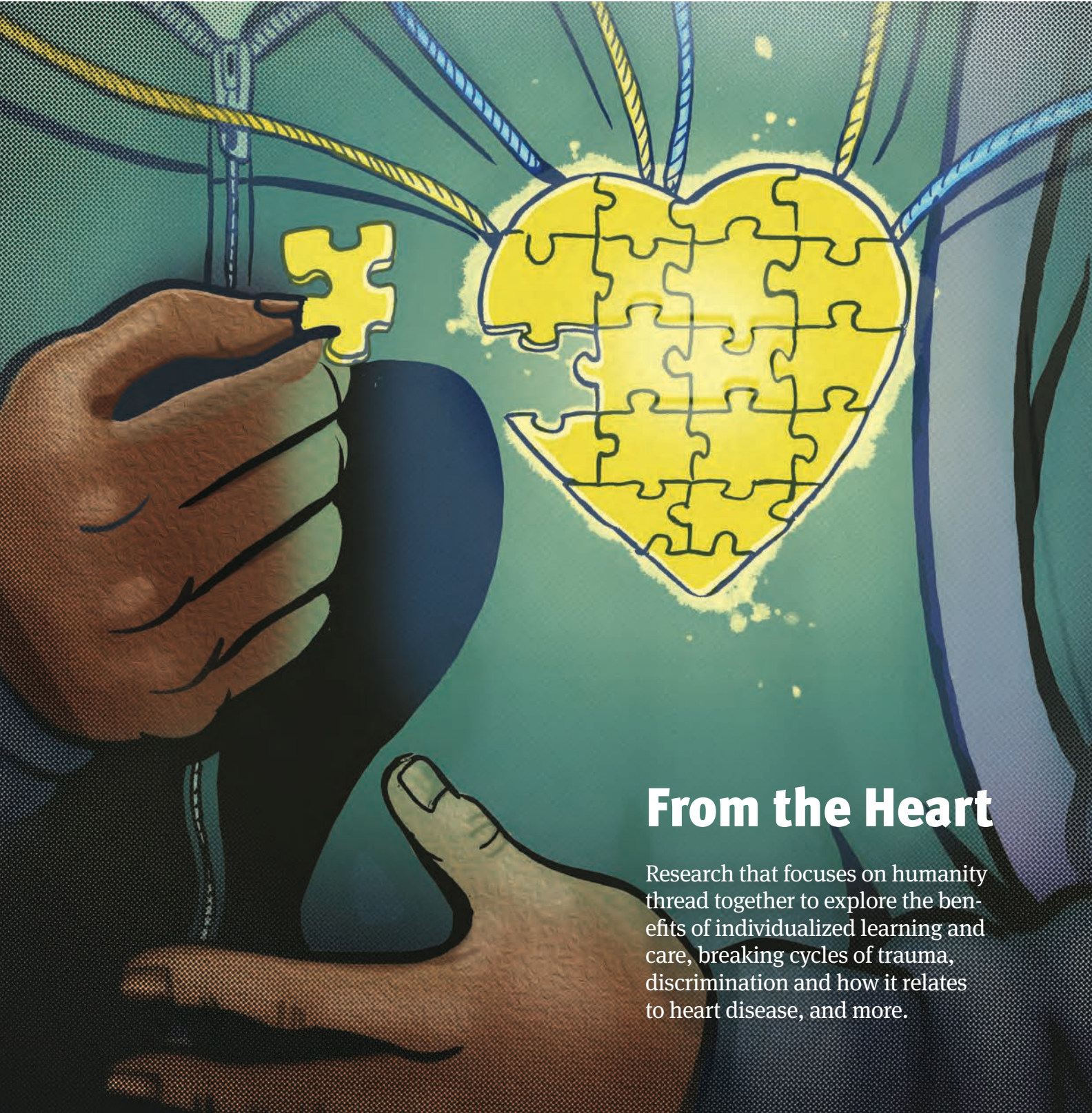


CALIFORNIA
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Quest

ISSUE 7 FALL 2021

Pursuing Innovation Through Research



From the Heart

Research that focuses on humanity thread together to explore the benefits of individualized learning and care, breaking cycles of trauma, discrimination and how it relates to heart disease, and more.

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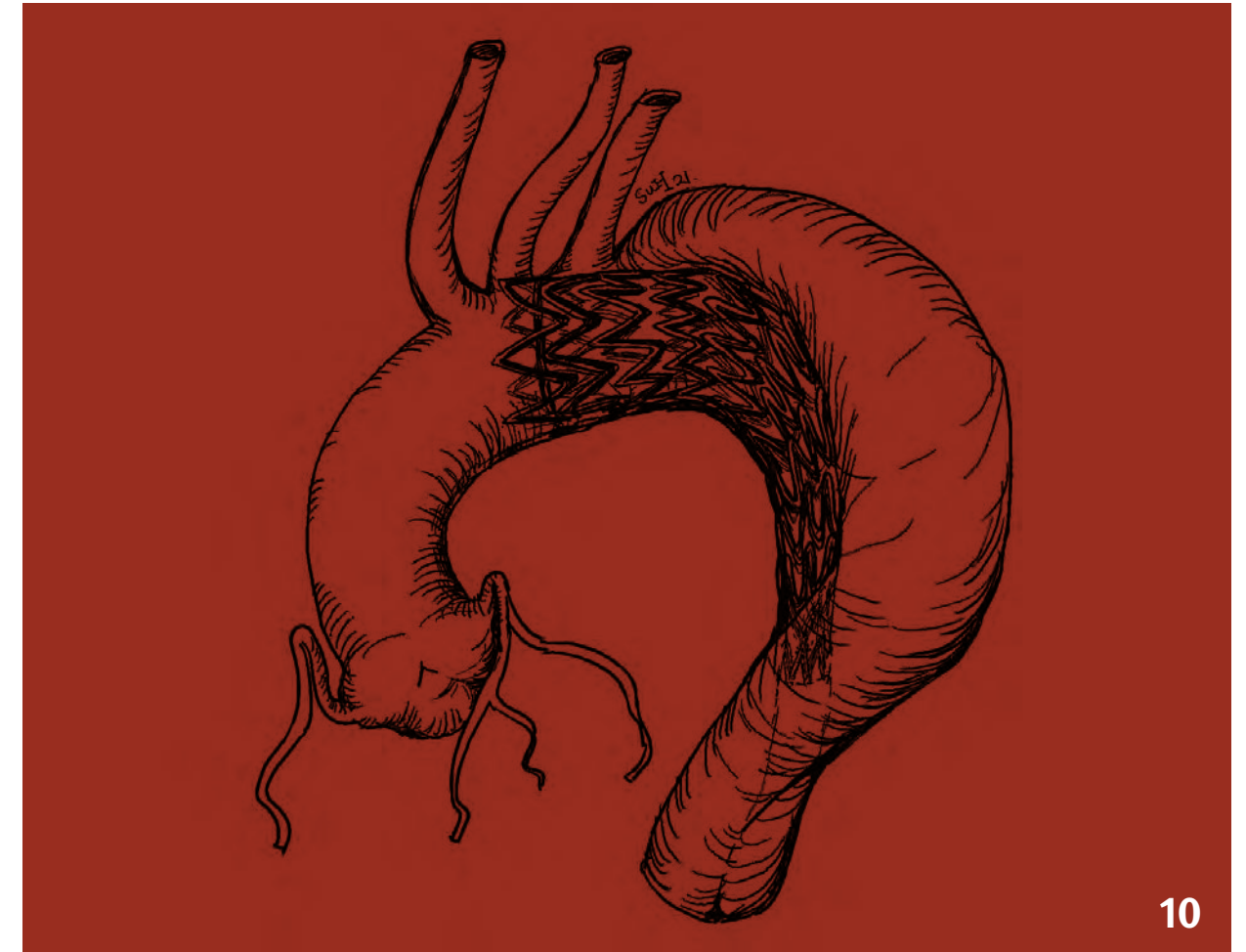
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Fiscal Year 2021 Funding Summary

ON THE COVER: Illustrator Felipe Flores envisions the intersection of mental and physical health and the impact on the heart.

RIGHT: Sketch of human thoracic aorta after endovascular surgery. Endograft is implanted via minimal incision to cover the diseased aorta with Type B Dissection. Dr. Suh has been pursuing her research to examine endograft performance since 2008.

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Mapping the Human Heart

Dr. Ga-Young Kelly Suh is using computer-created models to improve treatment options for those that use medical devices

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Can Discrimination Lead to Heart Disease?

Amber Johnson explores the reality for some Black women: words carrying racist messages and attitudes can not only cause hurt feelings, but can also lead to physical ailments and health decline.

AMBER JOHNSON
College of Health and Human Services

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*PHOTO: President Conoley
speaks to students and faculty
at Commencement 2021.
Photo by Sean DuFrene*

MESSAGE FROM THE PRESIDENT

Welcome to Quest!

This beautiful and information-filled publication provides a window to the vast array of talent, research interests and accomplishments of Beach faculty and of their graduate and undergraduate mentees. Your reading explorations will discover important work in social justice, biomedical engineering, photography and film, and have many stops in between. You will learn about Victorian Studies, homelessness, heart disease, ocean acidification, and multiracial learning styles to name just a few. You will also get to know some of our terrific faculty members and students.

