important aspect of the color wheel is its arrangement in relation to color schemes. For instance, a combination of two opposite colors would be referred to as complimentary. On the other hand, a combination of colors located beside each other on the color wheel would be called analogous. All of this matters, because color harmony has a direct effect on our psychology. One study in 1996 even found that placebo pills using the warm color range were perceived as having a stimulant effect, with cool colors having a tranquilizing effect. Although a lot of this is determined by personal and cultural factors, our brains associate color with a visual experience. Therefore, our visual intake will affect our brains and bodies."

16. 2:45 pm CLIMATE: WAVES, TRAINS, SURFERS, SUNSPOTS, MINIMA, HISTORY, WARMING AND OCEAN CURRENTS. *Clark Lundell*, Auburn University. Objects radiating pulses of energy, measured over time, are visualized through sinusoidal waves. Ocean waves are pulses of energy which often cluster in wave trains of 14 individual waves. Waves and wave trains increase and decrease in the quantity of energy they carry. Surfers wait for the highest energy wave in a wave train, which can be 14 waves apart, to catch the awesome bomb wave. The sun emits solar wave pulses of energy manifested through the number of sunspots. The greater the sunspot activity in a solar wave, an 11-year time cycle, the higher energy emitted by the sun. Cycles are numbered. In 2018 we completed 11-year cycle # 24. Solar wave cycles are produced in trains which can contain 5 to 10 eleven-year solar cycles. In 2018 we completed a wave train of ten solar cycles that began in 1906 with cycle # 14. A high energy wave train (1906 to 2018 called a Grand Solar Maximum) is followed by a low energy train (2019 to 2120 called a Grand Solar Minimum). Historically Grand Solar Minima are associated with cooler world temperatures which under current circumstances may minimally off set global warming trends. The real impact upon world temperatures may be atmospheric

warming and a solar minimum combining to alter ocean currents which drive the distribution of energy across the globe directly affecting world climate.

SECTION X. BIOETHICS AND HISTORY & PHILOSOPHY OF SCIENCE

Poster Session
Thursday Afternoon
KHCC Atrium and Ballroom Boyer
Clark Lundell, Presiding

17. 3:00 pm DISPROPORTIONATE EFFECTS OF CLIMATE CHANGE ON POOR AND MINORITY POPULATIONS. *Shuntele Burns*, Alabama State University. The environmental effects of climate change pose increased threats to health, safety, and economic security. Although climate change affects the entire planet and its inhabitants, it has a disproportionately adverse impact on poor and minority populations. In the U.S., low-income and minority populations are more likely to be exposed to higher levels of air pollution, and climate change will further worsen air quality. They are also more likely to reside in urban areas with less plant life to moderate heat and more buildings and pavement to hold heat. Thus, these populations are often more susceptible to respiratory and heat-related illnesses. Severe weather episodes and other conditions caused by climate change may decrease employment prospects in areas like tourism and agriculture, which engage significant numbers of low-income and minority workers. Globally, health issues triggered or exacerbated by climate change are more apt to occur in poor populations in tropical environments. Poor countries are also at a greater disadvantage from climate change because their economies depend principally on agriculture, which is vulnerable to weather mutability and extremes. In addition, primary crops like rice and wheat, staples in many low-income countries, are becoming less nutritious because of increased levels of CO_2. Climate change is a global crisis with grave implications for the future of the planet. Solutions to this crisis should include a consideration of the moral and ethical issues surrounding it—issues related to social, economic, and environmental justice.