CHAPMAN FORWARD

Volume 1, Issue 1
A Research Publication of Chapman University

CHAPMAN FORWARD

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Chapman Magazine (USPS #007643) is published quarterly by Chapman University.

Periodicals postage paid at Orange, Calif., and at additional mailing offices.

POSTMASTER:
Send address changes to:
Chapman Magazine
One University Drive
Orange, Calif. 92866-9911

We welcome your feedback on Chapman Forward. Please send comments to magazine@chapman.edu.

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FEATURES

DEPARTMENTS

On the Cover:
Documentarian Sally Rubin delves into hillbilly stereotypes and ends up starting a whole new conversation.
Photo by Challenge Roddie

THE POWER OF FORWARD MOMENTUM

Welcome to the inaugural issue of Chapman Forward magazine, devoted to the sharing of new discovery, scholarship and creative activity by our students and faculty. Chapman has a long reputation for attracting preeminent faculty whose expertise enhances student learning. I am excited to be part of the Chapman Family, not just to help grow the research enterprise as the vice president of research, but to continue my own academic endeavors related to water resources, climate and impact to human systems.

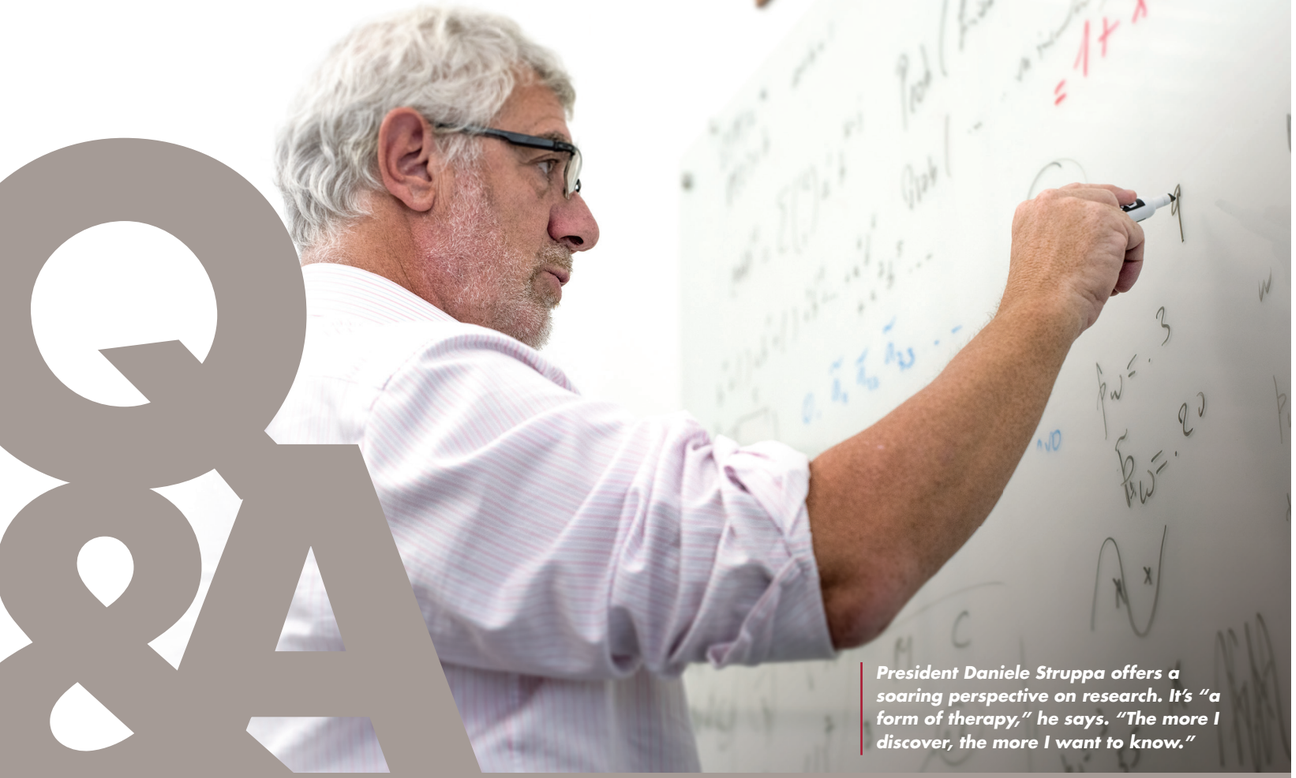
In the past decade, Chapman has seen a tremendous expansion in research and scholarship. Since 2006, publications from Chapman faculty have increased ten-fold, and research expenditures have risen by five times. New infrastructure includes state-of-the-art core lab facilities at the Harry and Diane Rinker Health Science Campus in Irvine, as well as the Keck Center for Science and Engineering and Musco Center for the Arts on our Main Campus in Orange. This infrastructure allows Chapman faculty and students to conduct transformative research projects and perform in world-class facilities.

The stories presented in Chapman Forward highlight just a few of the exciting areas where Chapman faculty and students are making a difference in the world and in our community. Many of these efforts are funded by outside sponsors such as federal, state and local nonprofits and foundations. These include diverse research subjects such as changes in natural ecosystems; maternal and child health; documentaries about rural America; and studies of extremist groups and terrorism.

Chapman is committed to continuing growth in research and has highlighted several areas in the University's 2018–2023 Strategic Plan. Among them are establishing the new Fowler School of Engineering in 2020; supporting the research agenda through the Faculty Opportunity Fund, student support and research services; and further expansion of our research infrastructure.

This is an exciting time, and Chapman Forward provides a glimpse into the role that research and scholarship play in enhancing student experiences and growing Chapman's reputation. At Chapman, we are proud to embrace an "Anything Imaginable" attitude, and we invite you along for this exciting journey.

Thomas Piechota, Ph.D.
Vice President for Research



President Daniele Struppa offers a soaring perspective on research. It's "a form of therapy," he says. "The more I discover, the more I want to know."

Rarefied Air

STORY BY BRITTANY HANSON

PHOTOS BY DENNIS ARP

Tent-bound at 21,000 feet on the side of Cho Oyu in the Himalayas, Daniele Struppa recovered from altitude-induced edema and did the only other reasonable thing he could. He started work on a research paper exploring a mathematical theory he had been carrying with him for a while.

"It wasn't the full-fledged paper," he clarified. "But with math, you can do the work in a very austere environment."

An avid mountaineer as well as an internationally known mathematician, Struppa has also toted his affinity for research to the tops of peaks in the Alps and Andes. In his current role as president of Chapman University, his research explorations continue.

Far from base camp, in the comfort of his Memorial Hall office and within arm's reach of his well-used whiteboard, we sat down with Struppa to ask him about the ascendant world of research at Chapman.

What distinguishes Chapman as a research institution?

Our researchers are very involved as teachers. If you go to a think tank or a national lab, you do research all day. If you go to most universities, you often find faculty who teach in a classroom, but who are not researchers. Chapman is different. As a scholar, I teach classes because my intellectual interests change. I want to be sure that what I'm talking about is stimulating my thinking, not just a repetition of what I know. Because if it were that, well, I wouldn't go to class.

I believe that's what makes Chapman a special place. Our ability to bring research into the classroom keeps it alive, exciting, new, challenging, different. That's what a class should be.

What's your current research project?

I'm involved in three or four projects. My longest one has stretched over 10 years and is related to work with Chapman physicist (and National Medal of Science winner) Yakir Aharonov. It started with a question: "How can you take some very low-energy light, such as infrared, then use it to create high-energy light, such as gamma rays?" His question took him to a paradoxical place in mathematics, so his task for me was to help him understand the mathematics and show whether this phenomenon was real and how you could explore it in the best possible way.

Another project is a book looking at how mathematics shaped culture and philosophy. My co-authors and I pick moments in the history of humanity where interesting changes occurred, and we explore how mathematics played a role. For instance, the development of perspective in painting is actually a mathematical construction – math and painting moving together.

Another chapter is about navigation instruments and how when we entered the Age of Discovery and started crossing the oceans, we needed new discoveries in math to make that happen. The book is designed to be for a large audience, which is one of the challenges: presenting mathematical ideas in ways that are appealing to a variety of people.

How does your research connect to your teaching?

With the book, some of the foundational ideas came from discussions and writings of students in a class I taught. In particular, the chapter on navigation is an elaboration of something written by one of my students. For the students, there's engagement in intellectual invention rather than just listening to someone talk about stuff.

Given your presidential obligations, what drives you to continue with your research?

Really, research is a form of therapy. It's a little addictive, in a good sense. I often say to my kids that one of the things that sets humans apart from other animals is our inherent curiosity. When you stifle curiosity, especially in younger years, you end up with people who may not be helpful to themselves or others. So the question is, really, what can you do to maintain that curiosity?

I've been lucky in my life and have never lost my curiosity. The more I discover, the more I want to know. As researchers, we figure out new things and then there's the next natural question. I know that's the way it works in mathematics.

What's next for research at Chapman?

We're going to see an incredible increase – even more than we have seen recently, thanks to the incredible faculty that we have hired.

Our scholarly publications have spiked from 64 in 2007 to 461 in 2017. Our citation numbers have grown from 36 in 2007 to 4,320 in 2017. That means that every day, on average, there are 12 people citing one of our papers. The rise is dramatic. And not only are we publishing a higher volume, but we're producing a high quality. That's backed up by the citation numbers.

These numbers – 461 and 4,320 – show that not only are we publishing more, but our work is more impactful. This perfectly demonstrates the transformation of our institution.

"Appalachia is a wound and a joy and a poem. A knot of complication.
But you cannot know a place without loving it and hating it and feeling everything in between."

Silas House • Writer, Appalachian studies scholar

APPALACHIAN AWAKENING

Documentarian Sally Rubin trains her lens on the shallow stereotypes of a region and ends up diving deeply into a whole new conversation.

BY DENNIS ARP

Sally Rubin was determined to get to know Appalachia – to untie the knot and disentangle the misconceptions that attach themselves to the region. But first she had to find her way there.

"Appalachia is a construction, a social and cultural invention," says Chad Berry, a professor of Appalachian studies at Berea College in Kentucky. "Iowa is a construction, too. The difference is that you know you're in Iowa because there's a sign there that says, 'Welcome to Iowa.' There's no such sign with Appalachia."

Berry is among those interviewed in Rubin's new feature-length documentary "hillbilly." In researching and shooting the film, Rubin not only found that perceptions of Appalachia are a timely subject for exploration. She learned that Appalachia itself is amorphous, evolving and more diverse than she, and certainly America, might ever have imagined.

"At first, we set out to do a historical survey of the development of the hillbilly stereotype in film and TV," says Rubin, an assistant professor of documentary film at Chapman University. "Then, several months in, we came to realize that if this film is going to be about what Appalachia isn't, we have to tell what Appalachia is. That's when we started including the alternative Appalachian perspective."

A journey of more than four years is bound to provide twists and turns along the way. This project had plenty, including one the filmmakers didn't see coming.

"The results of the (2016 presidential) election changed the entire context of the film and how we told the story," said Rubin, who co-directed "hillbilly" with Kentucky native Ashley York, who now lives in Los Angeles and teaches at the USC School of Cinematic Arts. "We always thought the film would be relevant, but suddenly it went from niche-relevant to nationally relevant."

Toward the end of production, the filmmakers realized they needed a throughline to link all of the story's themes. So York, who like Rubin is committed to social justice and a feminist approach in her filmmaking, stepped before the cameras to become a character in the film. Weaved throughout are scenes in which York reconnects with her Appalachian family members who attended rallies and voted for President Trump. These nuanced, sometimes tense but always loving conversations add intimacy and urgency to the film.

In one scene, York visits her Granny Shelby in Jonesville, Ky. They trade hugs as they're joined by several other family members who had voted for Barack Obama but now wear MAGA hats. York eases into the role of neutral interviewer as she probes their enthusiasm for Trump. "People from the mountains," she hears, "really had no one to have our back before." There's a long pause while York nods awkwardly, and then the inevitable question: "Who'd you vote for?" She purses her lips and reveals that she voted for Hillary Clinton.

"I must not have burped you girls just right," her grandmother deadpans. "I should have held you upside down and patted you on your butt."