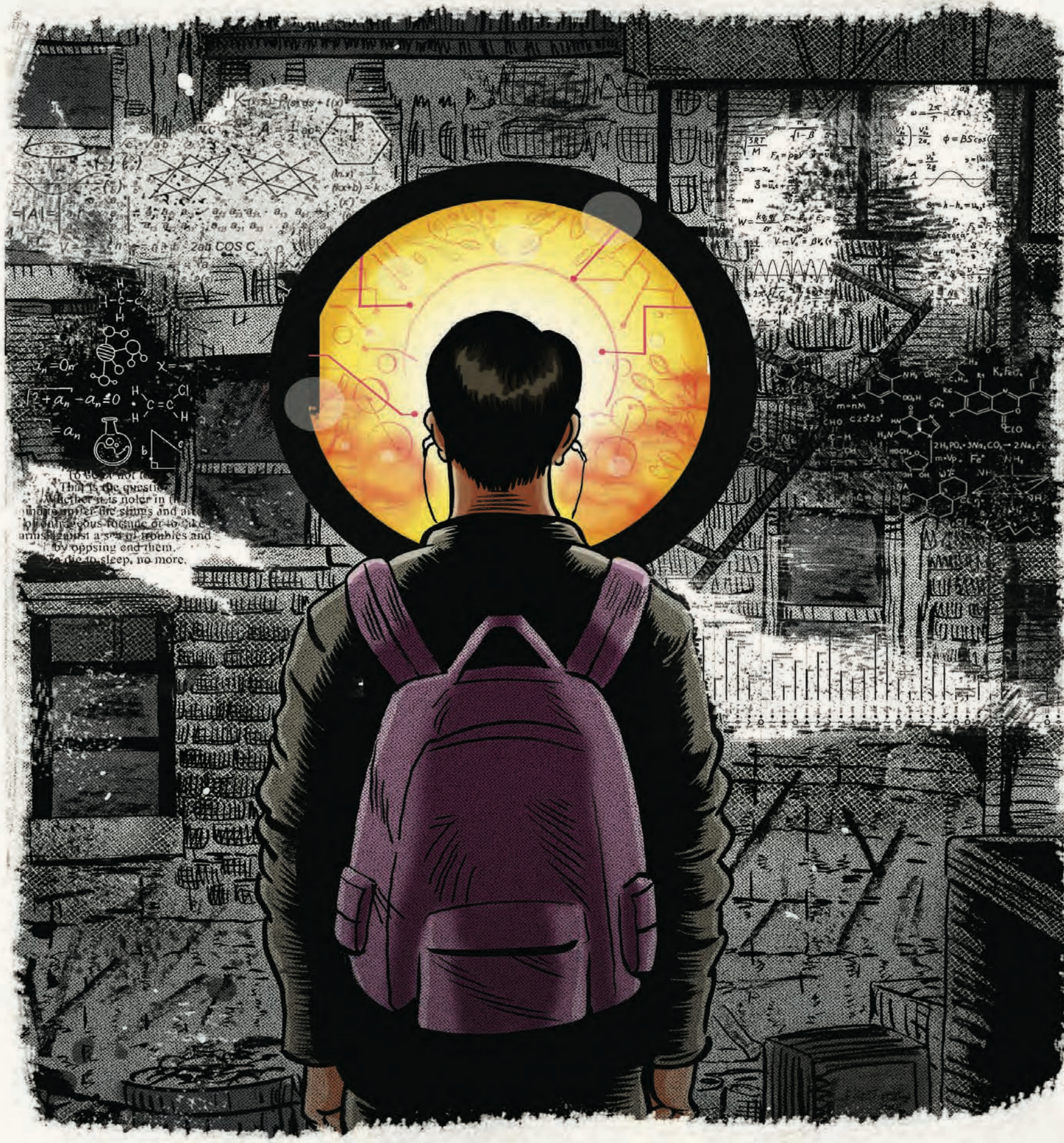
We consider our faculty and our students' engagement in research to be a natural enrichment to and extension of classroom learning and a vital part of our student-centered mission. Doing research with a faculty member is a well-established high impact educational practice shown to add to our students' success in their eventual professional careers.

Readers, thank you, on behalf of the university, for your interest in the work of our talented faculty and students. Thank you, Beach faculty and students, for your exemplary contributions across the many creative, scholarly, and research areas that characterize The Beach.

Go Beach!

A handwritten signature in cursive script that reads "Jane".

Jane Close Conoley



CHANGING THE LESSON PLAN: PERSONALIZING EDUCATIONAL EXPERIENCES

Noah Golden works to prove individualizing education equals success.

COLLEGE OF
EDUCATION

WORDS:
Sylvia Rodemeyer

Noah Golden's experience in the classroom as a student, educator and researcher has spanned both coasts and many different classrooms. A common theme emerged in his evaluations: Students, specifically adolescent men of color, are often ranked by what they don't know versus what they do. This point of view often overlooks individual strengths and paths toward success, leaving otherwise motivated students without the tools and guidance necessary.

"Sadly, so much of education is grounded in deficit. I'm a big fan of ways of teaching and learning that start with someone's strengths and then build upon them. As a researcher I want to understand on a micro level what those strengths are and how those changes happen in the classroom," Golden says.

That perspective informs his view that the experiences and understandings of these young scholars can contribute to broader debates on how to work towards equity and justice in and through education.

"I want to understand it more so that I can translate that work into teacher education so we can support the next generation of teachers to be doing culturally responsive pedagogy, to be thinking about the funds of knowledge and how we tap into those," Golden elaborates.

Golden explains adolescent scholars of color in urban schools are often framed as "at-risk." That perceived risk is based on identified deficiencies in students as opposed to social processes. He became particularly interested in researching alternative learning spaces due to the ways that learners are often positioned within traditional learning environments. He and his colleagues found that more often than not, deficit models positioning working-class and poor adolescent scholars of color as intrinsically lacking are used to account for disparities in academic achievement in these educational programs. Thus, discounting the ability to close the gap in achievement through an individualized approach.

Golden often uses the story of Jamahl* to illustrate the impact of individualized attention. Jamaal was a student who went entered and exited multiple high school programs. Traditional metrics would label Jamahl as a dropout and as someone who didn't care about education, but,

as Golden found through his research, when you took the time to get to know Jamahl, you would find a whole other story.

As Golden and his peers discovered, Jamaal had a specific interest that could have been encouraged further and he could have been given individualized lessons related to his interest within his normal studies.

“When I met Jamahl, he was always carrying around a camera. His Language Arts teacher described him as always fiddling around with his camera as a way to hide his low skills instead of working in class. It turns out his camera was a cultural tool. It was a way of him saying ‘I am a photographer.’”

From a responsive identity lens a teacher could adapt some of Jamahl’s assignments to utilize his camera. Instead of seeing his interest as a deficit, there are ways to connect with photography in a social sciences or math class.

Jamahl went through several programs until he found The Opportunity Center*, where he eventually graduated.

Jamahl described it as such when Golden had Jamahl and some of his peers present their findings to administration and field educators: “School doesn’t live where they live. We need to make school live where we live.”

That shift right there, where the young people had the podium and the stage, lead to some really powerful dialogues.” Golden says of including the students in the process.

How does Golden think that secondary education can be more responsive to young men of color?

“We need to look at connections between what is going on in classroom spaces and shifts in an identity. By interviewing students over a semester to a year, you really see shifts over time. I spent three years in classrooms interviewing young people, and what is absolutely key to that repositioning work is relationships with educators. What educators need to be able to create those relationships is freedom over curriculum.”

Existing scholarship points to resistance to continuing colonizing practices, the internalizing of low expectations, lack of access to academic support and resources, or ethno-racialized, classed, or gendered (among other) discourses of who gets to be seen as a worthy or strong student as the explanatory locus for such utterances.

Another shift Golden sees as useful is teachers using their collective agency to push back against performance-based assessments and high stakes tests. He points to institutions he’s observed that include a more cooperative and fluid assessment style. Those assessments included a variety of ways for students to share their learnings, including series of work, in-depth presentation about their subject matter, and fielding questions from both educators and students.

“We are at our best when we are in dialogue with students, [when] we are collectively exploring issues through our disciplines. We can’t have young people sit for years being objects in the classroom and taking notes and regurgitating information and expect them at the age of 18 to be powerful civic participants,” Golden says.

Golden is continuing his work by currently investigating the role of instruction in learners’ identity work at a successful alternative academic program and is investigating why and how this program is working at the micro-level. Golden’s work is made possible via support from The Spencer Foundation and the NCTE group of English Language Arts Teacher Educators. ■

PAGE 4: Students traditionally labeled as disinterested or distracted are able to find focus with an individualized learning plan.

“

I want to understand it more so that I can translate that work into teacher education so we can support the next generation of teachers to be doing culturally responsive pedagogy, to be thinking about the funds of knowledge and how we tap into those.

”

** names have been changed to protect the anonymity of participants*



Lacey Lennon focuses on telling familial stories through performance in photography and video.

COLLEGE OF THE ARTS

WORDS: Sylvia Rodemeyer

Very few of us are emerging from the past year in the same state we started the pandemic in. Lacey Lennon, Assistant Professor, Photography, has seen a shift in her own work, particularly in how family is depicted.

“The idea of families in photography helps bring me into awareness of my role in the families I belong to, and to access feelings that are difficult to describe in conventional terms,” Lennon explains.

Lennon uses actors in the pictures she makes. The final product becomes a sliver of them, a sliver of a memory, and a sliver of the idea in her head. The final product allows Lennon to celebrate and process.

“What Audre Lorde calls that “whole powerful world of nonverbal communication” is what I am continually exploring with photography. In my pictures, fragmented versions of the same self, other selves, multiply throughout. Often,

“

There is an intense need to ground my work in something that feels soulful. The rhythm and sensations that are part of soul music are so interesting to me and that is what my work feels like. I see it all layered like a song.

”

COLLEGE OF THE ARTS

PAGE 7: Lacey Lennon, photographed in Los Angeles, a frequent backdrop of her work.

these people are based on family members, sisters, friends, or musicians I love. I work with actors because I want to portray people as vessels to hold details of multiple people, feelings, and contemplative moments. Small details like basketball t-shirts, tattoos, side-eye wincing are woven throughout like poetry,” she says of her work, for me, performance exists as both a medium, and the content of my work. The scenarios I stage are drawn from personal memories and take place in parks, on the

street and in homes, in my own neighborhood in Mid City, Los Angeles.

The themes of being a person in the world and navigating space, and relationships show up in her work. Lennon explains that all of it comes together to create a singular piece. She likens it to soul music.

“There is an intense need to ground my work in something that feels soulful. The rhythm and sensations that are part of soul music are so interesting to me and that is what my work feels like. I see it all layered like a song,” Lennon said.

