# FUELING DISCOVERY

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College of Letters & Science
UNIVERSITY OF WISCONSIN–MADISON

COLLEGE OF LETTERS & SCIENCE

# Curiosity-driven research fuels life-changing discovery at L&S

ERIC M. WILCOTS

What is the role of research — the act of discovering — today? It is the means by which we, as a society, seek to understand the world around us. It teaches us about what it means to be human and how we, as humans, interact and connect with each other. It drives innovation and technological advancement.

There are times when discovery is uncomfortable; when our research reveals truths that may challenge conventional wisdom or our perceptions of ourselves or the world around us. That is when research and discovery are most valuable and our support of that process was enshrined by the Board of Regents in 1894 in the famous statement: "Whatever may be the limitations which trammel inquiry elsewhere, we believe that the great state University of Wisconsin should ever encourage that continual and fearless sifting and winnowing by which alone the truth can be found."

This "Fueling Discovery" supplement to the Wisconsin State Journal is our annual celebration of the many acts of "sifting and winnowing" that happen every day in the 37 academic departments and more than 60 interdisciplinary research centers that make up the College of Letters & Science at the University of Wisconsin-Madison.

We asked faculty from across the college to write about their own research in their own words, not for the professional peers with whom we are so used to discussing our work, but in the spirit of the Wisconsin Idea.

It is our mission, and that of the university, to address and tackle the most challenging and important questions of our time.

It is also our mission to provide a transformative experience for our students.

While our faculty and graduate students are often on the front lines of discovery, participation in research has a lasting impact on our undergraduate students, as well.

Being able to work with faculty as an undergraduate shaped my own career, and we want our students to have that same experience. Therefore, in this edition of "Fueling Discovery" we also recognize and celebrate the undergraduate research experience in the College of Letters & Science.

My colleagues in L&S are motivated by questions of how and why.

We seek to understand the natural world we inhabit, from the way glaciers form, to the chemical composition of our universe. We strive to understand how we as humans interact with one another, from our politics to our family systems. L&S researchers also delve into the creative expression that has reflected our hopes, dreams and challenges over time.

Understanding the stories we tell and write and the art and music we create, leads to a greater understanding of who we are as human beings.

We pursue not only curiosity-driven research, but also research inspired by a need to understand our interactions in a world tied to computing and data. Our computing, data and information scientists are exploring ever-more exciting ways of leveraging data and advancing technology to better understand, and improve, our world.

The profound importance of curiosity-driven research is its impact on future generations. The things we take for granted today – the knowledge, technology and understanding –all came from curiosity-driven research that led to discovery years, decades or even centuries ago.

By fueling discovery today, we are investing in our future and that of our children and the world they will inherit.

## About the dean

**Eric M. Wilcots** is the dean of the College of Letters & Science, having been named to the position after serving as interim dean from August 2019-May 2020. Prior to assuming that role, Wilcots served as deputy dean, charged with overseeing the college's efforts on a wide range of initiatives, including inclusivity/diversity, undergraduate education enhancement, research initiatives and research services.

He is also the Mary C. Jacoby Professor in the Department of Astronomy, which he joined in 1995 and chaired from 2005-08. Wilcots' research focuses on the evolution and environment of galaxies and groups in which they reside through the lens of radio wavelengths.

In addition to his academic research and classroom work, he has won two teaching awards during his time at UW-Madison, including the Chancellor's Inclusive Excellence Teaching Award, and has served as the co-chair of the Wisconsin Science Festival Steering Committee.

## INDEX OF CONTRIBUTORS



## ABOUT THE SECTION

"Fueling Discovery" is a joint effort of the UW-Madison College of Letters & Science and the Wisconsin State Journal. No taxpayer dollars were used to create the section. The effort was financed through sponsorships and gifts from alumni and friends.

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PHILANTHROPY

# Advancing UW through philanthropic partnership

STEVE KEAN

Academic year 2021-2022 will be transformative for the University of Wisconsin and for the College of Letters & Science. This fall, UW-Madison welcomed the largest and most diverse first-year class in the university's history. The extraordinary minds in departments throughout the college are leading groundbreaking research in areas as varied as climate change, quantum computing and racial equity. Every day, the UW is helping our state meet the challenges of the present to build a better future, and it is the generosity of donors that makes these achievements possible.

This fall, we celebrate the end of the Wisconsin Foundation and Alumni Association's All Ways Forward campaign, which has been the largest, most successful fundraising effort in the history of the university and the College of Letters & Science. In 2013, we set a goal to raise $3.2 billion to enhance the student experience, support faculty excellence and increase scholarship support for graduate and undergraduate students. We significantly surpassed this goal because thousands of donors from around the state and around the world recognized their supportive role as partners in helping the students and faculty of the College of Letters & Science achieve great things.

This philanthropic partnership with donors large and small has allowed the College of Letters & Science to endow more than 90 new chairs and professorships since 2013 and allowed UW-Madison to retain and attract world renowned faculty. It is through the generosity of donors that Bucky's Tuition promise extends a UW education to students for whom cost might otherwise put that opportunity out of reach.