PHOTO BY CHALLENGE RODDIE

Sally Rubin and her Chapman documentary film students discuss a scene from "hillbilly."

FRUSTRATED BY HYPOCRISY

For Rubin, the filmmaking journey connects to the roots of her mother, who grew up in Calderwood, Tenn., in the Great Smoky Mountains. The filmmaker also knows coal country from her 2010 film "Deep Down," which chronicles friendships and divisions as a way of life erodes in eastern Kentucky.

"From the time I was younger, I've been frustrated by the hypocrisy and stereotypes around rural white people," says Rubin. "Growing up in liberal Boston, those in my circle wouldn't be caught dead saying the N word or anything like that, but they would very happily throw around terms like redneck, hillbilly and poor white trash. I noticed that, and it pissed me off."

Rubin's pop-culture flashpoint for the project was the character Pennsatucky on the Netflix series "Orange Is the New Black."

"It's this innovative show, with risky storytelling and gender-nonconforming characters, and at the same time there's this character who's a tired old mashup of every stereotypical quality of an Appalachian person – holy roller, meth head, abuser of the welfare system," Rubin says. "For me, it was 'enough is enough.'"

Once York came onboard as a partner in the project, the two launched into a review of scholarly research.

"There's a huge body of scholarship on the history of Appalachian identity and representation," Rubin says.

Key texts include "Hillbilly" by Tony Harkins and "Hillbillyland" by Jerry Williamson. "Ashley and I practically memorized those texts," says Rubin, who adds that "Belonging" by Bell Hooks also was enlightening. "It's all about Southern and Appalachian identity, especially from the vantage point of a woman of color who left and then came back. It helped me look at the region in a new way."

In March 2014, the filmmakers attended the annual Appalachian Studies Association Conference, where they met and interviewed a host of key scholars.

"Every single scholar we interviewed became an advisor on our film," Rubin notes.

THE ROAD TO A GRIPPING STORY

Rubin's research goals were twofold: "Making sure we have a wide, diverse and thorough handle on the concepts of the film, and then deciding, 'Is this going to make a compelling story?'"

Validation came in the form of outside funding from state humanities councils in South Carolina, Virginia, Ohio, Kentucky and West Virginia. Later "hillbilly" earned two major grants from the National Endowment for the Arts and one from the National Endowment for the Humanities.

That support allowed the filmmakers to gather stories during field research trips that crisscrossed six states. "We knew we needed media clips, and we knew we needed experts talking about what we were seeing in the media clips. But we also wanted stories, so we sought out characters who could bring the human element to the film," Rubin says.

In addition to Billy Redden, the actor who portrayed the banjo player in "Deliverance" (and now a Walmart worker in Georgia), "hillbilly" gives voice to artists and activists, queer musicians and "Affrilachian" poets – the flipside of the hackneyed regional stereotypes.

"I'm happy to see somebody trying to cover us as we really are and not what some people think we are. It's wonderful the attention you've paid to so many areas that are so important to all of us. I'm proud to have been mentioned in the film a time or two. "

- Dolly Parton -

"I'm very proud that we were careful to showcase the diversity of the region," says Samantha Cole, a native of Lee County, Ky., who was interviewed for the film and eventually took on the role of associate producer. "I had known for some time that Appalachia was home to all these different folks, but all those narratives had been buried, shut down."

Cole has helped the filmmakers develop a companion piece to "hillbilly" called "Her Appalachia," which shares interviews with women of the region and takes a critical look at female Appalachian archetypes like the "mountain mawmaw," "sex pot" and "freeloader."

Rubin shares insights with students and with Andre Dhont in the Dhont Documentary Film Center of Chapman Studios West.

"The film is surprising and refreshing, treating white rural voters generously and expanding cultural understanding of the region. … For outsiders, the film could potentially challenge viewers' perceptions; for Appalachians, it's a cinematic portrayal of which they can be proud."

- From a review by The Nashville Scene -

"The diverse nature of the region had been at the periphery of my thoughts," Cole says. "Now I want to seek out those diverse voices that are of and for the region."

When Rubin first reached out to her about a possible on-camera interview more than four years ago, Cole didn't imagine the journey that would result, including her writing proposals and securing grants.

"Sally was fabulous to work with," Cole says. "She provided this big overarching picture, but she was also attentive to details. She's a great artist and creative thinker, but also a fantastic teacher."

Cole was there when "hillbilly" premiered in May at the Nashville Film Festival, where attendees filled a 250-seat theater and a 115-seat spillover venue as well. Cole saw filmgoers "connect with the story and afterward say that they had never seen anyone express the same thoughts and feelings they had been holding in for years."

"It's like we're empowered to have pride in the place we call home," Cole adds. "This film not only invites conversations but deep thinking about the media we consume – in terms of the hillbilly figure yes, but also any minority or oppressed group."

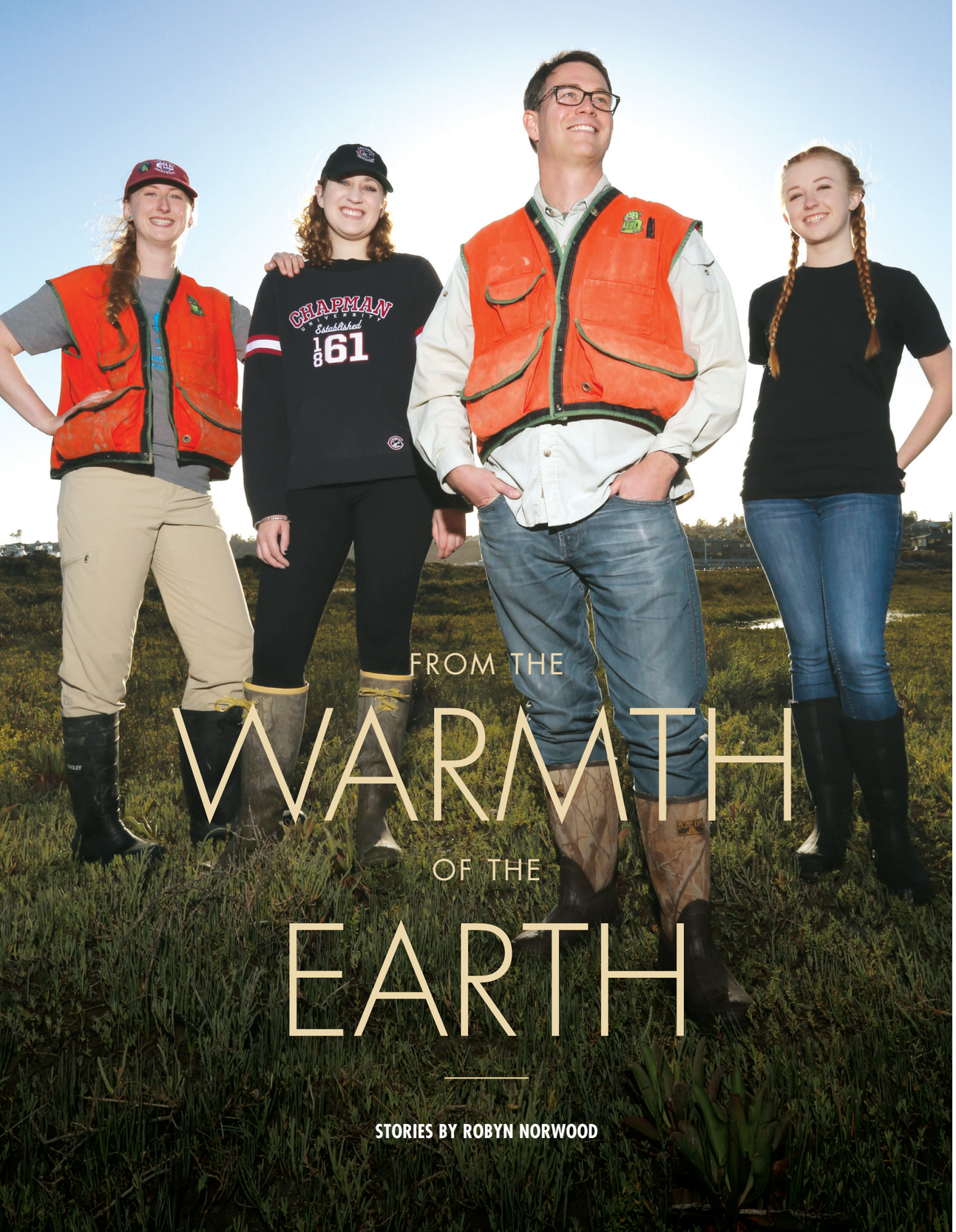
Rubin says she's eager to see "hillbilly" prompt conversations in family rooms and over kitchen tables, but also in group forums and classrooms, perhaps even after a screening on Capitol Hill.

"Hopefully the film will live in the world for decades and have a broad impact," Rubin says. "My dream would be that we would see less vitriol between people from urban and rural backgrounds. The film has universal themes and offers a lot to unpack, so it lends itself to rich conversations. I'd like to see all of those continue."

Cinematographer Bryan Donnell and co-directors Rubin, seated, and Ashley York traversed six states shooting scenes for "hillbilly."

"HILLBILLY"

- Has secured national distribution through The Orchard, which also distributes the Academy Award-nominated documentaries "Cartel Land" and "Life, Animated."
- Will be released digitally and for broadcast later this year, with worldwide broadcast distribution to follow.
- Launches a theatrical run this fall to qualify for an Academy Award nomination.
- Is an official selection at almost 20 film festivals, including Nashville, DOC NYC, Hot Springs, Traverse City and the Los Angeles Film Festival, where it won the Jury Prize for Documentary.
- Received funding support from the National Endowment for the Arts and the National Endowment for the Humanities, as well as the state humanities councils of Kentucky, Ohio, South Carolina, Virginia and West Virginia.
- Was accepted into the Fledgling Fund's Engagement Lab, where the filmmakers will spend a year working to disseminate the themes of "hillbilly" in dozens of communities and at universities nationwide.
- Offers more information at hillbillymovie.com.



FROM THE WARMTH OF THE EARTH

STORIES BY ROBYN NORWOOD

SAMPLES COLLECTED IN A PEATLAND BOG BY JASON KELLER AND HIS STUDENTS MAY OFFER CLUES TO AN UNCERTAIN FUTURE.

AMID THE SCENT of spruce trees in northern Minnesota, an odd sight rises from the peatland bog. Ten silolike enclosures nearly 30 feet tall and 40 feet across dot a small area of the 2,800-acre Marcell Experimental Forest, a part of the U.S. Department of Agriculture's Experimental Forest network. The tops of the octagonal chambers are open to the rain and snow, but inside the temperatures and carbon dioxide levels are carefully controlled. Each chamber is designed to simulate a different climate change scenario.

"Welcome to a warmer future," declares a sign at the entrance to an enclosure that is heated to 9 degrees Celsius warmer than the outside temperature, representing a dramatic change in climate. Inside, spring comes early and autumn arrives late.

Chapman University Associate Professor Jason Keller, Ph.D., and his student researchers journey to this outpost in the southernmost part of North America's great boreal forest about four times each summer. Together, they gather data and collect samples they ship back to their campus laboratory in the sort of coolers you would expect to hold cold drinks.

Instead, the coolers could hold clues to the future of the planet.

The Chapman researchers are part of a project known as SPRUCE – an acronym for Spruce and Peatland Responses Under Changing Environments – that is funded by the U.S. Department of Energy (DOE) and operated by Oak Ridge National Laboratory. In 2015, Keller was awarded a three-year, $1.5 million DOE grant as principal investigator on a SPRUCE project in collaboration with the University of Oregon and Purdue University. Chapman also was part of a $1 million DOE grant for peatland research in 2012, securing about $400,000 of that amount.

The interest in a remote peatland forest 200 miles north of Minneapolis might seem puzzling at first. Yet peat – the slowly decomposing organic matter that for centuries has been dug up, dried and burned as fuel in parts of northern Europe – is key for understanding climate change. Since the retreat of the glaciers, northern peatlands have acted as carbon sinks – pulling carbon dioxide from the atmosphere and storing it belowground in their soils. Though peatlands cover only about 3 percent of below ground Earth's surface, they store about a third of the planet's soil carbon.