“I spend hours walking and making pictures on the street. Those pictures funnel into my photographs, which are somewhat staged. I may cast actors, I may find people that I’m interested in. These people that I cast and work with feel like a network of extended family. I’m interested in how they can exist as



LEFT: Funkadelic Pond Water, 2021. Archival Pigment Print.

ABOVE: Smiling Pictures 3, 2020. Archival pigment print

amalgamations of people in my past, people in my family, but also how they can exist with their own personality traits that come through,” Lennon said.

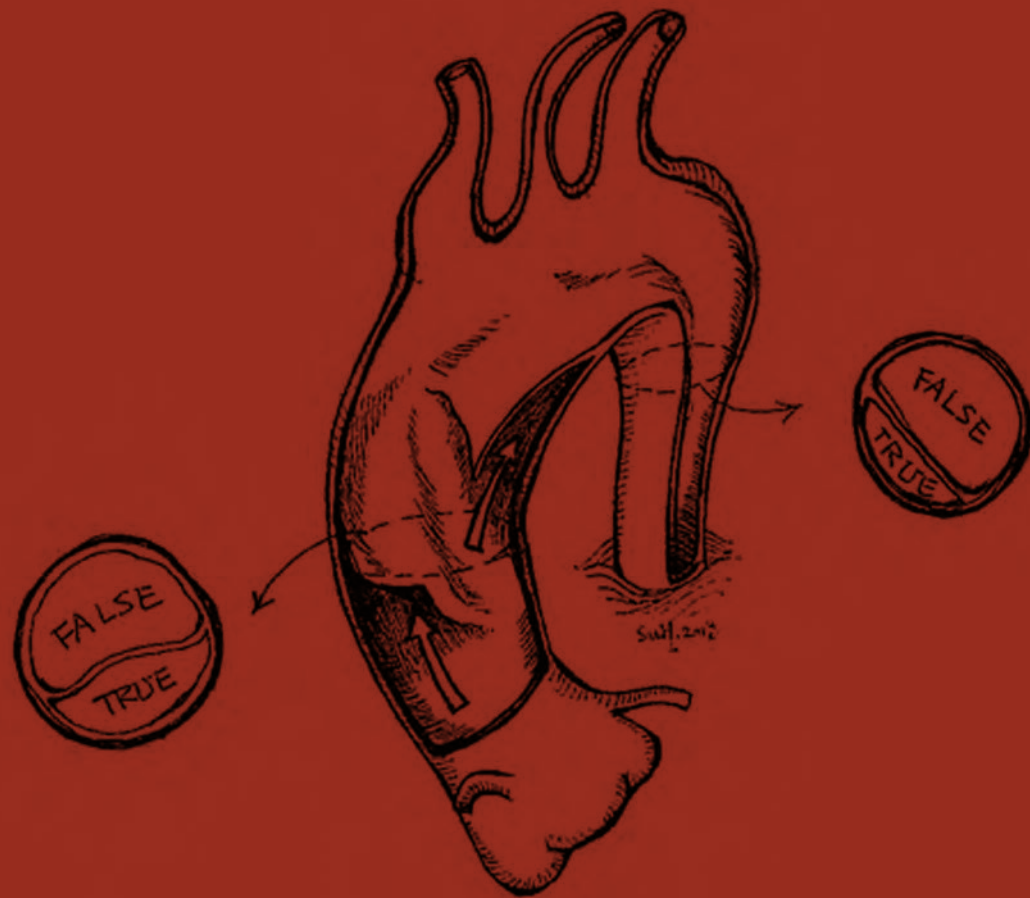
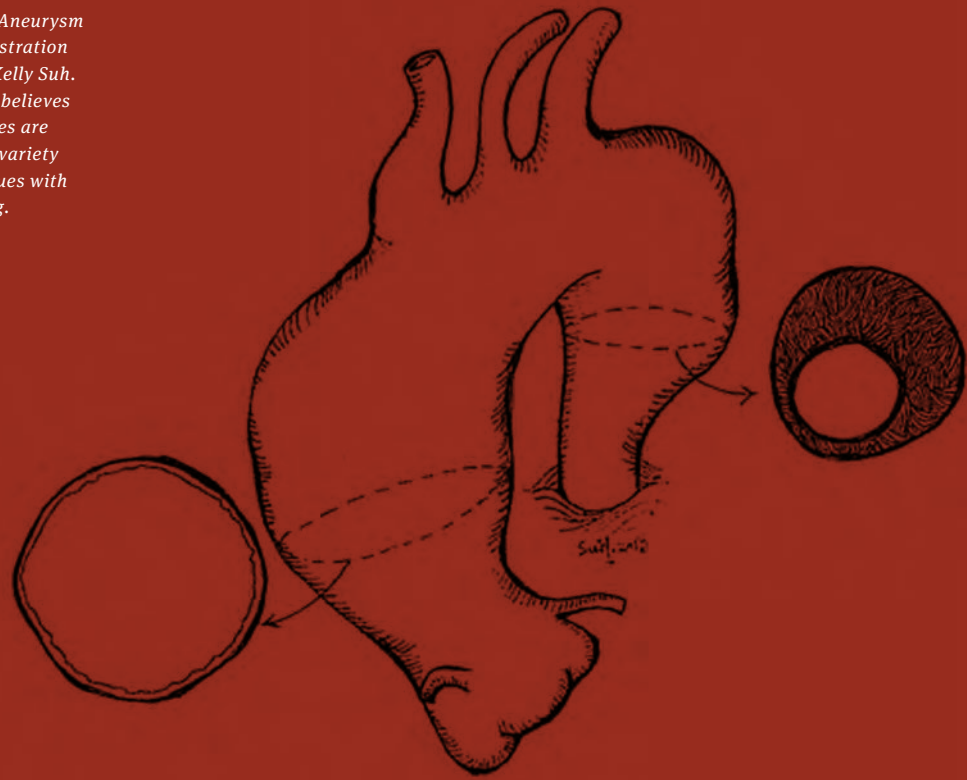
Her work was recently included in Aperture’s “Photo No-Nos,” a collection that invited photographers invited to what they no longer make images of or consider off-limits. Lennon wrote about pickup trucks, specifically her Dad’s truck, that she named Remedios the Beauty, after the character in Gabriel Garcia Marquez’ “100 Years Of Solitude.” She talked about the last pickup truck picture she made.

Lennon credits her current perspective on being able to feel more grounded in how she approaches her work.

“A lot of my thinking in making and dealing with video, for a while, had been speculative and had been about theoretical ideas, and that recently there’s been a digestion of those speculative ideas into something that feels very much grounded in a physical experience of the world,” Lennon said.

Lennon’s plans to continue to use photography to explore these big moments and emotions through the poetry of what is not said in imagery. She was recently selected for a small faculty grant. ■

Illustrations: Aneurysm dissection illustration by Ga-Young Kelly Suh. Professor Suh believes better outcomes are possible for a variety of medical issues with better imaging.



COLLEGE OF ENGINEERING

MAPPING THE HUMAN HEART

Ga-Young Kelly Suh's medical imaging research expands the possibilities for treatment.



LEFT: Alara Blofield, a 4th-year BME student and senior member of Cardio-Vascular Research Club provides a presentation to share her research outcome with her teammate, Jorge Cortes. Alara and Jorge have been working with designing the left-ventricular assist device (LVAD) implantable within the aorta to avoid the problems with current LVADs with bypass. Dan Dao and Gabriela Murrieta are working as another research team to explore application of 3D printing to customize orthopedic implants to better fit the patient anatomy. Justin Mel Cortez is working with his teammate, Thaotho Nguyen (not pictured) to analyze CT images with bioprosthetic heart valve implanted in patients.

BELOW: Professor Ga-Young Kelly Suh

COLLEGE OF ENGINEERING

WORDS: Britt Julious

It is Ga-Young Kelly Suh, Ph.D.'s love of the human body—and a strong desire to provide more accurate and humane solutions for the use of medical devices—that has fueled her research over the last decade. Suh works in medical imaging-based and patient-specific research, using computer-created models to study the effects of medical devices on the human heart.

“Graphically, I love the human body. It’s beautiful inside,” said Suh, an assistant professor of biomedical engineering. Suh hopes her research will one day lead to virtual—or tabletop—surgery. Through tools like a 3D printer, Suh aims to con-

struct the needed sphere and vessel to determine if it is safe for use in humans without having to first test it in humans. These kinds of advancements can ultimately lead to better treatments, medicines, hospital care, and patient livelihood. One day, her work may reduce device failure or the likelihood of bad surgical outcomes or hospitalization time and increase one’s chance of recovery.

Suh joined Cal State Long Beach in 2019. Her research is in coordination with physicians, radiologists, image technicians and other industry personnel where she focuses on small clinical studies to acquire valuable data. Most of Suh’s Cal State research is funded internally. In 2021,

she received an ORED multidisciplinary grant for \$15,000 and a summer student research award for \$5,000 as well as a faculty small grant of \$5,000. Suh was also awarded a research subaward from Stanford University for collaborative research in the medical device industries for \$50,000 in both 2019 and 2020.

Suh measures the patient-specific vessel shape and range of motion with implanted medical devices through imaging data from CTs, MRIs, X-rays and ultrasounds to create a data input and formulate a plan for research. “That medical imaging data gives us the possibility and the choice,” she said.

Suh and her team must justify their chosen range of motion for accuracy. Previously, past researchers and medical professionals did not believe a patient’s range of motion was related to things like heart disease, its treatment or any adverse surgical outcomes. Now, the paradigm has changed. Most researchers understand that range of motion and the blood vessels themselves can and do affect the performance of medical devices.

“What I’m seeing as a boundary condition is a device-testing widget,” said Suh. “When we test something like this and we don’t want it to be broken based on the daily loading, then we want to know how much the data loading would be.

In order to test the efficacy of the medical devices, Suh acquires data based on how much a patient would use a device on a daily basis. “We have to measure the range of the loading, which would be naturally applied and apply these to [millions of cycles of use], just to make sure it’s not going to be broken and hurt people,” Suh said.

Despite Suh’s research load, she still dedicates a large portion of her time to teaching. She has launched her laboratory, the Cardiovascular Research Club (CVRC), with 100 percent undergraduate students. The laboratory features several projects initiated by Suh’s undergraduate students, a practice that many students don’t get the chance to experience until their post-undergrad years, if at all.

“Ninety-nine percent of students come to me saying, ‘I want to do research, any kind of research,’ because it’s good for their resume,” Suh explained.

Students begin by reading a journal article, presenting their journal summary to the larger group of students, and then meeting with Suh one-on-one to gauge their interests.

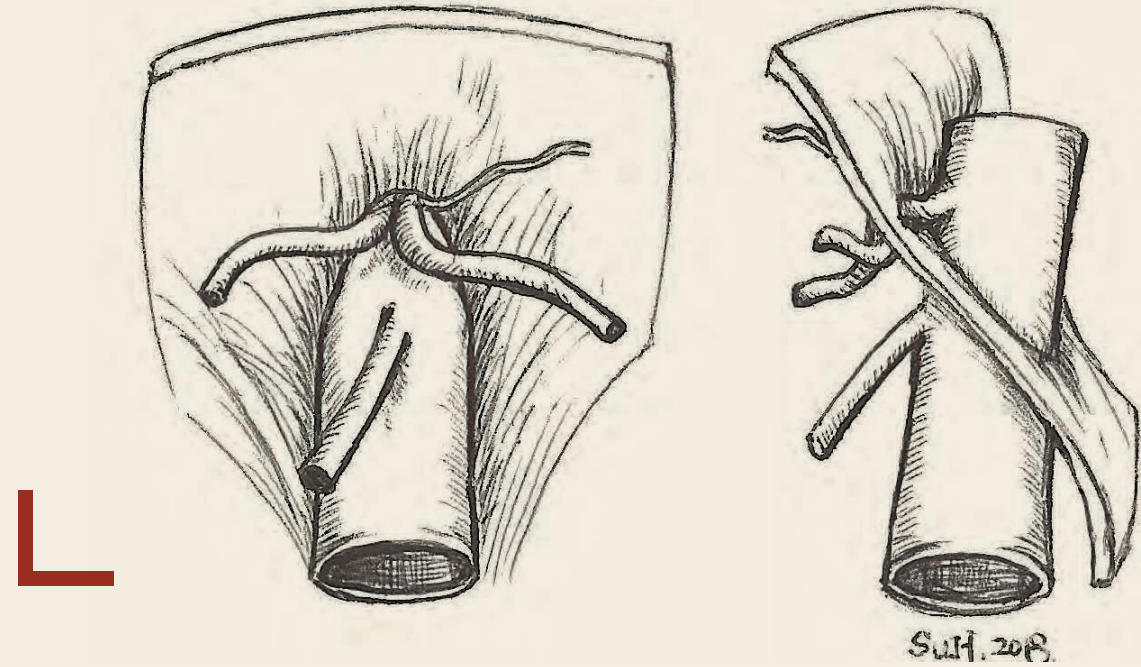
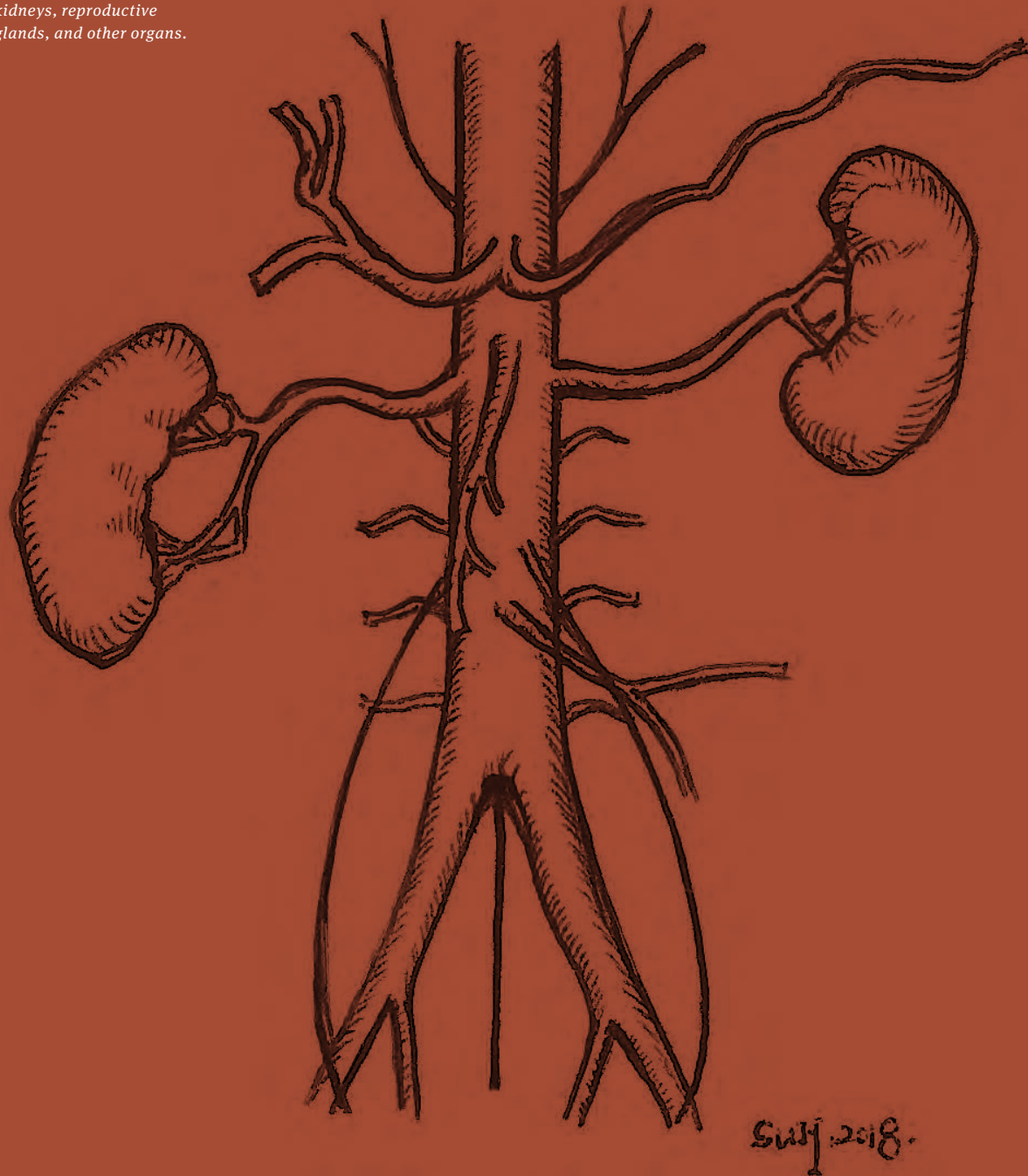
“My job is to give them guidance along the way so they can support themselves for a long time,” said Suh. After giving her students initial guidance, Suh continuously motivates them to find “gaps” in the research. These “gaps” are where undergraduates can form their own research questions and establish a project to study.

“What I do is help them to think in that way, not just doing the fancy thing,” Suh added. “And if they find the research, they usually get really interested and want to contribute as much as possible, so I’m thankful in that way.”

Students are given about 80 percent freedom to direct their research and manage their timeline. The more time they dedicate to their research, the greater chance they have to present their work in a conference. “But if they do not dedicate [themselves], then their project will go away after they leave,” Suh said. “So it’s their call to make their project important and knowledgeable.”



Illustration: An anatomical illustration by Ga-Young Kelly Suh that represents abdominal aorta branches. The abdominal aorta supplies blood to the stomach, liver, pancreas, spleen, small and large intestines, kidneys, reproductive glands, and other organs.



“

We have to measure the range of the loading, which would be naturally applied and apply these to [millions of cycles of use], just to make sure it's not going to be broken and hurt people.

”

ABOVE: An example of Median arcuate ligament syndrome (MALS), which occurs when the arc-shaped band of tissue in the chest area presses on, or traps, the artery that supplies blood to the organs to the upper abdomen.

This teaching style was a catalyst for Suh's desire to work at Cal State Long Beach. Before joining the university, Suh didn't have many chances to teach undergrad students or teach in a classroom as most of her time was spent with advanced graduate or Ph.D.-level students.

One project, which was presented in a student competition, aims to create a design and determine the proper materials and methodology to prototype the vascular stent design. Suh's student used her 3D printer to work on a design that is both affordable and suitable for 3D printing while still maintaining durability under usual blood pressure or collapse of a vessel. Thus far, they have created three generations of design with improvements and aim to switch material from regular resin to flexible resin.

“I am very motivated to apply this kind of teaching style to the classroom, so it's not just delivering the knowledge or information,” said Suh about letting undergraduates direct their own research. “They have to find what they want to know on their own, eventually. We cannot always be with them. I guess that's what the teacher should do—make them independent.”

Despite the limitations of the pandemic, Suh's lab was able to present one project in 2020 at the Annual Biomedical Research Conference for Minority Students managed by the American Society of Microbiology. Two research abstracts were also presented at the symposium and two student computational papers were presented internally within the university at the 33rd annual Student Research Competition, with another coming up this year. All student projects are outlined on the CVRC lab website and Suh makes the final decision for which student work will be presented at conferences.

Suh's work is ambitious, but not impossible. “This is a dream that I would like to contribute to by spending my 10 years or 30 years doing research in the future,” Suh said. “If they find a way through my research, that would be a really honorable moment.” ■

PAGES 16-17: Black women are more likely to be discriminated against when seeking medical care. Professor Amber Johnson is interested in learning if that discrimination can lead to heart disease. Photos permission provided by Creative Commons.

CAN DISCRIMINATION LEAD TO HEART DISEASE?



CHHS' Amber Johnson is the first researcher to empirically study the relationship between racism, shame, and biological responses.