"What motivates our work at SPRUCE is the possibility that soil carbon that has been stored in peatlands may suddenly return to the atmosphere as the greenhouse gas methane. That process would have global implications for Earth's climate," Keller said.

"We don't know if that's going to happen or not. That's the point of doing the experiments. We need to figure this out. Maybe the soil carbon stays belowground and is not responsive to warming at all – which would be less dramatic, and have a smaller impact on the global climate."

VARIABLES AND CONTROLS

Two of the 10 enclosures at the SPRUCE site remain unheated, as controls. Two others are heated to 2.25 degrees Celsius above the temperature outside, two are plus-4.5 degrees, two are plus-6.75 degrees and two are 9 degrees above the outdoor temperature that fluctuates with the seasons.

In addition to warming the air in eight of the 10 enclosures, researchers also designed a way to warm the soil in those chambers to about 10 feet below the ground via vertical heating rods. Five of the enclosures – one at each temperature, including one unheated chamber – also receive an elevated atmospheric carbon dioxide treatment, adding another variable.

The combination of temperature and elevated carbon dioxide treatments allows Keller and other researchers to explore 10 possible climate scenarios and see how the bog will respond. "By considering this wide range of possible futures, we are able to inform mathematical models that could better describe the connections between peatlands and the global climate," Keller said.

When Keller and his students – mostly undergraduates or recent graduates continuing their research – visit SPRUCE, they collect water and soil samples, some of them removed from up to 10 feet below the surface with a device known as a Russian corer.

"We shove it down, twist it, pull it back up, open it up and we are holding soil that is thousands of years old. It is pretty cool," Keller said.

Those soil samples are mostly what was once sphagnum moss – similar to the peat moss you might buy for your home gardening projects – but in progressive states of decay. Cold temperatures and wet conditions that limit the availability of oxygen slow the decomposition of the moss and other plants, allowing the carbon-rich soil to persist for centuries beneath the surface.

"Sixty times more carbon than we emit every year from fossil fuel burning worldwide is stored in peat, and it's been sort of slowly accumulating there over thousands of years," Keller said.

Opposite page: Chapman student researchers, from left, Haley Miller '18, Jessica Rush '18 and Emily Hanna '18 work alongside Professor Jason Keller as "Swamp Monsters" – the team's affectionate term (complete with vest logo) for those studying wetland ecology.

Cassandra Zalman, Ph.D., instructional assistant professor in biological sciences, gathers field data in northern Minnesota.

LESSONS OF SPRUCE

Back on the Chapman campus in the Keller laboratory, which moved in September from Hashinger Science Center to an expansive, state-of-the-art facility on the second floor of the $130 million Keck Center for Science and Engineering, Keller and his students study the soil and water samples. They use equipment such as a gas chromatograph to measure carbon dioxide and methane concentrations, and often work with samples in an anaerobic glove box, a space without oxygen.

The results of the SPRUCE research so far have been interesting.

Keller was among the co-authors of 2016 article in the journal "Nature Communications" describing the initial finding that while surface soils produced more methane in response to deep soil warming at SPRUCE, the vast carbon stores in deeper soils were less responsive to the warming treatments. The second lead author on the paper, Anya Hopple, a post-doctoral researcher from the University of Oregon, joined Keller's laboratory this fall.

The findings would suggest that a slow incremental rise in temperature might not have devastating effects on the release of the carbon stored in peatlands, as some fear. At least not initially. Much of Keller's ongoing work explores whether the deep soil carbon remains stable as the heating treatments continue.

"It's all about the feedbacks," Keller said. "Peatlands are a perfectly normal part of the climate system and have been since they existed. But if our initial change of the climate system causes these peatlands or other wetlands to act differently, that has the potential to create globally-significant feedbacks. If wetlands start releasing more methane, that could accelerate climate change."

Among other work Chapman students pursue at the Minnesota site is studying humic substance reduction, or the way microbes breathe organic compounds instead of oxygen. Jessica Rush '18, a recent Chapman graduate who is working as Keller's laboratory manager this year, said she entered college as a pre-med student but changed her mind.

"I joined Dr. Keller's lab my sophomore year and took physiology my junior year. I found myself loving research more and more," she said.

Emily Hanna '18, now pursuing a graduate degree at UC Irvine in public health with an environmental health emphasis, studied a novel process called methylotrophic methanogenesis in the Minnesota peatlands.

"I think a lot of students gravitate toward global change questions or sustainability questions," Keller said. "The world is changing, and for our students the world is going to look different when they're my age than it does now."

"This is going to be a big issue for them. For many of them, it already is a big issue. They're already working on it."

Studying connections between peatlands and the global environment allows researchers to consider a "wide range of possible futures," Professor Jason Keller says.

At UC Berkeley, Chapman University graduate Tyler Anthony '14 is a Ph.D. candidate studying greenhouse gas emissions in corn and alfalfa fields in the Sacramento-San Joaquin Delta. He focuses on the impacts of soil type as a driver of climate change response in agriculture.

At the University of Michigan, Chapman graduate Jennifer Bowen '15 is a Ph.D. candidate studying how the chemistry of natural organic molecules in streams and other freshwaters controls the release of carbon dioxide, a greenhouse gas, into the atmosphere.

"I'm really interested in how the global carbon cycle is changing with climate change," said Bowen, who earned dual degrees in chemistry and environmental science and policy at Chapman.

Anthony and Bowen have more in common than literally getting their hands dirty pursuing important questions in environmental science. They both are building on extensive opportunities to conduct research as undergraduates at Chapman.

Bowen began working in the salt marshes of coastal Orange County after her first year at Chapman, initially following instructions and learning how to operate instruments. She later carried out her own study at the salt marsh and also conducted laboratory research on samples from the Minnesota peatland studies led by Jason Keller, Ph.D., an associate professor in the Schmid College of Science and Technology. In addition, Bowen co-authored multiple papers with Warren de Bruyn, Ph.D., a professor of chemistry at Chapman.

"By my third and fourth year, I was carrying out independent research," she said. "I think some of the major differences between the undergraduate research experience at Chapman and larger universities is the fact that at Chapman you get to develop your own questions and test them. At Chapman, you have the opportunity to do research that teaches you how to be a real scientist."

"(Professor Kim) said, 'You can have all these opportunities to know your professors one-on-one in small classes and help shape your curriculum.' That's what sold me. And that's actually the experience I got."

Tyler Anthony '14,
on undergrad research at Chapman

AWASH IN OPPORTUNITIES

"At Chapman you get to develop your own questions and test them."

Jennifer Bowen '15

Anthony, who earned a degree in environmental science and policy at Chapman, recently was awarded a $150,000 Delta Science Fellowship for early-career scientists for his work related to greenhouse gas emissions, nutrient cycling and ecosystem health in the San Francisco Bay-Delta region.

"This area is a water source for 20 million people, but it's also very highly productive agriculturally," Anthony said. "It was wetlands 150 years ago, 200 years ago, but they drained it because it's really good soil for crops." His work could help farmers make decisions about which crops to grow or whether to restore their land to wetlands and sell the carbon offset credits in the cap-and-trade market.

Before evolving into a wetland biogeochemist, Anthony conducted research as a Chapman undergraduate in the Kim Environmental Geochemistry Laboratory under Professor Christopher Kim, Ph.D., and worked as lab manager for a year after graduating before beginning his postgraduate work at Berkeley. He also studied wetland soil carbon storage with Keller.

The research opportunities and close engagement with professors at Chapman were deciding factors in his final choice among three colleges, Anthony said, particularly after his cellphone rang just as he was driving to visit another school as a high school senior. The call was from Kim.

"He said, 'You can have all these opportunities to know your professors one-on-one in small classes and help shape your curriculum,'" Anthony said. "That's what sold me. And that's actually the experience I got."

Professors like Keller continue to deliver such experiences.

"What makes Chapman unique is not that we're doing really good wetland biogeochemistry," said Keller, who led students on multiple trips to Minnesota last summer. "I think what makes Chapman unique is that we're doing really good wetland biogeochemistry with undergraduates."

THE ROOTS OF RACIST HATE

Exploring the darkness of white supremacy, Pete Simi finds an unmistakable link to childhood trauma.

STORY AND PHOTOS BY DENNIS ARP

Sociologist Pete Simi tracks the many ways hate groups communicate and recruit, including via graffiti.

Chapman University Professor Pete Simi has been to birthday parties where the cake was shaped like a swastika. He has seen a 5-year-old casually snap into a Nazi salute and heard other children recite horribly racist nursery rhymes from memory. He has listened to a white nationalist describe fits of rage so intense that after the man rained ax-handle blows on a victim, he vomited from physical and emotional exhaustion.

Such are the experiences of a researcher who for more than two decades has immersed himself in the study of racist communities to unearth the roots of their extremist behavior.

So in the run-up to the anniversary of last August's deadly Charlottesville, Va., rally by white supremacists, Simi was renewing calls for vigilance and saying that we shouldn't be surprised when racist beliefs ignite into violence.

"Charlottesville has sparked renewed attention, and people say, 'Where did this come from?'" says Simi, Ph.D., associate professor of sociology at Chapman and co-author of the book "American Swastika: Inside the White Power Movement's Hidden Spaces of Hate." "That surprise I find interesting. I can't tell you how many times people have told me, 'I didn't even know these groups still existed.' It's clear that our awareness has been deficient, because they've been around all along. We just weren't paying attention."

Student research assistant Amy Aghajanian '20 studies how hate groups promote themselves and their cause online.

Simi's research includes observation at events like the Unite the Right rally on Aug. 12, 2017, that resulted in the death of a counter-protester when a car plowed into a crowd of activists. Video of the incident in Charlottesville shocked the nation.

"They keep thinking the way they did, even though they don't want to anymore."

Simi was at a conference of the American Sociological Association in Montreal when his phone started buzzing with notices of the Charlottesville violence. In the days that followed, he was sought out by numerous reporters and others trying to sort through the motives of those emboldened to publicly express racist hate. Most recently he was among the experts featured in the PBS documentary series "Documenting Hate: Charlottesville" produced by Frontline and ProPublica.

Simi's research also has explored the roots of terrorism, with a primary focus on Islamic extremist groups. He has received grant support from the National Science Foundation, the Harry Frank Guggenheim Foundation, the National Institute of Justice and the Department of Defense.

Over the years, Simi has conducted more than 100 interviews with a wide range of adults who are former members of white supremacist groups. The 20,000 pages of life histories he and his team have compiled reveal unmistakable trends.

"They tend to have common vulnerabilities from childhood," Simi says of those he studies. "We see high levels of physical abuse, sexual abuse, parental neglect, family substance abuse problems – all the things we've known for decades have detrimental consequences."

In fact, about 80 percent of the former white supremacists he has interviewed say they experienced childhood traumas. Two-thirds share that they have a history of substance-abuse and/or attempting suicide, and half report witnessing serious acts of violence, experiencing physical abuse, being expelled or dropping out of school.

SEEDS OF HATE

Unresolved trauma can become particularly volatile when it mixes with desensitization, adds Simi, who has a background in mental health assessment. "When they hear the N word at home, when they hear their parents say that blacks are more prone to criminality, when they hear these racial epithets, it provides them with familiarity," he says. "So when they come in contact with these white supremacist groups, they're primed for it."

Over time, those who were drawn to hate groups sometimes sour on the life and see their views shift toward tolerance. Even after they leave and try to start anew, however, it can be hard to change their thinking, Simi says. Some experience symptoms of relapse that mirror those of drug addicts.

"They keep thinking the way they did, even though they don't want to anymore," he says.

One former group member recounted such an experience when a fast-food restaurant messed up her drive-through order. She went inside to get it straightened out, and a Latina employee tried to show her that the order was actually correct.

"The former white supremacist just goes off," Simi says. "She starts shouting racial epithets, and the next thing she knows she's heading out the door giving a Nazi salute and yelling 'White power!' By the time she gets to her car, it's like she has come to, and she starts crying – she's feeling so ashamed."

Another interview subject was a decade removed from his white supremacist past when he learned that his daughter had started dating a Latino. The moment triggered a similarly visceral reaction – until the man caught himself.

"I had to say to myself, 'Mr. Racist, you're not cured,'" he recounted to Simi.

Some of those Simi has interviewed fear they might have brain damage. "When you're exposed to this kind of powerful environment, it stands to reason that it's going to have neurophysiological consequences," Simi says. "But in terms of research, we don't really know."