COLLEGE OF HEALTH
AND HUMAN SERVICES

WORDS:
Sharon Hong

R

emember the old children’s rhyme: Sticks and stones may break my bones, but words will never hurt me?

Rewind a couple decades and you’d often hear young children reciting it in response to name-calling or bullying as a way to prove that they were unphased.

Nowadays, most people agree that the saying doesn’t really hold true. Words, indeed, hurt. And according to Assistant Professor Amber Johnson, for some Black women, words carrying racist messages and attitudes can not only cause hurt feelings, but it can also lead to physical ailments and health decline.

Johnson, who has a doctorate in public health education, is interested in understanding the

health impact of discrimination for Black women and how it may contribute to health disparities. Studies show that 49 percent of Black women will develop cardiovascular disease over their lifetime. That’s one in every two Black women – a troubling statistic that persists even as overall rates of cardiovascular disease have declined.

While there is existing research on the relationship between discrimination and cardiovascular disease among populations, researchers haven’t yet figured out exactly how this occurs. It’s kind of like how scientists are still trying to learn how the COVID-19 virus impacts body functions. Scientists know that COVID-19 infection can lead to a number of different outcomes: loss of taste and smell, low oxygen levels, and even death. But what are the mechanisms – the way the virus specifically affects the lungs, heart, brain – that lead to these outcomes?

Johnson has zeroed in on the emotion of shame as a possible pathway for how discrimination leads to poor health.

“We define shame as a social threat. It threatens one’s self-esteem, social status or social position,” Johnson explained. “There has to be an interaction for discrimination to occur, and shame is a social emotion that’s based on our biological need to be connected. If there is a biological basis for an emotion, that means there has to be a biological connection to it somewhere.”

For the past two years, Johnson has been studying the relationship between discrimination and shame. In 2020, funded through the College of Health and Human Services (CHHS) Small Faculty Grant, she published the first paper to empirically investigate associations between racism, internalized shame, and self-esteem (Amber J. Johnson | Juliet Wakefield (Reviewing editor)

RIGHT: Students Victoria A. Davis and Jessica Nwabuzor join Assistant Professor Amber Johnson en route to the Psychology Building to conduct research on Johnson’s study: Racism, Shame and Stress Reactivity.



“

We define shame as a social threat. It threatens one’s self-esteem, social status or social position. There has to be an interaction for discrimination to occur, and shame is a social emotion that’s based on our biological need to be connected. If there is a biological basis for an emotion, that means there has to be a biological connection to it somewhere.

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LEFT: Assistant Professor Amber Johnson is dedicated to researching disparities in the medical care of Black women.

(2020) Examining associations between racism, internalized shame, and self-esteem among African Americans, *Cogent Psychology*, 7:1, DOI: 10.1080/23311908.2020.1757857). Her research involved surveying 203 undergraduate students and asking them to fill out two self-reported questionnaires. The first was an 18-item self-report inventory (Schedule of Racist Events) that asks the frequency of racist discrimination experience within the past year and over their entire life. The second was a 30-item Internalized Shame Scale questionnaire that asks questions about feelings of shame and self-esteem. Results of the study showed a correlation between racist events and internalized shame and Johnson's paper called for additional examination of the process by which racism and shame contribute to mental and physical health among African American populations.

Furthering her research, Johnson and Psychology professor Guido Urizar were awarded a \$15,000 grant from Cal State Long Beach's Office of Research and Economic Development to conduct an interdisciplinary study that looked at racism, shame, and stress reactivity. With the help of 15 students, Johnson and Urizar collected stress

reactivity markers like blood pressure, saliva samples, and weight measurements. The professors taught the students how to conduct social stress tests in a laboratory setting, which gave students valuable hands-on experience.

The study was halted prematurely due to the pandemic, but Johnson and Urizar were able to publish preliminary work (Johnson AJ, Urizar GG Jr. Internalized Shame and Social Stress-Induced Blood Pressure Patterns among Young Black Women. *Ethnicity & Disease*. 2021 ;31(2):167-176. DOI: 10.18865/ed.31.2.167. PMID: 33883857) that showed that Black women who had reported higher levels of shame had poor blood pressure recovery and prolonged blood pressure reactivity. These women, when exposed to stress, had blood pressure levels that continued to rise for approximately 30 minutes and after an hour, their blood pressure still did not return to baseline.

"That reactivity or prolonged activity suggests that those with high internalized shame had a physiological response in their blood pressure levels, as opposed to women with low shame who had a more immediate response and then were able to return to baseline quickly," Johnson said.

Johnson focuses specifically on Black women and their experiences because shame is culturally and racially specific. For example, many Black women may feel societal pressure to straighten their hair in order to be perceived as more professional, and they may experience shame by others who believe that their competence or professionalism is defined by the texture of their hair.

Johnson says these are specific experiences that Black women have to actively cope with.

"And when we actively cope, there's a physiological process that comes with it. That's how discrimination and shame are connected," she said.

Johnson's goal is that her research will prompt health professionals and other agencies to "acknowledge, address, prioritize and heal" the psychological impact of the everyday experiences of Black women, and advocate for systems that create equity.

"Even with all these lifestyle interventions that focus on physical activity and diet, what we often don't see is the psychological impact of identifying as a Black woman as a key stressor," she said.

Since much of her lab work was halted due to the pandemic, Johnson has collaborated with Chantrey Murphy, assistant professor of Sociology, on a qualitative study of 40 Black women across the U.S. that measures shame and their specific experiences in 2020. This project was funded \$3,000 by the CHHS Small Faculty Grant for a student assistant

"There is no limit to Dr. Johnson's research impact," Murphy said. "Her research in public health and health science seeks to address and intervene in those long-term and inter-generational consequences by empowering the Black community to command agency in their holistic healthcare journey through education and advocacy.

"This is what we seek to accomplish with our Black Women Experiencing project. As we build our project, we hope to develop meaningful interventions for Black women (and practitioners) that are tailored to Black women's cultural and (inter) personal experiences while promoting positive health outcomes."

Johnson noted that her students have made her research all the more meaningful as many of them are taking what they've learned and applying it to their own communities. Some students have been inspired to investigate shame, physical activity, and wearing a hijab, as well as understanding shame and the model minority stereotype among Asian Americans.

"I'm happy that this is not specific only to Black women and we can honor the unique cultural characteristics involved with what elicits shame," Johnson said. "It's made me the happiest that these students want to explore shame in their own communities." ■

“
What’s even more damaging is that these experiences affect the stress responses of infants, which may explain why infant mortality rates in the U.S. are highest among African Americans regardless of income or education status. Even worse, these effects can be passed on from one generation to the next.
 ”

Urizar said Johnson's research can have important implications for identifying biological mechanisms associated with racial health disparities.

"Her work has elevated our understanding of how our body's biological responses to health may be altered due to chronic stress associated with experiences of racial inequality," he said. "It's important for society to understand the long-lasting impact that racism and discrimination can have on the health of our African American community.

"What's even more damaging is that these experiences affect the stress responses of infants, which may explain why infant mortality rates in the U.S. are highest among African Americans regardless of income or education status. Even worse, these effects can be passed on from one generation to the next."

BREAKING THE CYCLE

A lifetime of stressors for ethnic and racial minorities can cause faster cognitive decline in old age. CLA's Sandra Arévalo wants to help prevent that.



COLLEGE OF LIBERAL ARTS

WORDS: Sharon Hong

LEFT: The mental and physical decline of older adults from diverse racial and ethnic backgrounds can impact current college students as they try to care for family and attend to their studies.

Remember when in your freshman year of college you joined an acapella group and danced and sang with your acapella besties to beat your male rivals in a campus competition? No? Okay, so maybe that's the plot of musical comedy Pitch Perfect. But if most mainstream American movies are to be believed, college is almost exclusively about frats, friends, and fun. You almost never see anyone go to class or study and everyone can afford it.

For many college students, reality is very different. College can often be stressful. Some students must get jobs to pay for college. Others are juggling the demands of their homelife and coursework. Sandra Arévalo, assistant professor of Human Development, is particularly concerned for racial and ethnic minority students who have the added responsibility of caring for an older family member.

“Due to existing social and economic racial and ethnic disparities in the U.S., a great proportion of older adults from diverse racial and ethnic backgrounds experience earlier onset of diseases related to stress and older age. Taking care of an older family member with a health problem is more common among racial and ethnic minority families who lack access to adequate resources, and our students are taking a good portion of that load,” Arévalo said. “This is affecting their careers and opportunities to move up the social ladder.”

One in five Americans are unpaid family caregivers, according to The National Alliance for Caregiving (NAC) and AARP's 2020 Caregiving in the U.S. report. One in 10 caregivers is a student enrolled in college or other classes (11 percent) and in 2020, Generation Z (born 1997 or after) represented six percent of all caregivers – a figure that will only increase as Gen X (born 1965 to 1980) continues to age.

Arévalo, who has focused her research on the overall health and cognitive decline of older Latino adults, examines how social conditions and lifetime exposure to stress contributes to faster decline in physical and mental health outcomes compared to older white adults. Experiences are cumulative over a lifetime and Arévalo is examining how social factors may affect physical bodies creating and maintaining health disparities for minority groups across the life course.

“From childhood to adolescence to adulthood to aging, members of minoritized groups compared to whites, have higher exposure to stressors including discrimination, trauma, adverse social conditions, and living in unsafe and polluted neighborhoods. This happens not only to people who have lower incomes, but to individuals across the socioeconomic spectrum,” Arévalo said. “A large body of research shows that stress can activate or worsen many health disorders thus partially explaining the high number of health conditions experienced by minoritized groups as they age.”

Arévalo is currently working on a pilot project to identify the prevalence of Cal State Long Beach undergraduate students who are taking care of an older adult. Her project, which received funding through one of the National Institute on Aging's Resource Centers for Minority Aging Research (RCMAR), will measure stress levels of undergraduate caregivers and ultimately seek to identify the needs of these students.