WHAT RESEARCH MIGHT TELL US

Simi hopes to get the funding to build on a pilot study in which MRI and EEG results were recorded while subjects viewed visual triggers.

"If it's true that experiences continue to impact responses, it could have real implications for how to do interventions," says Simi, whose research is helping to inform the support strategies of Life After Hate, an organization founded by former violent extremists "dedicated to inspiring all people to a place of compassion and forgiveness – for themselves and each other."

It's not easy to take such an empathetic approach with those who had dedicated themselves to a life of hate, Simi admits. But it does work.

"A fair number of formers talk about what a difference it made to receive compassion from a Jewish person, from an African-American who offers a helping hand without judgment. It helps break down that shield of extremism," Simi says. "That's what extremism is – a defense mechanism against the difficulties of being vulnerable."

It's also important to recognize that as our society becomes more polarized and lines of communication become less open, "We're really fueling extremism," Simi adds. "That's what extremists are hoping for."

In the face of such zealotry, Simi's research continues to evolve. Since Charlottesville he and his team have started doing more interviews with subjects in their late teens and early 20s, because there's a sense that people in these age groups are becoming more vulnerable to recruitment.

"With the proliferation of social media platforms and some of the changes politically, do we have a different background profile for those getting involved? That's one of the questions that has yet to be answered," Simi says.

One thing Simi is sure of: White supremacists see a green light for sharing their message in this time of political fanaticism. And those seeking converts are getting more sophisticated in their approach.

"Just look at the term 'alt-right' and how it's been promoted by Richard Spencer, a white supremacist by any definition of the term," Simi says. "The term has been promoted so heavily so it could have a more insidious, veiled influence on people."

Simi was on hand to observe Unite the Right 2 on Aug. 12 outside the White House, where counter-protesters far outnumbered white supremacists. Spencer, who led torch carriers through the University of Virginia campus in 2017, didn't attend this year's "white civil rights" rally.

"A number of leading figures such as Spencer and Andrew Anglin advised folks to stay away, arguing that once was enough and the time is not right for rallies," Simi says. "Their message is: Go back to infiltrating the system and working to move the mainstream further to the extremes by using social media, etc. Also, why attend one of these events when so much of what is coming out of the White House is consistent with your worldview? Dehumanizing language like 'animals,' 'infestation' and most recently referring to an African-American woman as a 'dog.' No need for rallies when you have the most powerful voice in the world speaking your language."

Simi also has words of caution for those who counter-protest. He suggests following the lead of the Anti-Defamation League and holding a rally with a positive message at the same time in a different location.

"That's what extremism is – a defense mechanism against the difficulties of being vulnerable."

"For the folks holding these (white supremacist) rallies, confrontation is like oxygen, especially when it turns violent," he says. "It's exactly what they're looking for if they can spin it so they are the victims."

Simi says that extremist groups see a green light for sharing their message in this time of political fanaticism.

THE AMENITIES FACTOR

Brainstorming students help Jim Doti expand his highly successful econometric model, and suddenly California's soaring housing costs start to make sense.

BY DAWN BONKER

It's a fundamental fact of real estate life: Location matters. But what if your location is also near the ocean? It turns out, that's a bigger influence on price than economists previously understood. Factor in those coastal breezes, and California's soaring real estate values make more sense, according to a model devised by economist Jim Doti and his students at Chapman University.

Doti, Ph.D., professor in the Argyros School of Business and Economics as well as president emeritus, developed the model with his students as part of a class project. The findings were so eye-opening that Doti included them in his spring Economic Forecast Update, the companion event to the University's annual fall Economic Forecast, now in its 41st year and one of the nation's most accurate.

"I am a transplant from Chicago," Doti says, "and I have believed for 40 years that there is more value to a home in California than just the price. The Amenities Factor explains why. We hear that the secret to real estate is 'location, location, location,' and the Amenities Factor proves the adage."

Doti delights in sharing the credit with students in his course on econometrics, a branch of economics that uses statistics, economic history, patterns and other data to forecast trends. During the spring semester, he and his students applied the principles to predict a variety of economic developments.

Housing is always a chief topic in the annual forecasts, so it was a natural one to put to the test. They used several traditional predictors of property values for a region, including the natural amenities scale, a gauge used by the U.S. Department of Agriculture that calculates climate, topography, water and other features into a desirability score.

Yet, the numbers weren't adding up as expected and didn't fully explain the price of California real estate.

Then a student asked a good question. Did the type of water matter? What if it were an ocean?

"It just kind of came to me. I figured people love to be by the ocean," says McKenna Koledo '18, who graduated with a degree in business administration from Chapman's Argyros School of Business and Economics. The new graduate knows of what she speaks. She grew up in the San Francisco Bay area, where her family has business interests in property investments and management.

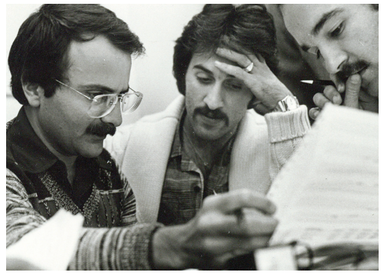
So the class added a dummy variable to the formula – one extra point to each of California's coastal counties. With that one modification, the new model predicted prices that matched real-world values.

"After we ran it with the dummy variable, the significance of the natural amenities score went significantly down," Koledo explains.

The new model uncovered surprises, too, by revealing real estate bargains and overpriced trends around the state.

Add in the Amenities Factor, for example, and Riverside County is more overvalued than both Orange and Los Angeles counties. Placer County – home to Lake Tahoe – is one of the most undervalued counties in California. Meanwhile, Silicon Valley's Santa Clara County is the most overvalued.

"These are the exciting things that happen in econometrics," Doti says.



At left, then-Professor Jim Doti and graduate students Shahram Mehran, center, and Reza Alavi, crunch the numbers for an early Economic Forecast.

> "We hear that the secret to real estate is 'location, location, location,' and the Amenities Factor proves the adage."
>
> Jim Doti

It's fitting that the Amenities Factor began as a classroom project. Doti, ever the professor, routinely drops digestible economics lessons into his national and regional economic forecast presentations. Indeed, the forecasts themselves grew from classroom teaching efforts.

In 1977, few economists gave much thought to Orange County's economy. But Doti, then a young economics professor at Chapman, saw it as a laboratory for econometrics. Rather than developing a textbook study, Doti challenged his students to assemble data reports and plug the numbers into his forecast model.

Today the forecasts are among several research reports presented by the University's A. Gary Anderson Center for Economic Research. From 2004 to 2016, Chapman's forecast accuracy for real GDP ranked No. 1 when compared with forecasts issued by the organizations participating in the Blue Chip Economic Indicators surveys.

Generations of graduate and undergraduate students have contributed to the forecast efforts, learning first-hand the importance of economic forecasting to investors, business owners and others working everywhere from Main Street to Wall Street.

One of the most recent student researchers was Samantha Glasson '19, who relished the number-crunching project and even used her econometrics lessons to predict the outcome of Golden State Warrior games. But Glasson also hails from Napa County, one of the jewels in California's $35 billion wine industry.

"My home county was ranked 15.9 percent overvalued. I assume some of that is because it is not adjacent to the Pacific," she jokes. "I guess we'll have to add in a wine country variable next time."

Chapman Economic Forecast

- Now in its 41st year, the forecast is issued each December and updated in June. It consistently ranks among the most accurate in the nation.
- Professor Jim Doti – now president emeritus – first developed the econometric model as a project involving his students, who continue to help prepare reports. The Forecast's title sponsor is Bank of America, with additional support from the Argyros Family Foundation, Ayco and C&L Refrigeration.
- From 2004 to 2016, the Forecast's accuracy for real GDP ranked No. 1 when compared with those by organizations participating in the Blue Chip Economic Indicators surveys.

Housing Affordability Tops List of Concerns in Survey

Orange County residents see housing affordability as the region's top problem. What's more, they worry that their children won't be able to afford to live where they grew up. Those are among the findings of a comprehensive Chapman University survey seeking to get a read on the attitudes of Orange County residents.

"Fifty percent of our (700) respondents were worried that their kids won't be able to buy a home in Orange County – any home," said Fred Smoller, Ph.D., associate professor of political science at Chapman and lead researcher on the Orange County Annual Survey, supported by a grant from Fieldstead and Company.

No wonder. The median price of a home in Orange County reached $725,000 in March, according to real estate data firm CoreLogic. Rents follow suit: The Orange County average was $1,871 in the last quarter of 2017, according to data firm Reis, Inc.

Homelessness was the second-biggest concern on respondents' radars. A wide majority – 63 percent – said they would support a quarter-cent tax to fight homelessness.

The survey threw a light on other trends as well, including increased support for gun control, environmental protection and Deferred Action for Childhood Arrivals (DACA), Smoller said.

The findings highlight changes in the county that could resound long into the future, reshaping the county's identity as a conservative Republican stronghold.

"It's not that people's attitudes are changing. It's that the people themselves are changing," Smoller said, noting that the county is much more ethnically diverse today than it was a generation ago.

THE MIND OF A MOM

STORY BY DAWN BONKER

PHOTOS BY CHALLENGE RODDIE

In Laura Glynn's lab, the effects of pregnancy and parenthood get special scrutiny, driving hopes for advances in preventive care.

Scientist Laura Glynn has long been interested in the perinatal period and its implications for both mothers and children. Her work could someday help physicians flag conditions that contribute to preterm birth and postpartum depression in women and cognitive delays and mental health problems in children.

Glynn's research contributes to a growing body of literature showing that what happens during pregnancy is increasingly understood to have lifelong impact on the baby's brain structure, as well as the mother's.

But the Chapman University professor of psychology can't help but smile when she gets the "mommy brain" question. The routine realities of pregnancy and maternal brain development capture her attention, too. So, naturally, people ask about so-called mommy brain, that bit of mental fuzziness surrounding childbirth that leads to lost car keys or forgotten appointments.

"It's hard to acknowledge that not every aspect of motherhood is positive," Glynn says.

Don't fret, though. "Mommy brain" typically is mild and does not impair significant decision-making. And Glynn, Ph.D., understands the interest. She, too, is curious to understand how this phase of female life noodles with a woman's brain, cognition and behavior.

"This is part of what spurred my work – women saying, 'I'm different after pregnancy,'" Glynn says. "For me as a researcher, that is near and dear to my heart. It is an underappreciated fact that pregnancy represents a period of neurological growth for a mom and that this is a sensitive period of development in a woman's lifespan. To understand things like postpartum depression, or how a woman becomes a sensitive, caring mother, we really need to understand this reproduction transition that's largely been ignored by scientists."

Glynn is helping to close up that knowledge gap. She leads Chapman's Early Human and Lifespan Development Research Program, which makes its home in a historic schoolhouse refurbished by Chapman to house Glynn's lab.

For nearly 20 years, Glynn has been involved in a longitudinal study funded by a number of different agencies, including the National Institute of Child and Human Development and the National Institute of Neurological Disorders and Stroke. The project is currently supported by the National Institute of Mental Health's Silvio O. Conte Centers through a $10 million award. The Conte Centers are hubs of neuroscience research established at several universities. The goal of this long-term study is to understand how prenatal and early life experience influences lifespan mental health trajectories.

Along with making home visits to mothers and children, research staff and undergraduate research assistants interview, videotape and observe the same participants for years, gathering information on physical and emotional development as well as family life and economic circumstances. The oldest in this cohort of children are turning 18, so researchers have shifted their information-gathering to include behaviors and pathologies of young adulthood. Such information may help Glynn discover links between early-childhood exposures and adult health conditions, ranging from obesity to depression.

In collaboration with grant partners at University of California campuses in Irvine and Los Angeles, Glynn has reported on a variety of study findings through the years. In one study, she and other researchers identified patterns affecting African-American women who suffered multiple racist experiences in childhood. Rates of premature birth and maternal high blood pressure increased, as did those of low-birth-weight infants.

Glynn hopes more research like this can help clinicians create better intervention strategies and treatment plans that would improve health outcomes for mothers and their children.

"It's hard to lift kids out of poverty. But maybe you can buffer the impacts," she says.