Her hypothesis is that racial and ethnic diverse students experience greater amounts of stress compared to white students and the overexposure of stressors, including the added stress of being a caregiver, is associated with higher mental health problems, higher anxiety, higher depression, and lower academic performance.

Students are self-identifying through a confidential and anonymous online survey. Arévalo hopes to recruit 450 students to take the survey. As of May 2021, 200 students have participated, with 30 students reporting as caregivers.

Arévalo's survey includes questions using validated measures of depression and generalized levels of anxiety. She also included several scales that have been used to assess differential

social stressors, including the Adverse Childhood Experiences (ACE) scale that asks about traumatic or adverse experiences before the age of 18.

National studies using ACE have shown that people who experience between three and five of these adverse effects have higher depressive symptomatology, higher anxiety levels, and connections to cardiovascular disease and diabetes. Arévalo is already seeing that the cognition scores of students providing caregiving are lower than students who don't bear that responsibility.

“Early life exposure to adverse events has shown to be associated with the development of several health diseases in adulthood. Several physiological mechanisms may explain this link but the most studied is the disruption in the response of the hypothalamic-pituitary-adrenal (HPA) axis and autonomic nervous system.”

Arévalo, who has training in sociology and completed a post-doctoral training in nutritional epidemiology, said she's very passionate about her research because society often puts fault on the individual for things that may have been out of their control. This tendency to emphasize individual responsibility could influence how professors, counselors, or bosses perceive the performance of college-age caregivers.

“As a society, we tend to put much weight on individual choices and individual behaviors, and we overlook the fact that not all

individuals have access to the same resources, and to some groups the choices are significantly limited,” she said. “A student who is frequently absent, not turning their assignments on time, or performing at a lower level than that of what they are capable of might be a student who is taking additional caring responsibilities at home.”

As for solutions, Arévalo wants to develop support groups for students who are caregivers and provide a space where they can share their experiences, lean on each other, and attend workshops to increase health literacy and caregiving capabilities, with the ultimate goal of reducing their stress levels and increasing their wellbeing. At the same time, support groups may also be helpful for the family members who are receiving care. During her postdoctoral training in minority aging, Arévalo witnessed aging family members suffering greater health decline because of lack of understanding or educational material about their ailments.

“Older minoritized adults with behaviors suggestive of Alzheimer's disease or a related dementia, may not receive adequate attention due to low health literacy levels among family members who frequently identify these behaviors as part of normal aging. Meanwhile, if they were addressed or a health provider had the opportunity to provide some intervention, the progression of the disease could be slowed down, and the quality of life improved substantially.” Arévalo said. “Racial and ethnic diverse older adults are being diagnosed with Alzheimer's disease and related dementia at more advanced stages than their white counterparts.”

Arévalo hopes to capture her total student sample this summer and then complete more in-depth qualitative and quantitative interviews with those identifying as caregivers and potentially even those older adults receiving family care.

“Let's identify the students who are going through this. Let's provide them support and resources and let's try to break this cycle,” she said. ■

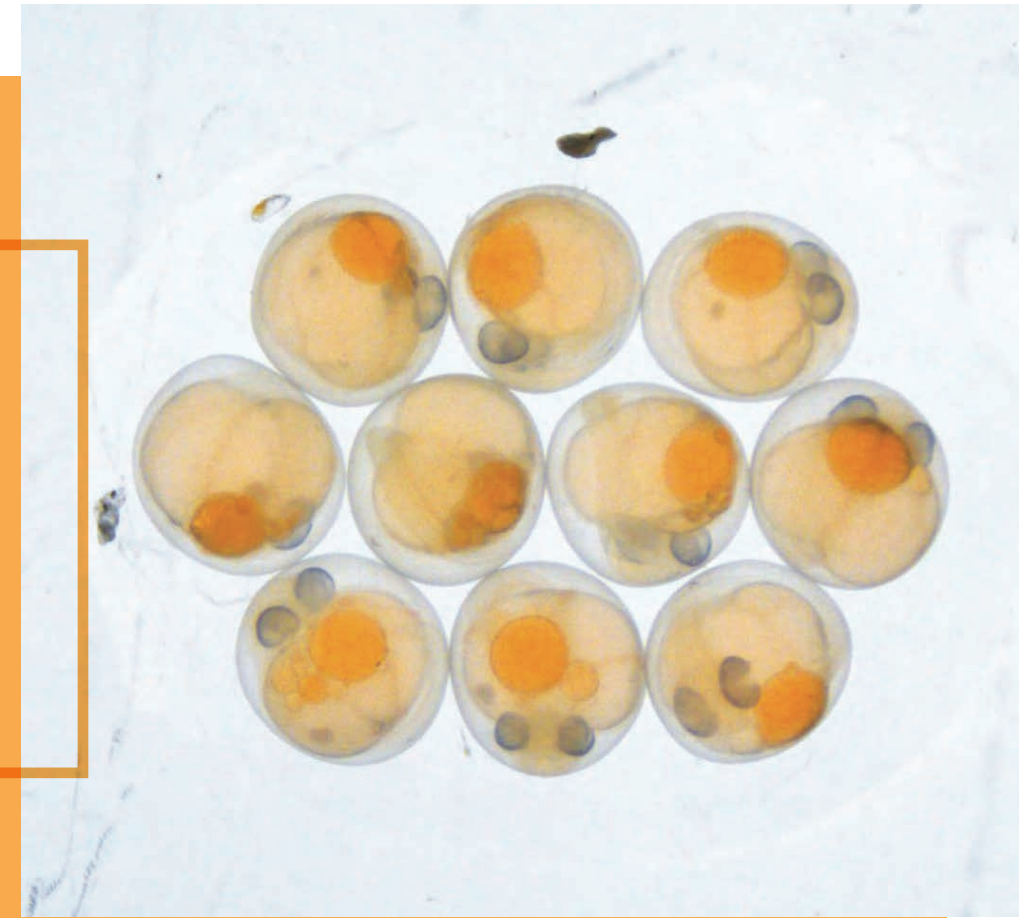
“

Let's identify the students who are going through this. Let's provide them support and resources and let's try to break this cycle.

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PHOTO: A scan of Grunion egg specimens.

Photo courtesy of Darren Johnson



SPAWNING DIVERSITY

Diverse fish populations may have a fin up on their competition when coping with the changing oceans.

COLLEGE OF
NATURAL SCIENCES
AND MATHEMATICS

WORDS:
Sylvia Rodemeyer

When it comes to ocean dwellers, the majority of media attention is focused on sharks, whales, and other large sea creatures. It's hard to miss them, for one. From the ever-popular annual Shark Week that has jumped from TV screens to Twitter, to the inescapable earworm “Baby Shark”, they're ubiquitous. Beyond the large creatures of the sea, something smaller is showing signs that there are signs that environmental changes to the ocean could have a long-term impact on everything from phytoplankton to tiger sharks.

ALL CREATURES GREAT AND SMALL | Darren Johnson, Associate Professor, Biological Sciences, is concentrating on the more microscopic creatures that live in the



ABOVE: An adolescent Grunion

LEFT: Unfertilized Grunion eggs. This species was selected because of similarities to other local species and their lengthy larval stage.

ocean. Johnson's research is focused on marine species during their larval stages. Currently, his lab is studying how ocean acidification affects larvae, and how those changes are affecting the ocean as a whole.

As a result of climate change, ocean chemistry has shifted. As atmospheric carbon dioxide increases, excess CO₂ is absorbed by the ocean, which lowers the pH of seawater. Certain marine species' larvae can be harmed by this, resulting in reduced growth and survival. If the pH change is great enough, it could impact

the long-term success of these species and general ocean health.

"I'm interested in understanding how high CO₂ and low pH levels influence the fitness of marine organisms," Johnson said.

Johnson has recently been tracking Long Beach's iconic California Grunion. He is measuring larval growth and survival in ambient and acidified seawater to test their tolerance to ocean acidification.

Besides their Long Beach lore, why did Johnson choose grunion as the focus of their research? During mating season (better known as grunion runs), grunion can be caught by hand and spawned in controlled environments in Johnson's lab. Offspring from such experiments can be genetically analyzed. Further, grunion share certain characteristics with other fish in the area, such as repeated spawning behavior and an extended larval stage, making them good comparison subjects.

Johnson's lab has captured the attention of students as well. His lab has about half a dozen research assistants, including graduate Biology student Emma Siegfried.

"The work that he does on grunion larvae in connection with ocean acidification is the entire reason why I decided to go to graduate school at CSULB in the first place. The thing that interests me the most about the work we're doing is that it is so important for understanding the

future of our oceans and how fish will respond to the changes humans are causing," Siegfried says of what attracted her to the work.

STRENGTH IN DIFFERENCES | Johnson and his lab have observed that some populations may have the genetic capacity to adapt and increase their tolerance of low pH and high pCO₂ levels, and this may offset the more harmful effects of ocean acidification.

"One of our current projects is trying to get a sense for how much variation is there in the wild and will that be enough to offset some of these environmental changes? A working hypothesis of ours is that species that have a lot of gene flow among populations may be more genetically predisposed to handling these changes," Johnson said.

For example, a population that is made up of many smaller populations that have developed across a range of pH conditions may have more genetic diversity and may be able to handle shifts in the pH because of this diversity, especially in comparison to a population of the same species that stayed fairly stagnant and didn't intermingle with more diverse and mobile groups.

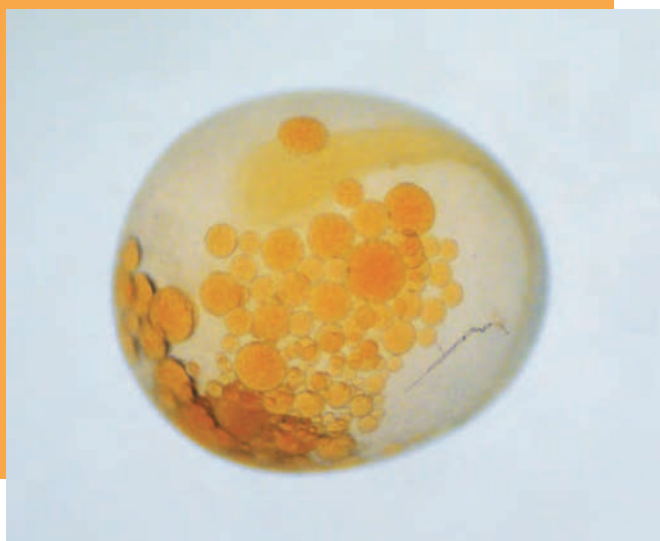
"We look at whether a population will have a little more resilience if they have more genetic diversity. Because of this,

some families (of fish) are really susceptible to ocean acidification and others can weather changes in seawater chemistry," Johnson said.

So far, Johnson and his team are finding that the California Grunion have the potential to adapt relatively quickly to long-term changes in ocean chemistry, as well as finding that while more acidic waters resulted in more larvae dying, ocean acidification conditions didn't have a sizeable impact on the growth of fish that lived. Put more simply: if a grunion survived the larvae stage, they were largely similar to fish in less impacted water.

"Understanding whether fish populations can adapt over time and become at least somewhat more tolerant of changes in seawater chemistry will help us anticipate more accurately the long-term effects of ocean acidification," Johnson said.

While it's not entirely clear how this bodes not just for grunions, but groupers and great whites, Johnson hopes to build on his current research, funded in part by a National Science Foundation grant of \$450,000, and will expand to focus on how changes in ocean chemistry are changing the patterns of natural selection. In the meantime, maybe consider starting a petition for Grunion Week on a certain cable channel. ■





SPOTLIGHTING RESEARCH

LEFT: The large and iconic BEACH letters that greet visitors and students at the West Campus Drive and Beach Drive intersection loop. Photo by Sean DuFrene.

COLLEGE OF THE ARTS

Soyeon Kim & Susan Bloom:
Assistant Professors

COLLEGE OF LIBERAL ARTS

Dr. Neil Hultgren:
English Professor

COLLEGE OF NATURAL SCIENCES AND MATHEMATICS

Dr. Katarzyna Slowinska:
Professor of Chemistry

COLLABORATIVE EFFORT

Dr. Grace L. Reynolds:
Associate Dean for Faculty Affairs and Research, CHHS

Dr. Ju Cheol Moon:
Assistant Professor, Computer Engineering and Computer Science, COE

Dr. Dennis G. Fisher:
Professor (Emeritus), Psychology, CLA

COLLEGE OF BUSINESS

Dr. Chailin Cummings:
Professor of Business Administration

COLLEGE OF EDUCATION

Dr. Nina M. Flores:
Assistant Professor



LEFT: A scene from "Across the DMZ: The Land We Lost and Found." The film is the result of collaborative efforts from both groups of students.

of this interdisciplinary and deeply collaborative art form. Mimicking the outside world, the editing students advise the directors on story structure, shot selection and audience response, while the directors articulate and clarify their vision, and push the editors to make it happen. Additionally, the film students rarely, if ever, have thus far had the chance to work on animated projects, giving them another skill before they graduate, while the animation students gain a deeper understanding of film story and viewer priority. Both groups of students have found the pairings highly rewarding and the films reflect the synergy of complementary expertise.

The two professors' partnership led them to work on a collaborative project, and with the infusion of financial support from the university's internal grants program, they are working on a new film. Their project goal is to create a short poetic experimental film that combines lyrical animation with live action footage and interviews.

The film's narrator, now in his eighties, reflects on a long and arduous journey he made as a child down the Korean peninsula, visualized as a childlike lyrical animation. Interwoven in the telling of his journey is the discovery of an unintentional refuge established for wildlife when the border was created after fighting had ceased during the Korean War. Comprised of the Demilitarized Zone (DMZ) – a no man's land - separating North and South Korea, this refuge for birds and other animals - many of them endangered – allows them to travel freely across the heavily guarded borders. Wildlife forage in the south during the day and return to the quiet solitude of the DMZ at night for refuge.

The film project, titled "Across the DMZ: The Land We Lost and Found," is a reflection of unintended consequences to the lives and landscape of the Korean Peninsula since 1950. The story is told not as a historical documentary, but as an individual's journey shaped by events across space and time.

The film's storyline follows a young child, who in 1950 walks over 300 miles starting at the northernmost tip of the Korean Peninsula. He continues down through what became the Demilitarized Zone and into the newly established South Korea. His journey is one of severe deprivation and hardship, yet the horror shown through his young eyes is muted by the hope and perseverance that propels him and his family forward to the end of their journey. ■

Unintended Consequences

COLLEGE OF THE ARTS

Soyeon Kim & Susan Bloom:
Assistant Professors

School of Art Assistant Professor Soyeon Kim and Film & Electronic Arts Assistant Professor Susan Bloom met during faculty orientation two years ago. They quickly discovered shared interests in using art and film to tell stories about animals and the environment. They also saw an opportunity for students in their School of Art Animation and Film & Electronic Arts Editing courses to collaborate. Now successfully integrated for the last four semesters, students in these advanced courses learn firsthand the nature

COLLEGE OF LIBERAL ARTS

Dr. Neil Hultgren:
English Professor

Romance and Research

Recently awarded a National Endowment for the Humanities Fellowship, English Professor Dr. Neil Hultgren has focused his academic career on late 19th-century British literature. The NEH award allows him to break new ground by bringing archival research and the study of narrative technique to popular British fiction that explored notions of the space and time of the universe.

Supported by the fellowship, Hultgren will complete his book manuscript for publication with an academic press. "Meanwhile," he notes, "romances are great for teaching and research. The stories I research also interest my students, many of whom enjoy writing and reading speculative fiction."

As early as high school, he was fascinated by writers Isaac Asimov and Ray Bradbury. He has since earned a doctorate in English and teaches and publishes on British literature of the 19th century.

Hultgren began researching popular romances from the 1800s that reminded him of Asimov and Bradbury: not steamy love stories, but fiction that challenges conceptions of literary realism and the everyday.

This research led to his current book project, “Cosmic Romance: The Universe in British Fiction, 1885-1930.” The project considers novels and stories that experiment with the basics of storytelling to expand human awareness. One story, Arthur Machen’s “The White People” (1899), relies on one eighteen-page paragraph to describe the consciousness of a teenage girl who loses herself in the magic rituals of fairies.

Another text, in this case a series of books, H. Rider Haggard’s Ayesha five novels (1886-1923), follows a nearly immortal Egyptian priestess, Ayesha, who interacts with characters reincarnated over centuries. Hultgren contends that the concept of reincarnation allowed Haggard to connect multiple novels via sequels and prequels, all during a time when sequels and prequels were less prominent than they are today.

“Given current pop culture, whether the ties among the Marvel Universe’s movies and shows or the intricacies of mind-bending blockbuster films such Tenet, I’m curious about how writers of the 1800s and early 1900s invented the science fiction and fantasy narratives we take for granted,” said Hultgren.

He said he researches romance because it brings into contact conversations and ideas that we might not expect to find together, such as the occult movement of Theosophy, physics models that preceded Einstein’s, and pseudoscientific treatises on racial science.

Hultgren has also held a Harry Ransom Center Fellowship supported by the C. P. Snow Memorial Fund, which allowed him to research manuscripts by Machen. ■

Collagen for Cancer Treatment

Collagen is a famous molecule... especially in the cosmetics industry, but it is so much more. Especially in cancer research and gene therapy!

The structure of collagen is unique, it coils just like DNA, but instead of having two strands it has three, which gives it the added strength to become the main scaffolding protein in connective tissue.

Collagen is also very large, thus modifying it for research as functional biomaterial is difficult to control. This is why Chemistry Professor Dr. Katarzyna Slowinska works with a truncated version of collagen, known as collagen peptides, which can be more easily modified for a desired research application.

The focus of Slowinska’s research is to design the carriers based on collagen peptides for cancer drugs and gene therapy. Collagen peptides form a nanoparticle that can be modified to transport the cargo through biological membranes. Her research efforts

COLLEGE OF
NATURAL SCIENCES
AND MATHEMATICS

Dr. Katarzyna Slowinska:
Professor of Chemistry



ABOVE: An illustration of a collagen model. Illustration provided by Dr. Katarzyna Slowinska.

have been supported by grants from National Institutes of Health, Research Corporation, DARPA and private companies, totaling \$1.2 million.

Cancer drugs are not very soluble, so it is difficult to deliver the therapeutic dose to cancer cells. Thus carriers, like collagen peptides, help to increase the dose of the drug. In addition, the delivery to the wrong location, such as healthy cells, will result in toxic side effects.

One of the most unique ways to direct the drugs to the correct location is to use collagen peptides that can change shape based on temperature. Only one type of shape can cross the biological membrane. Cooling down the area near the tumor cells will cause the peptide to change shape when in a cold area. This will result in the drug uptake into the tumor cells while healthy cells stay unaffected at body temperature.

Just this year, the rapid development of the Covid-19 vaccine relied on brand new technology of delivering the RNA (ribonucleic acid) to stimulate the immune system and develop the protection against the coronavirus infection. The carrier that delivers the RNA is not perfect; the vaccine must store at minus 80°C to prevent the decomposition of cargo.

Slowinska hopes to advance the carriers for nucleic acids therapeutics, so the protection against decomposition is better and does not result in an allergic reaction. In recent years, her research has shown that the collagen peptide can form a cage-like protection for RNA.

Finally, the story of collagen would not be complete without mentioning new research being conducted for the cosmetic industry. Slowinska’s “Collagen Lab” is working with Shiseido, the Japanese cosmetics company, on research to stimulate skin cells to control the level of collagen production to improve the health and appearance of the skin. ■

Exploring Homelessness in Long Beach

COLLABORATIVE EFFORT

Dr. Grace L. Reynolds:
Associate Dean for Faculty
Affairs and Research, CHHS

Dr. Ju Cheol Moon:
Assistant Professor,
Computer Engineering and
Computer Science, COE

Dr. Dennis G. Fisher:
Professor (Emeritus),
Psychology, CLA

Homelessness is a significant problem in Long Beach, CA. The researchers wanted to understand what makes people homeless and what makes homeless people transition out of homelessness. One member of the research team was a student, who learned how to apply a deep learning framework (a type of artificial intelligence) to an applied social science problem that is important in the Long Beach community and to handle large scale tabular data using Python programming.