Another study revealed that high levels of a hormone released by the placenta could predict a woman's risk for postpartum depression. Glynn found that elevations in placental corticotropin-releasing hormone (pCRH) are associated with the development of postpartum depression.

More work is needed to understand what's happening with pCRH, which may initiate a mother's alertness to her infant's needs, she says.

"Mom has her baby, and she's anxious about it. That's normal. I think what may be going on is that for some women that change in anxiety is very extreme. It may move out of that functional range and into a pathological range," she says.

Postpartum depression has long been categorized as a major depressive disorder. But these findings that connect it to the placental hormone suggest it may be time for clinicians and scientists to rethink that diagnostic categorization and devise treatments unique to postpartum conditions, says Glynn, who reported the findings in the journal "Depression and Anxiety."

Glynn's research also extends to the typical influences of pregnancy on maternal brain development. Pregnancy exposes women to more hormones than at any other time in their lives. On a graph that Glynn shares when she talks about lifelong estrogen exposures, the exposures during adolescence and menstrual cycles barely register on the scale, compared with those of pregnancy.

"Underappreciated is the sheer magnitude of these changes," she says.

This type of exposure certainly fosters a unique brand of neuroplasticity, the process by which the brain changes and adapts throughout life, she says. In rodent studies, evidence suggests that childbirth and mothering make for better foraging skills and offer protection against cognitive aging.

In short, Glynn says, "Mom rats age more successfully than their (non-mom) counterparts."

Back in the human world, one of Glynn's studies found that mothers were better at accurately recognizing anger, fear and disgust.

It's fun to relate such findings to those clichés that liken new moms to mother bears, or to recall mothers who really did seem to have eyes in the backs of their heads. But for Glynn the real joy is looking for the clues that will lead to a new understanding of how biology, psychology and environment influence the maternal brain.

Science still has a ways to go on that front.

"There is still so much we don't know," she says.

But on one count, she is confident.

"Mothers," she says, "are made, not born."

"To understand things like postpartum depression, or how a woman becomes a sensitive, caring mother, we really need to understand this reproduction transition that's largely been ignored by scientists."

- Laura Glynn

Research assistant Gage Peterson '17, left, and research scientist Mariann Howland review data in one of the labs led by Professor Laura Glynn.

THE WONDERS OF SLIME

BY DENNIS ARP

The first time she saw one, Lauren Friend '19 was repelled. "Maybe even disgusted," she says. But over time, she has developed a healthy respect for her research subject, the humble hagfish, which despite its slimy appearance and scavenging nature wiggles its way into the hearts of researchers by steering them toward scientific breakthroughs.

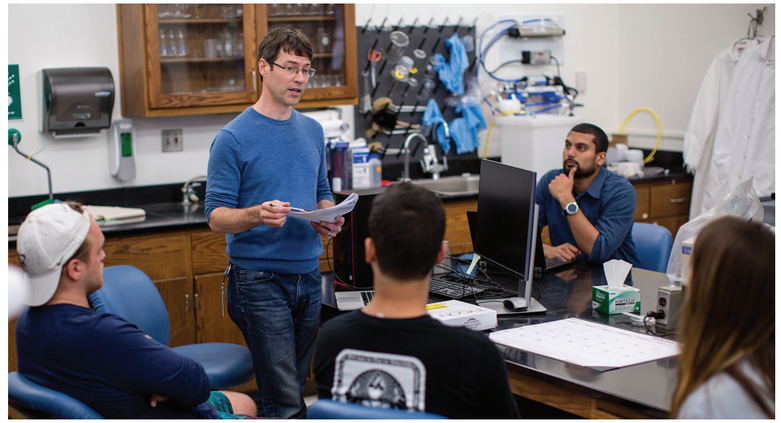
"You have to appreciate what they can teach us," the biochemistry major says.

Friend and her Chapman University student colleagues in the marine research lab of Douglas Fudge, Ph.D., have dived deeply into the bottom-dwelling world of this intriguing creature. Fudge has been hooked ever since he was a grad student. He considered focusing his research on squid, "but in the end, hagfish slime was something I couldn't resist," he says.

Biochemistry major Lauren Friend '19 displays hagfish slime, which stretches to reveal fibers that are stronger than steel, on a per-weight basis.

No wonder. Once mistaken for a worm, with a skull but no vertebrae, lacking sight or a jaw, the hagfish can produce a jaw-dropping amount of slime as a defense against attack. Among other things, Fudge's team is exploring just how all that slime gets produced. In the controlled conditions of the lab, students collect and then release a pre-slime substance called exudate, produced by glands on the hagfish. When it hits seawater, just a milliliter of the exudate instantly swells to encompass more than a liter of goo, which can clog the gills of potential predators.

"When you pull the slime from a bucket, it's like holding a bag of water, except that there's just no bag," says Fudge, an associate professor of biology in the Schmid College of Science and Technology. "Somehow these fibers are holding this large volume of water."



A Chapman research team reaches deep into the slippery world of the hagfish, chasing insights that hold gobs of promise.

If fibers that are renewable and biodegradable could replace petroleum-based options, it would spark advances in manufacturing and disposal, says biology professor Douglas Fudge.

In the new Keck Center for Science and Engineering, Fudge's lab houses more than 100 hagfish in specially designed tanks. Students join in the research, exploring how the hagfish move and escape attack as well as possible uses for their slime.

As Fudge holds up the pliable substance, silky strands elucidate why that slime has researchers so excited. Thousands of super-strong threads – each more than 100 times thinner than a human hair – weave throughout the goo. Like spider silk, these fibers are stronger than steel, on a per-weight basis. If the strands can be synthesized and mass-produced, they might provide an alternative to petroleum-based fibers like nylon and Kevlar.

"These are billion-dollar industries," says Fudge, who notes that two industry collaborators are helping to fund his team's work. Proprietary restrictions prevent him from detailing this branch of his research.

"It would be a big advance if these fibers that are renewable and biodegradable could replace petroleum-based ones that are problematic in both their manufacture and disposal," Fudge adds.

Insights from the slime might also lead to advances in firefighting, anti-shark sprays, suspension gels for drugs – the possibilities seem limitless.

Fudge and his research colleagues have "a somewhat crazy hypothesis" about how hagfish create the framework for their slime. They think that the nucleus of a cell might act like a spinning wheel, twisting intermediate filaments into a single high-performance fiber 1 micron in diameter.

"If this idea is right, we should see the nucleus spinning in one direction when we look at it under the microscope," Fudge says.

Meanwhile, a National Science Foundation grant is funding a project involving Chapman's lab, seeking to identify the genes that produce the slime's two components: mucous and threads.

"Knowing the genes involved will be helpful in trying to synthesize an artificial version of this amazing substance," Fudge says.

Photo by Nathan Worden '13 (MBA '18)

Working with students such as Nick Callen '21, Bart Wilson incorporates literary exploration in classes that seek to upend the presumption that economics is morally bankrupt.

Cents and Sensibility

STORY BY SARI HARRAR

PHOTOS BY DENNIS ARP

Humanomics bridges disciplines, raising questions of morality and humanity in thinking anew about how we make economic choices.

Call it economics with a human face. At Chapman University's new Smith Institute for Political Economy and Philosophy, the focus is on humanomics – a mind-bending inquiry into the intersection of economics and the humanities. Through seminars and research projects, the journey is taking students and faculty into uncharted territory and attracting wider attention with a new book, journal articles and the institute's first international conference.

"People don't typically think of morality and humanity as important in economics," says institute director Bart Wilson, Ph.D., who holds the Donald P. Kennedy Chair in Economics and Law at Chapman. "There's this idea that economics is heartless, objective, based solely on cold, hard facts. And I think the presumption in literature and philosophy is often that economics is morally bankrupt."

But in humanomics, Wilson and others are questioning these assumptions.

"In our first course, we asked students to think about what makes nations rich, what makes good people good – and what those two things have to do with each other. We're still asking those questions," he says.

The institute opened in 2016, supported by more than $15 million in gifts from the Charles Koch Foundation and two anonymous donors, with additional funding from Chapman trustees Gavin Herbert and Rick Muth (MBA'81). The institute's name honors both Adam Smith (1723-1790), the moral philosopher widely known for authoring "The Wealth of Nations" and "The Theory of Moral Sentiments" – books that launched the field of economics; and Chapman Professor Vernon Smith, Ph.D., the 2002 Nobel laureate in economics and the father of experimental economics.

"The Smith Institute's broad mission is to reintegrate the study of the humanities and economics in the spirit of Adam Smith, and to recombine research and undergraduate education as a discovery process in the spirit of Vernon Smith," Wilson explains.

TWO-WAY INQUIRY

That mission got its start in 2010, when Wilson and Jan Osborn, Ph.D., associate professor of English at Chapman, co-taught a First-Year Foundations seminar titled Humanomics: Exchange and the Human Condition. The course juxtaposed John Steinbeck's harrowing Dust Bowl novel "The Grapes of Wrath" with journalist Matt Ridley's upbeat 2010 book "The Rational Optimist: How Prosperity Evolves."

"Each book questioned the other's premise," Osborn says. "Reading the two together deepened the inquiry both ways."

The idea for the course and the term humanomics emerged from an ongoing conversation between Osborn and Wilson about the deep disconnect between economics and the humanities.

"Literature is about the human experience. But the charts and graphs and numbers of economics are all about human beings, too," Osborn notes. "We put two major works into conversation with each other and as a result see things in a new way. There are no right answers – it's about generating new questions and living with new ambiguities."

Wilson and Osborn expected to teach the class once and move on. Instead, humanomics snowballed thanks to student demand. In 2011, Wilson and Osborn added a Presidential Seminar, in which students and faculty discuss the arts, humanities, philosophy and economics over dinner in a Socratic dialogue format. The seminar has been offered every semester since. The foundations class, which won Chapman's 2011-2012 Pedagogical Innovation Award, is offered every fall. An Interterm course was added in 2014. Along the way, Keith Hankins, Ph.D., assistant professor of philosophy, and others began teaching humanomics courses as well. The institute is adding 10 new faculty positions in economics, the humanities, literature and philosophy.

Vernon Smith sat in on the first seminar – and was intrigued by humanomics' "let's ask new questions" approach. He and Wilson have co-authored the new book "Humanomics: Moral Sentiments and the Wealth of Nations for the Twenty-First Century," published this fall by Cambridge University Press. Among the scholars to praise the book is Deirdre Nansen McCloskey, distinguished professor of economics, history, English and communication at the University of Illinois at Chicago. She called it "a scientific and ethical triumph (that) combines the sacred and the profane, just as we do."

NEW TAKES ON EXPERIMENTS

Smith and Wilson also collaborated on innovative experiments that test the role of humanomics' human variables in how people make economic decisions.

In one study published this year in the journal "Games and Economic Behavior," they tweaked the rules of a classic experiment called the ultimatum game. "We redesigned it to test Adam Smith's proposition in 'The Theory of Moral Sentiments' that 'beneficence is always free, it cannot be extorted by force,'" Wilson says. They found that when responders were given the ability to opt out of the ultimatum game for a mere $1 payoff, 40 percent of proposers offered a $22-to-$2 split to the responders (in favor of the proposer) and that, contrary to the results in the standard ultimatum game, 61 percent of the responders accepted such grossly "unfair" offers. "Reading Adam Smith gave us the idea to run an experiment that we had no reason to run before," Wilson says, "and the result was a re-interpretation of the ultimatum game as plausibly as much about extortion as it is about fairness."

Jan Osborn – here working with student Christina Iriart '19 – says that humanomics isn't about finding the right answers. "It's about generating new questions and living with new ambiguities."

In a study published in July in the prestigious journal "Nature Human Behaviour," Wilson and Smith – along with Chapman anthropologists Hillard Kaplan, Ph.D., and Eric Schniter, Ph.D. – looked at what happens when people can choose between stealing and sharing food resources. Would they coldly maximize their own gains at the expense of others, as conventional economics might predict? The results surprised Wilson.

"We tend to think that people are instinctively selfish, and in our experiment they initially are," he says. "So it's pretty remarkable how humans find a way to cooperate and trade after the initial rampages of theft. I didn't expect such a clear result. It surprised me how much stealing declined over time. The uncertainty of the future helps prepare people to be more cooperative."

Students have also worked with Osborn and Wilson to publish academic papers based on humanomics classes. One recent example explores the connection between human social connection and morality using Smith's "Theory of Moral Sentiments" and Mary Shelley's "Frankenstein." Another student is analyzing characters from the TV series "Deadwood" as they react to commercial and economic forces.

"Vernon Smith's long-held view is, 'Why can't the classroom be the place that generates ideas for research?'" Wilson notes. "We're making that happen."

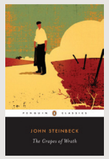
The institute's first academic meeting – a conference on property and political economy – featured speakers from major universities in the U.S., Canada, Australia and Spain. Meanwhile, undergraduates can apply for spots in the institute's Summer Scholars program, where they analyze data, design new experiments and ponder works of literature and economics.

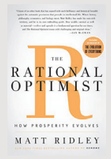
It's a mind-opening experience, says Chapman business administration major Kyle Joye '21.

"Humanomics class taught me to constantly think about economic solutions to better humanity," Joye wrote about the program in his application for the summer scholars program. "Talking about bettering society, seeing where flaws exist and learning from experts excites me because it shows that we are capable of finding solutions to serious problems like the national debt and welfare. I want to make the world a better place, and I feel like this approach will work toward that goal."

Humanomics: the Home Game

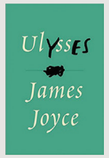
It's easy to join in the humanomics experience. Just read these pairings of books – a few chapters of one, followed by a few of the other – and ask yourself how morality, human experience, capitalism and commerce are explored in both works. Here's a tip from the pros: In the exploration, there are no wrong or right answers.

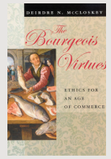




The Grapes of Wrath
by John Steinbeck

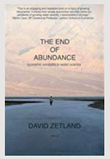
The Rational Optimist: How Prosperity Evolves
by Matt Ridley





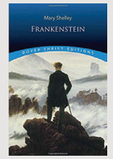
Ulysses
by James Joyce

The Bourgeois Virtues: Ethics for an Age of Commerce
by Deirdre McCloskey



How to Get Filthy Rich in Rising Asia
by Mohsin Hamid

The End of Abundance
by David Zetland



Frankenstein
by Mary Shelley

Markets without Limits: Moral Virtues and Commercial Interests
by Jason Brennan and Peter Jaworski

LET'S TALK ABOUT CANCER

A rich mix of data, personal insights and poetry helps caregivers navigate critical conversations.

BY DAWN BONKER

Cancer begins heaven knows when. But for most people it announces itself with a jolt of a diagnosis, followed by various treatments, sidelined plans, lousy side effects, medical bills, leaves of absence, recovery and hope for remission.

It's a lot for patients, family members and health practitioners to discuss, whichever direction the wild ride takes. And there's no single good way to start that conversation, say two Chapman University professors. So they've written a guide, weaving evidence-based research on health communication with stories and poetry from writers who've sat through their own uncomfortable moments in doctors' offices.

The result is "Conversing with Cancer: How to Ask Questions, Find and Share Information, and Make the Best Decisions" by Lisa Sparks, Ph.D., professor and dean of the Chapman School of Communication, and Anna Leahy, Ph.D., professor and director of the MFA in Creative Writing program. Their 12 themed chapters address a range of communication issues, from Internet overload to the demands of ongoing caregiving. A poem opens each chapter.

"I really hope it gets in the hands of patients and families who need it and that it gets beyond the classroom," Sparks says.

Sparks' considerable research and published writing on cancer communication inform several chapters. For example, in a section on culture and cancer care, she describes study findings indicating that less-educated patients were not accessing online cancer information.

Her work in this area reaches back to 2002, when she was awarded a fellowship at the National Cancer Institute, making her the first Cancer Communication Fellow within the National Institutes of Health. Just a few years prior, her father had died of lung cancer.

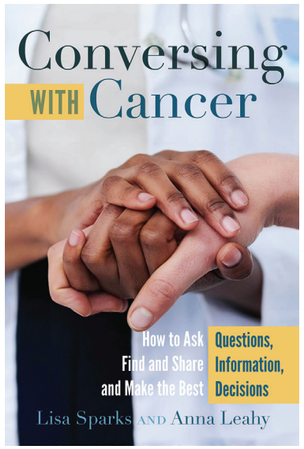
"So I knew that at some point I was going to move to the cancer context when I was emotionally ready," she says.

"Conversing with Cancer" by Lisa Sparks, left, and Anna Leahy addresses a range of cancer communication issues. *Photo by Livi Dom '20*

Likewise, Leahy brought personal experiences to the book, published as part of the Language as Social Action series from Peter Lang. Both her parents died of cancer, and her father's initial diagnosis hit when she was a teenager.

And the use of verse?

"Poetry is an area of language that we turn to when we struggle to communicate what we're thinking or feeling," Leahy says. "And a cancer diagnosis, or going through treatment, that's an experience for which we don't have adequate language. So I think poetry is a natural place for us to turn when we're figuring out how to communicate about cancer."

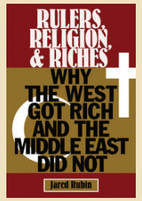


Conversing with Cancer: How to Ask Questions, Find and Share Information, and Make the Best Decisions
(Peter Lang)

Lisa Sparks, Ph.D., professor and dean of the School of Communication, Chapman University

Anna Leahy, Ph.D., professor and director of the MFA in Creative Writing program, Chapman University

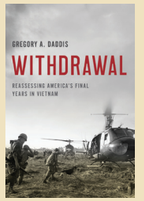
BOOKSHELF



Rulers, Religion, and Riches: Why the West Got Rich and the Middle East Did Not (Cambridge Studies in Economics, Choice, and Society)
(Cambridge University Press)

Jared Rubin, Ph.D., associate professor, co-director, Institute for the Study of Religion, Economics and Society

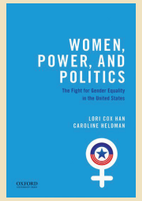
For centuries following the spread of Islam, the Middle East was far ahead of Europe. Yet, the modern economy was born in Europe. Why was it not born in the Middle East? Rubin examines the role Islam played in this reversal of fortunes.



Withdrawal: Reassessing America's Final Years in Vietnam
(Oxford University Press)

Gregory A. Daddis, Ph.D., associate professor of history, director of M.A. in War and Society

This book reinterprets American strategy in the final years of the Vietnam War, with particular attention on the "better war" narrative and the command of Creighton Abrams, who was later compared to David Petraeus during the surge in Iraq.



Women, Power, and Politics
(Oxford University Press)

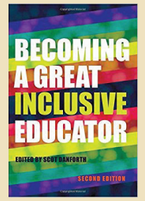
Lori Cox Han, Ph.D., professor of political science, with Caroline Heldman, Ph.D.

In this updated edition, Han explores women's continuing efforts to gain prominence in American politics and the gender-related issues that shape political power within society.

Assessing the War on Terror: Western and Middle Eastern Perspectives
(Routledge)

Charles Webel, Ph.D., professor of peace studies, with Mark Tomass, Ph.D.

The authors argue that the War on Terror is both ineffective and inhumane, and that there are better, more ethical ways to deal with political violence.



Becoming a Great Inclusive Educator
(Peter Lang)

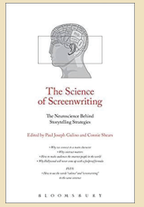
Edited by Scot Danforth, Ph.D., professor of education, assistant dean of research

This second edition provides guidance and resources to educators seeking new ways to improve inclusive teaching practices in their classrooms and schools.

Civil Protections and Remedies for Service Members
(Thomson Reuters)

Kyndra K. Rotunda, JD, professor, executive director, Military and Veterans Law Institute

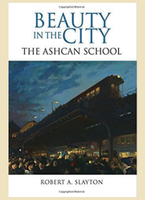
Rotunda discusses a range of topics, including the Federal Torts Claims Act, The Feres Bar, the Service Member Civil Relief Act, Military Disability Boards and Discharge Review Boards. Included is a "Military 101" chapter for civilian lawyers and law students.



The Science of Screenwriting – The Neuroscience Behind Storytelling Strategies
(Bloomsbury)

Paul Joseph Gulino, associate professor of film; Connie Shears, Ph.D., associate professor of psychology

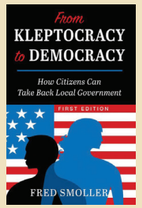
Gulino, author of the bestselling "Screenwriting: The Sequence Approach," and Shears, a noted cognitive psychologist, build an understanding of the human perceptual and cognitive processes.



Beauty in the City: The Ashcan School
(Excelsior Editions)

Robert A. Slayton, Ph.D., professor of history

This work presents a new interpretation of the Ashcan School of Art, arguing that these artists made the working-class city at the turn of the century a subject for beautiful art.



From Kleptocracy to Democracy: How Citizens Can Take Back Local Governments
(Cognella Academic Publishing)

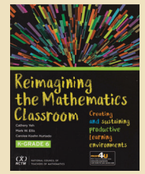
Fred Smoller, Ph.D., associate professor of political science

Smoller provides a critical examination of the political corruption that looted the city of Bell, Calif., between 1993 and 2010. Residents of the poor, immigrant community are still struggling to repay the city's exorbitant debt.

Wilfred Bion, Thinking and Emotional Experience with Moving Images
(Routledge)

Kelli Fuery, Ph.D., professor of film studies

Fuery offers an engaging overview of Bion's most significant contribution to psychoanalysis – his theory of thinking – and demonstrates its relevance for understanding why we watch moving images.



Reimagining the Mathematics Classroom
(National Council of Teachers of Mathematics)

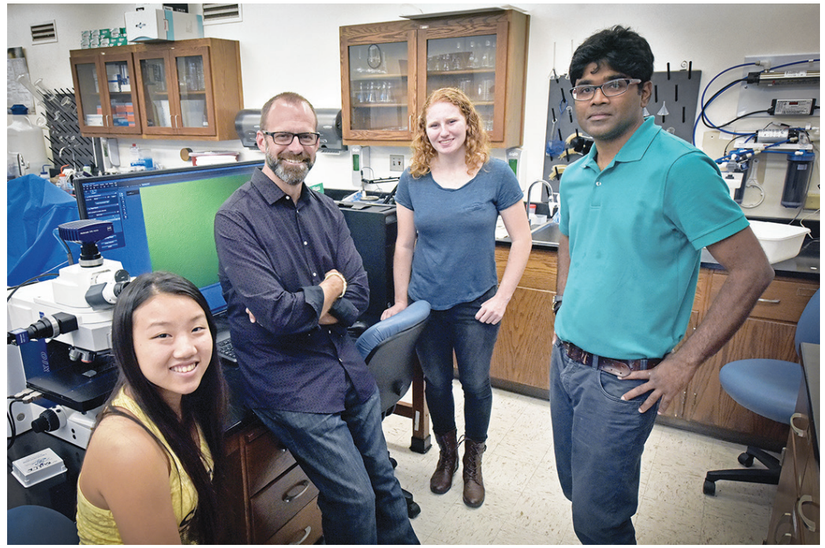
Cathery Yeh, Ph.D., professor of education

Yeh discusses current research on the essential elements of mathematics teaching and learning, while delivering proven techniques and real classroom examples.

THE CLOT THICKENS

Artificial platelets are just one of the possibilities for Andrew Lyon's polymer microgels.

BY DENNIS ARP



The polymer research team at Chapman is led by Andrew Lyon, second from left, and includes high school students Vivian Yip, left, and Maddie Tumbarello, as well as research scientist Molla Islam.

Andrew Lyon's research world revolves around stretchy bits of science 10,000 times smaller than a human cell. But those nanoparticles hold oversized promise as breakthroughs in the lives of everyone from trauma victims to cancer patients.

The microgels in Lyon's lab at Chapman University may ultimately be the building blocks for an IV injection that stems uncontrolled bleeding. Or they may get commercialized as a topical powder that first responders pour into a wound to get blood to clot. Then there's the science fiction scenario: They become a preemptive product that safely flows through the bloodstream of soldiers or others headed into harm's way so if they sustain a traumatic injury, protection is already in place.

Closest to market is a product that aids patients whose blood doesn't clot properly because they're undergoing chemotherapy.