Using sophisticated artificial intelligence to analyze the data collected in the field over a 14-year period, the research team concluded that participation in drug treatment was critical in helping alleviate homelessness. Once someone was no longer using drugs, then they would have more opportunity to become employed, which helped them transition out of homelessness.

The team studied 1,435 people in a low-income area of Long Beach, a highly urbanized metropolitan community in the Greater Los Angeles region. Individuals were interviewed at two points in time with at least 6 months between the initial baseline interview and follow-up interview.

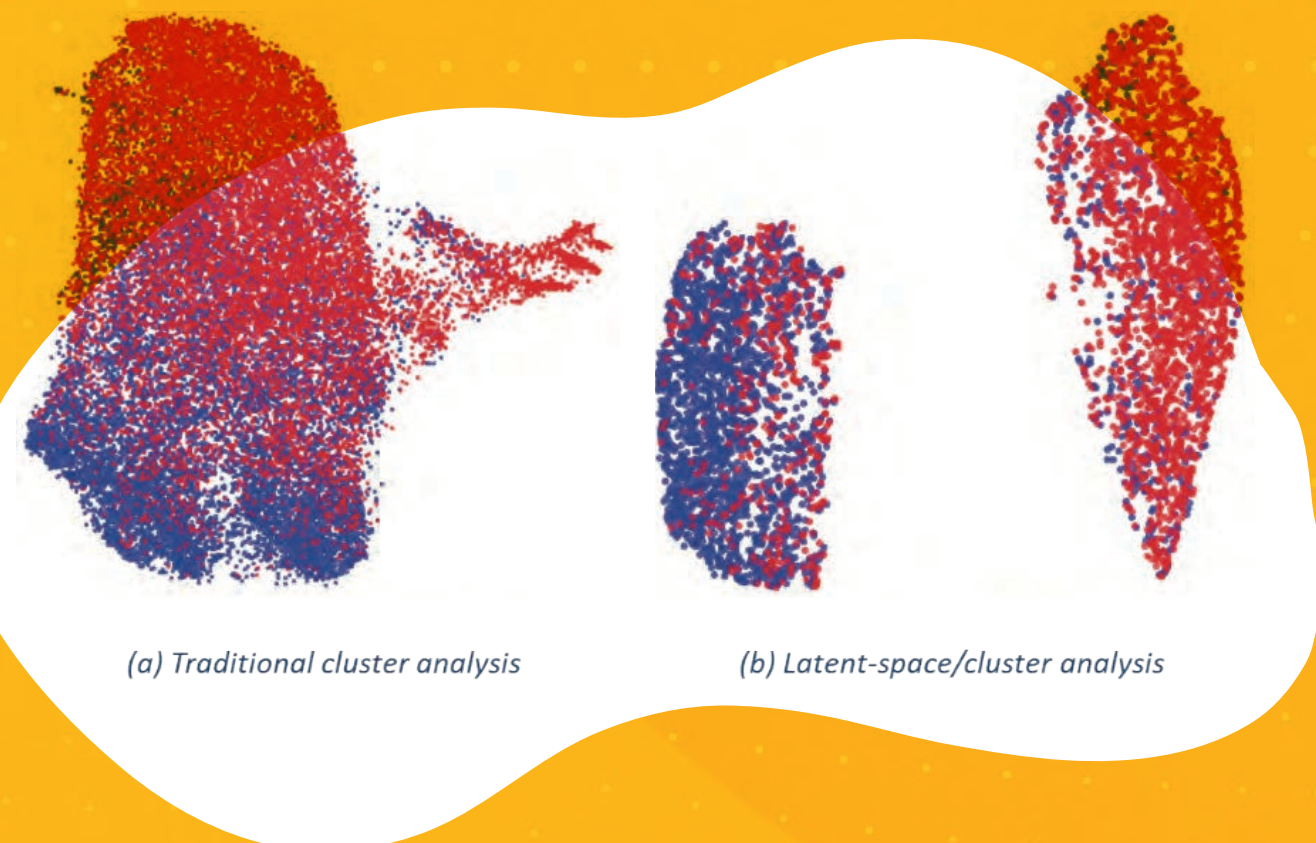
The first question asked was, “For people who were not homeless at baseline in our study what were the characteristics of those who became homeless?” What the team found was that those who became homeless were more likely to have unstable income

sources, like relying on welfare or trading or bartering of goods; being a homemaker or unemployed; and having used alcohol and/or crack cocaine.

The second question asked was, “For people who were homeless at baseline in our study, what was the difference between those who stayed homeless (chronic homeless) versus those who became non-homeless (transitioned out of homelessness) at follow-up?” What the researchers found was that those who transitioned out of homelessness were more likely to have not lived in a homeless shelter; have either been disabled, retired, or previously employed full-time; and have used drugs like Oxycontin or Fentanyl, but were able to successfully be admitted into a drug treatment program.

The findings highlight the importance of linking homeless programs to substance abuse treatment. Emphasis is also placed on assisting the homeless to obtain employment. The team is preparing a manuscript for submission for publication in a scientific journal. The findings have been presented to Cal State Long Beach President Dr. Jane Close Conoley, who is the chair of the Long Beach homelessness task force. ■

LEFT: Comparison of two cluster analysis methods. The red dots represent the stable group (homeless to homeless or non-homeless to non-homeless) and the blue dots represent the change group (homeless to non-homeless or non-homeless to homeless). The figure shows how the researchers' method, (b) Latent-space/cluster analysis, classified two groups more clearly than the traditional cluster analysis.



Beyond Publish or Perish

The unforeseen problems that result when universities judge the quality of faculty research based mainly on the ranking of a journal that publishes it has been a recent research focus of Dr. Chailin Cummings, a professor of business administration. Her research has shown that this has resulted in more attention paid to the quality of the journal than the quality

of the research itself when making promotional and reward decisions.

Her recent publication in the Academy of Management Perspectives, titled “An A is an A: The new bottom line for valuing academic research,” was the Journal’s “2020 Most Read Publication” with over 8,000 downloads.

Cummings also studies what scholars care about when doing research. Her research reveals that growing pressures to “publish or perish” in the academic world can result in researchers replacing what they are concerned and passionate about and instead doing research that will help them gain career and reputational benefits. The result can be at the expense of losing the intrinsic satisfaction of doing research that is personally rewarding. Her publication in Academy of Management Learning & Education, “Devolution of researcher care in organization studies and the moderation of organizational knowledge,” addresses this growing problem in academe today.

Cummings, collaborating with Dr. Jasmine Yur-Austin, recently published a pedagogical article showing how students can learn to use design thinking to structure complex projects. MBA students in a capstone course applied a design framework to a class project exploring how Cal State Long Beach and the City of Long Beach could work together for community development. Students and city officials worked together to explore potential partnership models to grow entrepreneurship in the region. The study provides a blueprint for building design thinking into courses involving complex class projects for achieving community engagement, innovation, and impact.

Cummings serves on the editorial board of the Journal of Applied Behavioral Science. ■

COLLEGE OF BUSINESS

Dr. Chailin Cummings:
Professor of Business
Administration

Tweets, Threats, and Censorship

COLLEGE OF EDUCATION

Dr. Nina M. Flores:
Assistant Professor

Assistant Professor Dr. Nina M. Flores (she/her/Dr) is with the Social & Cultural Analysis of Education master's program in the College of Education, where she engages students in deep analyses of issues concerning justice, power, and resistance. During 2020-2021, Flores was named as a fellow with the University of California National Center for Free Speech and Civic Engagement in support of her project, titled Tweets, Threats, and Censorship: Campus Resources to Support Faculty Through Incidents of Targeted Harassment. Her fellowship research examines the experiences of college and university faculty who, based on their expertise, teaching, or public comments, are targeted by members of the public with harassment and threats.

Examples of this type of harassment include being inundated by hundreds or thousands of tweets and emails or receiving threatening phone calls or mail to their home or office -- incidents often escalate to threats of violence, rape, or even death. For this research, Flores interviewed faculty members who experienced being targeted by the public, and she analyzed campus policies about free speech, academic freedom, and targeted harassment. As part of the project she developed a series of training sessions, strategy sessions, and workshops designed to assist college and university campuses as they increase their knowledge and understanding of the issue, and as they work toward better supporting faculty members while they navigate through these incidents (sessions are available through the UC National Center for Free Speech and Civic Engagement).

After a decade of writing about harassment and campus sexual assault and hearing from students who openly shared horror stories about the limited sex education they received during K-12 schooling, a clear theme emerged: the urgent need for exploring the ways in which college students could benefit from sex education that takes a comprehensive, justice-based approach to learning about sex, sexuality, pleasure, and desire. She is currently pursuing certification as a sex educator.

With graduate training in urban planning, political science, and education, Flores' teaching and research are heavily influenced by a multi-disciplinary perspective. Her research agenda has evolved from examining campuses as communities when considering issues of campus sexual assault, to using twitter to understand gendered experiences with street harassment and efforts to organize against it, to exploring the implications of harassment experienced at academic conferences. ■



FY 2021 FUNDING SUMMARY

California State University, Long Beach serves the university community by creating a campus environment that is conducive to promoting research and other scholarly activities that contribute to the mission of the university.

With a primary emphasis on faculty-student research engagement, the Office of Research & Economic Development provides leadership, information, direction, resources, training and technical assistance to faculty and students engaged in externally funded research, instruction, community service and other scholarly activities.

301

Proposals Submitted

151

Proposals Awarded

\$129M

Funds Requested

\$32M

Funds Awarded

\$34M

Total Expenditures

PHOTO: Grunion eggs under a microscope. Provided by Darren Johnson.