"If we can use these polymer nanoparticles to commercialize artificial platelets, we can change bleed rates and improve models of survivability," says Lyon, Ph.D., dean of Chapman's Schmid College of Science and Technology. "That's why we're so excited."

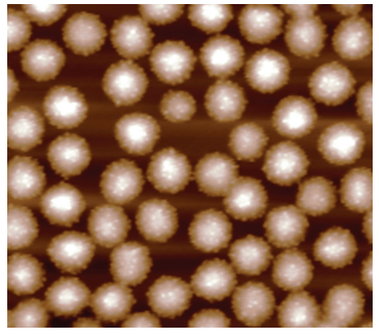
After nearly 20 years of foundational work in polymer science and soft condensed-matter physics, the science of polymer nanoparticles pretty much flows through Lyon's own genetic makeup.

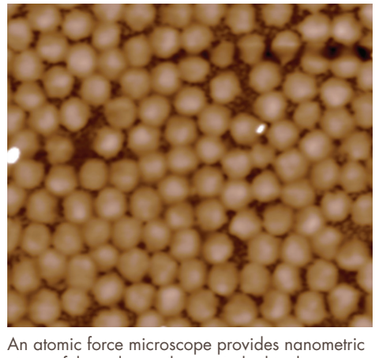
"The artificial platelets and how they work is kind of like taking an Isaac Asimov 'Fantastic Voyage,'" Lyon says.

Using an erasable marker, the dean creates interlocking loops, squiggles and arrows on his office whiteboard as he diagrams the science of his project at the molecular level. The particles at the heart of the research feature a coil-like structure that expands within a fibrin mesh to allow for multiple binding sites, mimicking the architecture of natural platelets.

Lyon uses an analogy: "If you're putting a stack of papers together, 20 staples are better than one," the researcher says. "So that's part of the secret sauce here – a super stretchy polymer that we've designed as the body of an artificial platelet that displays thousands of binding sites for natural fibrin."

Once the platelets bond to a clot, they pull the fibrin polymer in, "almost like a little muscle," Lyon says. "That makes the clot more stable so the body can step in and regenerate normal tissue."



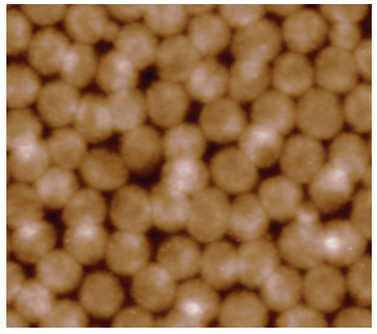


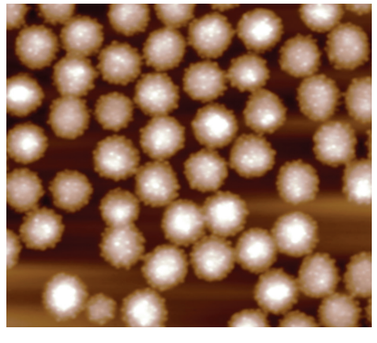
An atomic force microscope provides nanometric views of the polymers being studied in the Chapman lab. For more on the microscope and its insights, turn to page 35.

These days, Lyon's team is focusing on scale-up of the project to produce more of the polymer and ensure consistent quality. That will allow for further testing and, ultimately, commercialization.

"Going from a gram of polymer to making 50 grams takes a lot of science and engineering," he says.

This endeavor is hardly Lyon's alone. His team at Chapman includes research scientist Molla Islam, Ph.D., as well as Chapman graduate and student researchers. Meanwhile, collaboration crosses campuses and time zones, as Lyon is one of four main investigators on the project. The others are Thomas Barker, Ph.D., a professor of biomedical engineering at the University of Virginia; Ashley Brown, Ph.D., a professor at North Carolina State and UNC-Chapel Hill specializing in regenerative medicine and pharmacoengineering; and Wilbur Lam, Ph.D., of Emory University and the Institute for Electronics and Nanotechnology at Georgia Tech.





If researchers are able to use polymer nanoparticles to commercialize artificial platelets, "we can change bleed rates and improve models of survivability," says Andrew Lyon, center, with student lab assistant Maddie Tumbarello and researcher Molla I slam.

It was over a cup of coffee four years ago that Lyon and Barker launched the joint research effort. At the time, they were pursuing a $13 million grant from the Defense Advanced Research Projects Agency (DARPA) for a field-trauma application of their research. Although they didn't get that grant, the process "made us think deeply about how the technology could be successful," Lyon says. "So when we got in the lab and started building something, we had a good idea what the design features would be."

Now Lyon's team is part of a five-year, multimillion-dollar grant from the National Institutes of Health, and the hope is that the grant will culminate with team members gearing up for a clinical trial.

"All the initial studies are positive," he says.

As the project advances, transforming from a broad concept discussed over coffee into a biomedical breakthrough, Lyon takes a moment to reflect on the ups and downs along the way.

"I think of science as this constant oscillation between fascination and frustration," he says. "What you're really striving for is spending more time on the fascination side than on the frustration side."

Sure, there are frustrations as team members try to translate research into a reproducible product and then commercialize it. But, oh, the rewards on the fascination side when "you learn something about nature that no one has ever known before," Lyon says.

"The exciting thing is that we continue to challenge this technology, and now we can see the light at the end of the tunnel," he adds. "We can see how this will have a positive impact on people's lives."

Miao Zhang

SEEKING TREATMENT OPTIONS FOR MOVEMENT DISORDER

Chapman University School of Pharmacy researcher Miao Zhang is developing new drug treatment options for a rare degenerative disease. In December 2017, Zhang, Ph.D., was awarded a three-year $1,059,867 grant by the National Institutes of Health to study Spinocerebellar ataxia type 2, a condition that often causes problems with balance and coordination.

"This award allows us to take further action to identify the underlying causes of ataxia," said Zhang, assistant professor of ion channel pharmacology. "We know that SK ion channels have been associated with ataxia, although their exact role is not clear. Drugs that enhance SK ion channel activity have shown promise for treatment."

Zhang is in the pre-clinical phase of his research.

In addition to facing coordination difficulties, those diagnosed with ataxia initially experience tremors and weakness in muscles that control eye movement. Each of these symptoms is related to deterioration in the part of the brain that controls movement.

The outlook remains bleak for patients. It proves fatal within 10 to 20 years of onset and can affect people of all ages. Researchers are still searching for its origin and how it develops. It affects an estimated 150,000 Americans.

"Dr. Zhang's group and his collaborators have discovered that small molecules can modulate the activity of a specific potassium channel, alleviating the behavioral and neurological symptoms in a mice model," said Keykavous Parang, Ph.D., professor and associate dean of research in the School of Pharmacy. "With this new funding, he's planning to discover, optimize and evaluate novel compounds using structural, computational and biophysical methods."

Co-investigators Christopher Bader, left, Ann Gordon and Edward Day recently released their fifth Chapman University Survey of American Fears.

CORRUPTION, THE ENVIRONMENT TOP LIST OF AMERICAN FEARS

For the fourth year in a row, the top fear of Americans is corrupt government officials, as indicated by the 2018 Chapman University Survey of American Fears, released in October. In the fifth-annual survey, 74 percent of Americans expressed a fear of government corruption. The next-greatest fear is pollution of oceans, rivers and lakes, at 62 percent.

"We now have two years of data collected about American fears since President Trump's election, and a striking difference has to do with the environment," says Christopher Bader, Ph.D., professor of sociology at Chapman, and associate director at its Institute for the Study of Religion, Economics and Society, which helps support the survey. Bader is co-principal investigator of the survey, along with Chapman colleagues Ann Gordon, Ph.D., associate professor of political science, and Edward Day, Ph.D., associate professor of sociology.

Americans are increasingly fearful of pollution, global warming and other environmental disasters, Bader notes. "Not a single environmental concern made the top 10 list in 2016," he says. "But by 2018, five of the top ten fears are environmental in nature."

In general, fear appears to be on the rise, the researchers say. In the latest survey, all of the top 10 fears are held by more than half of Americans. A year ago, it was the top five fears.

The Chapman University Survey of American Fears provides an in-depth look at what scares Americans. In June, a random sample of 1,190 adults nationwide were asked their level of fear about 94 different phenomena, including crime, the government, disasters, personal anxieties and technology.

More information is at chapman.edu/fearsurvey.

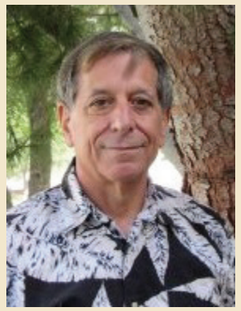
Law professor Michael Bazyler uses court decisions to teach about Holocaust issues.

A COMPREHENSIVE LOOK AT HOLOCAUST RESTITUTION

Recent research by a team led by Chapman University law professor Michael Bazyler reveals that a significant amount of property stolen during the Holocaust has yet to be returned to its rightful owners. The study is one of the most comprehensive of its kind examining legislation passed by the 47 endorsing states of the 2009 Terezin Declaration on Holocaust Era Assets and Related Issues. It was commissioned by the European Shoah Legacy Institute and highlights unresolved issues around private and communal property illegitimately seized from Holocaust victims. Estimates are that almost half of the 500,000 Holocaust survivors alive today live in poverty.

Bazyler, JD, 1939 Society Law Scholar in Holocaust and Human Rights Studies at Chapman's Fowler School of Law, is a leading authority on the use of American and European courts to redress genocide. His most recent book is "Law and the Holocaust: U.S. Cases and Materials," which uses federal and state court decisions to teach students about Holocaust issues. His 2016 work "Holocaust, Genocide, and the Law" won the National Jewish Book Award.

CLUES TO ALZHEIMER'S IN THE BOLIVIAN AMAZON?



Hillard Kaplan

An isolated population living a subsistence lifestyle in the Bolivian Amazon has already provided insights about preventing heart disease. Now researchers are hoping the indigenous group can do the same for Alzheimer's.

Grants totaling $7 million from the National Institutes of Health are funding a study of brain atrophy, cognitive impairment and Alzheimer's disease among the Tsimane, hunter-gatherers who have the worlds lowest reported levels of vascular aging.

"The link between arterial health and Alzheimer's is still unclear," says Hillard Kaplan, Ph.D., co-director of the Tsimane Project and professor in the Economic Science Institute at Chapman University. "This is the first study of a population that looks at the rate of tissue loss in the brain."

Research by Kaplan and others on the Tsimane Project team shows that a typical 80-year-old in the group has the same vascular age as an American in his or her mid-50s. The Tsimane also have few cases of diabetes and hypertension, to go with a near absence of stroke and heart attack.

Villagers spend as much as seven hours a day being physically active – hunting, gathering, fishing and farming. Their diet consists largely of non-processed carbohydrates that are high in fiber, while wild game and fish provide the bulk of their protein. There's almost no smoking.

If the industrialized world emulated the Tsimane in diet and activity, it would save millions of lives and billions of dollars in healthcare costs, Kaplan says.

"We are our own worst enemies," he notes.

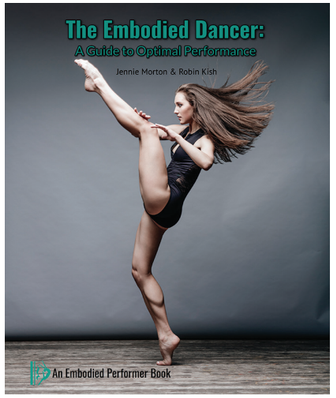
Now the question is: Does the Tsimane lifestyle "create a flexible brain that ages effectively?" Kaplan adds. "Our study will provide a deeper understanding of how genetics and behaviors interact."

The Tsimane Project is a collaboration involving Chapman, the University of New Mexico, USC, UC Santa Barbara and Long Beach Medical Center. To perform research, Kaplan regularly travels to the jungles of Bolivia, where the developing world is closing in on the Tsimane.

"We're watching their lifestyles change right before our eyes," Kaplan says. "This may be our last chance to study the natural history of Alzheimer's in a population that still has a lifestyle similar to that of prehistoric populations."

Researchers are investigating the brain health of isolated Tsimane villagers in the Bolivian Amazon in hopes of finding clues to preventing Alzheimer's. The Tsimane, who are physically active and consume almost no processed foods, experience a near absence of stroke and heart attack.

FACULTY NEWS



PROTECTING THE HEALTH OF 'ARTISTIC ATHLETES'

Suicide, career-ending injuries and the stress of relentless workouts might seem like problems seen just among elite athletes. But many performing artists also are at a high risk for developing these conditions, says a Chapman University dance professor.

Robin Kish, an advocate for entertainer health and an expert teacher of injury prevention techniques, continues to expand her work and research aimed at improving the health of these "artistic athletes." Two new books co-authored by Kish with Jennie Morton feature strategies and techniques designed to save careers, support mental health and thwart crushing injuries.

"Dancing Longer, Dancing Stronger: A Dancer's Guide to Improving Technique and Preventing Injury" (Princeton Book Company) presents general principles of injury prevention as well as specific exercises and Q&A discussions of common problems.

In the electronic book "The Embodied Dancer: A Guide to Optimal Performance" (Dance Apps Inc.), the authors offer insights and best practices that will help build healthy and fulfilling dance careers.

In summer 2018, Kish also helped shine a light on the unique health issues facing other entertainment performers. She co-chaired the 36th Annual Performing Arts Medicine Association's International Symposium on Chapman's campus, presented with support from the College of Performing Arts and Crean College of Health and Behavioral Sciences.

Hundreds of medical and entertainment professionals attended the conferences. Among its highlights was a talk by British singer-songwriter James Blake, who spoke frankly about his depression and the need for more awareness of the mental health crisis affecting performing artists.

During the conference, Kish and Morton, a psychologist and faculty member at The Colburn School in Los Angeles, received the association's Dawson Award, for contributions to the field of performing arts medicine.

Chapman dance professor Robin Kish, left, and Jennie Morton offer injury-prevention insights in "The Embodied Dancer: A Guide to Optimal Performance."

Jo Armour Smith

NIH GRANT FUNDS STUDY OF LOWER BACK PAIN

More than 80 percent of the population at some point will suffer from lower back pain, which accounts for more disability cases than any other medical condition, the National Institutes of Health reports. Chapman University Professor Jo Armour Smith has been awarded a five-year, $639,155 grant from the NIH to study how posture and brain organization affect back pain progression in young adults.

Smith, Ph.D., assistant professor of physical therapy in the Crean College of Health and Behavioral Sciences, said that she found herself both intrigued and challenged when treating adults with lower back pain during her clinical work. Doctors are unsure what causes the condition or how to treat it, aside from pain medications and physical therapy.

Smith plans to study the movement of 50 young adults ages 18-30 who experience recurring lower back pain, hoping to discover why for some people the condition remains the same, while others see their symptoms worsen to a chronic state. She will study movement while participants complete typical tasks, both inside and outside an MRI scanner. She hopes to gain insight into which parts of the brain control specific movements.

If at-risk patients and factors associated with this type of pain can be identified, more effective treatment options can be considered, Smith said.

5 QUESTIONS

The Heart of Happiness

Julia Boehm explores the link between optimism and cardiovascular health.

Happiness might sound like just a feel-good topic for research. But it's a serious subject with multiple implications for health and longevity. Julia Boehm, Ph.D., assistant professor in Chapman University's Department of Psychology, is funded by the National Institutes of Health to examine how happiness and optimism may impact cardiovascular well-being. We asked Boehm about her research.

Julia Boehm, Ph.D. *Photo by Dawn Bonker*

HOW DID YOU GET INTERESTED IN STUDYING HAPPINESS?

It goes back to when I was working on my senior thesis in college, which was about rumination – when people think repetitively about negative events in their lives and they can't get out of it. In my thesis research, I came across the field of positive psychology. Its focus is on people's strengths or the things that people are doing right in their lives. After graduate school, I was able to expand my interests to the relationship between happiness and health as a postdoctoral research fellow at Harvard School of Public Health. My research suggests that happy, optimistic people tend to have reduced risk of cardiovascular disease.

WHAT DO WE KNOW ABOUT THAT?

A growing body of evidence suggests that happier people are healthier, but we don't have a firm understanding of why. Two of the most widely proposed explanations are that happiness impacts health through health behaviors or some direct effect on physiology. However, the research to support such explanations is still in the beginning stages. For example, we don't know whether happiness and related constructs such as optimism promote healthy behaviors, or whether engaging in healthy behaviors fosters happiness. It is the old chicken-and-egg question. Some of my most recent work is trying to disentangle these questions.

WHAT ARE YOU LEARNING?

We are discovering that happiness often precedes healthier behaviors and healthier physiological profiles. For example, my research has found that as people age, those who are happy tend to eat healthier diets and engage in more physical activity than their less happy peers. Happier people also tend to have healthier levels of high-density lipoprotein cholesterol and triglycerides.

WHAT DATA SETS DO YOU USE?

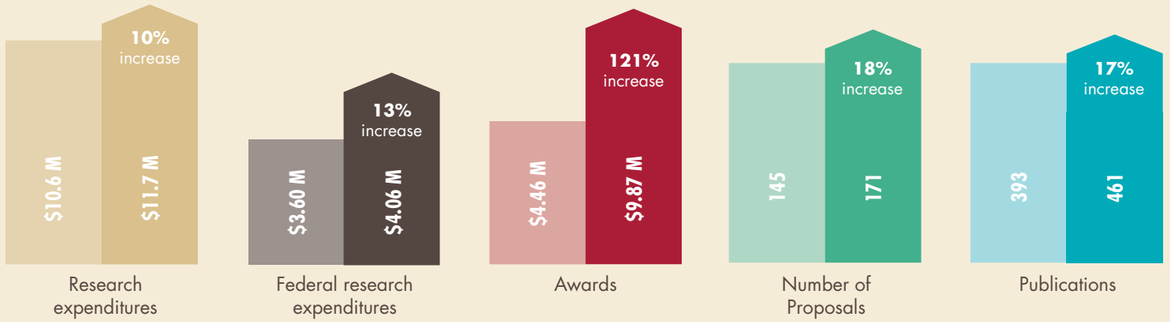
We try to get data from large, epidemiological cohorts that are longitudinal in nature. In other words, we want to be able to follow many people across years or even decades. With baseline measures of happiness or other psychological strengths, we can predict who develops poor health behaviors or a poor biological profile. Not many datasets fit these criteria, but I've done a lot of work with the Whitehall II Cohort and the English Longitudinal Study of Ageing from the U.K. From the U.S., I've used the Midlife in the United States Study. Most recently, I received a grant to work with the 1958 National Child Development Study from the U.K. It follows more than 10,000 children born in 1958 through midlife. That data measures psychological characteristics in early childhood. Our patterns of thinking and behavior are pretty well ingrained by the time we are adults. Yet children who are still developing have the potential to improve their psychological health. If we know that 10-year-old David tends to get a little sad or think pessimistically, interventions could be developed to foster his happiness and optimism, with the potential to improve cardiovascular health down the road.

HOW MUCH OF OUR HAPPINESS IS WITHIN OUR CONTROL?

There's debate about this in the literature. Some people estimate as much as 50 percent is genetically determined, with life circumstances making up another 10 percent. This leaves a substantial part of happiness that is under a person's control. So there is room for targeted interventions. They're not easy, though. It's something that people have to exert effort to do. It's kind of like losing weight. Nonetheless, evidence suggests that strategies such as expressing gratitude or doing kind acts for others can boost a person's sense of happiness.

RESEARCH ON THE RISE

Since 2006, publications by Chapman University faculty have climbed by a factor of 10, while research expenditures have quintupled. That upward trajectory continued in fiscal year 2017-18.



Other Numbers of Note

140,000 SQUARE FEET

Size of new Keck Center for Science and Engineering, the largest building project in Chapman's history. With its opening in June 2018, the Keck Center heralded a new era for innovation in science and technology.

51%

Percentage of incoming students interested in pursuing faculty-led research.

32

Number of faculty in the Million Dollar Club, recognizing those who have received more than $1 million in external support for their research.

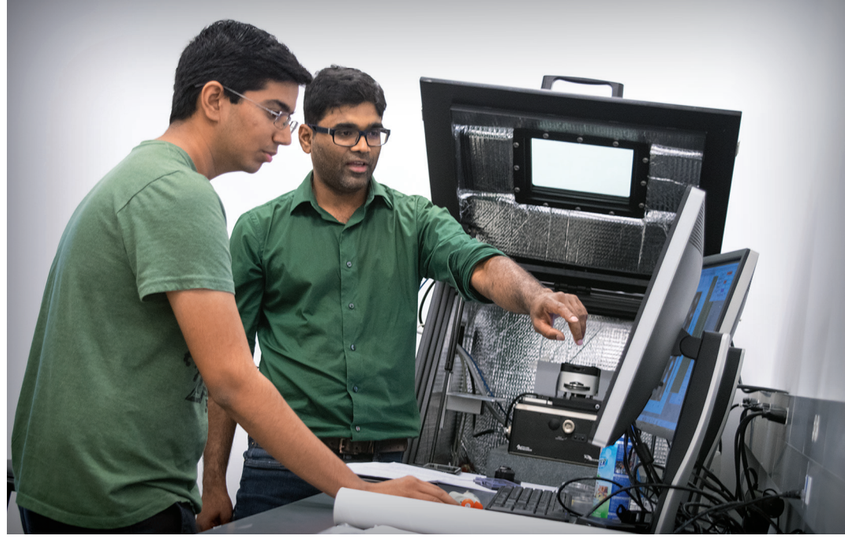
$7M

Amount of the largest federal award granted to Chapman, by the National Institutes of Health.

IN TOUCH WITH THE NANOMETRIC WORLD

The atomic force microscope uses feel rather than optics to help researchers see what otherwise would be a mystery.

BY HALLIE NICHOLSON (M.A. '14)



Researcher Molla Islam, right, gets help from high school student Anirudh Sharma as they examine polymers at the nanometric level. *Photo by Livi Dom '20*

Remember your first explorations into microscopic worlds? Perhaps it was in grade school, where a drop of pond water teemed with tiny organisms that made science come alive.

Chapman University researcher Molla Islam, Ph.D., still lives in such a world. Except that now his investigations are magnified to the molecular level.

He and his colleagues are using a new atomic force microscope to study polymers at the nanometric level. It's just one of the tools advancing research in the recently opened Keck Center for Science and Engineering at Chapman. In this 140,000-square-foot space, students are using advanced equipment for research across a range of fields, from cancer biology to materials science and quantum computing.

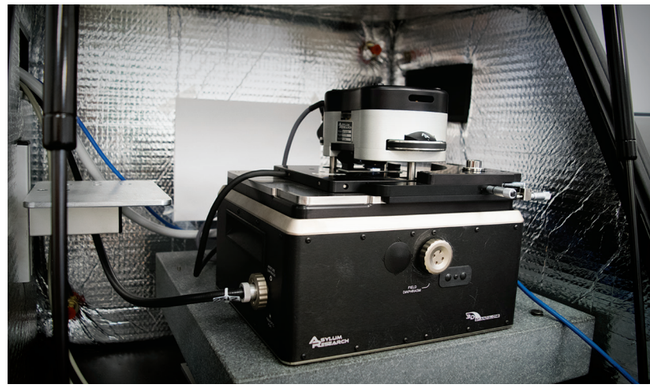
The atomic force microscope provides insights into the structural and mechanical properties of materials by taking measurements for three-dimensional high-resolution imaging down to about a billionth of a meter.

The device actually uses force, or feel, rather than optics to help researchers see what otherwise would be a mystery, Islam says. A mind-bogglingly sensitive crystal probe affixed to a cantilever taps the surface of a material, sensing the atomic interactions of particles. What results is a bumpy topographical map of the particles or material.

Examining such small particles and their properties can help drive innovative solutions to global challenges. At Chapman, Andrew Lyon Ph.D., dean of the Schmid College of Science and Technology, and Islam are studying polymer nanoparticles for potential applications as artificial platelets.

The equipment allows the researchers to see how the polymers interact. Are they drawn to each other, or are they repelling? This research could lead to breakthroughs in managing uncontrolled bleeding or building artificial muscle. For more on the team's research, turn to page 28.

"The AFM is one of the few microscopes that can look directly into the molecular world," Lyon said. "We no longer infer the shapes, sizes and structures of molecules – we directly observe them."



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