The College of Letters & Science is a remarkable institution made exceptional because of the partnership, kindness and generosity of thousands of people throughout the state and around the world. Thanks to them, we are able to ensure that the College of Letters & Science has the tools it needs to empower young minds and shape our future. I invite you to become one of our partners.

## About the author

**Steve Kean** is associate vice president and managing director of development at the Wisconsin Foundation and Alumni Association, leading 16 development professionals working on behalf of the College of Letters & Science.

## Making a gift

Consider making a gift to the College of Letters & Science by visiting www.allwaysforward.org/schools-colleges/ls or contacting Steve Kean at steve.kean@supportuw.org or (608) 308-5513.

## All ways forward

Find out more about the university's All Ways Forward campaign at www.allwaysforward.org.

JEFF MILLER, UW-MADISON

UW's crest flutters in an autumn breeze on Bascom Hill.

DEPARTMENT OF PSYCHOLOGY

# Building healthy brains

SETH POLLAK

Working with students to understand the societal importance of developing strong mental health is a driving force within the Department of Psychology.

I study how stress affects the way children learn. Many of my students are interested in understanding how our brains make complex behaviors possible, and many are interested in working to improve health and societal problems.

One of these problems is child poverty, which is now considered by pediatricians to be one of the most serious health issues facing children. Nearly 40% of children in the United States live in poor or near-poor households — that is about 13 million kids. And that number is currently growing, since so many families are experiencing job and income losses because of COVID-19.

Many people are shocked that a country as powerful as ours has so many infants and children that do not have enough resources (food, shelter, medicine) to meet their basic needs. In fact, concern for infants and children living in poverty is shared by citizens and politicians across the political spectrum. For humanitarian reasons, this situation is deeply troubling to many, but there are also many practical problems that stem from child poverty.

These children tend to do poorly in school, earn less money over their lifetimes, have worse health as adults (even if they move out of poverty), and have less of a sense of psychological well-being during their lives—leading to more psychological and behavioral problems. Together, these problems cost our country trillions of dollars.

What we now understand about humans is that our social experiences interact with our genes to build the networks of fast, efficient connections that become part of the architecture of our brains. The kinds of experiences that we have in infancy influence which brain circuits grow and are strengthened. Learning to deal with stress is an important part of healthy development. But when a child experiences extreme or frequent adversity — very difficult experiences such as abuse, neglect, caregiver substance abuse or mental illness, exposure to violence, family economic hardship — without adequate adult support, unhealthy responses can be triggered in the body.

These unhealthy processes can then affect the child's ability to develop what we call "core life skills." These include: being able to make plans; focus our attention; be aware of our environment and other people; control our behavior so that it is appropriate for a situation; and remain flexible so that we can adjust to changing social demands. Although extreme stress can hinder the growth of these life skills, it's never too late. These skills can be learned and practiced well into adulthood. The important thing is to try to help children develop these abilities early in life, so they have the most opportunity to use and benefit from them in their early social and educational experiences.

My UW-Madison students and I are examining how extremely stressful experiences can influence the way our brains process information: how we figure out what other people might be feeling, when a situation might be risky or dangerous, and how we are able to soothe or comfort ourselves when we get upset.

In addition to cognitive skills, such as learning math and reading, these social skills play a huge role in helping people to successfully navigate the complexity of modern life. The studies in my laboratory are helping us to understand how these brain processes work, in the hope that policymakers can then create effective educational interventions and strive to help all children reach their potential.

Working on these projects has helped UW-Madison students launch both research and applied careers in fields such as pediatrics, public health, economics, clinical psychology, and education. The healthy development of all children is essential for a thriving and prosperous community, and we now know a great deal about how child development works, as well as how to prevent and address problems.

We are continuing to use insights from cutting-edge science to improve the well-being and long-term life prospects of the most vulnerable children in our society.

## About the author

**Seth Pollak** is a professor in the Department of Psychology. His research and teaching focus on children's brain and behavioral development, with particular emphasis on emotions, learning and children's health. He is currently working on projects to improve the educational and social outcomes of children living in poverty and other stressful circumstances.

SCHOOL OF JOURNALISM AND MASS COMMUNICATION

# Turning the tide of polarization

## About the author

**Michael W. Wagner** is a Professor of Journalism and Mass Communication at the University of Wisconsin-Madison, where he also serves at the Tommy G. Thompson Center on Public Leadership, the Elections Research Center and the Mass Communication Research Center. Wagner's research and teaching focus on the ways that mediated information flows through society to influence how well democracy works.

MICHAEL W. WAGNER

When it comes to civic life, Wisconsin has been precursor, test-bed and microcosm of what was happening, and would happen, across our divided country.

Contentious political battles between rural and urban citizens, protests connected to the Black Lives Matter movement, and disagreements about COVID-19 policies contribute to nearly half of Wisconsinites reporting that they have stopped talking politics with someone because of a political disagreement, while another 20 percent have outright ended a friendship over politics.

Over the same decade, our research team has been observing Wisconsin, trying to understand how political life here has become so contentious, divided and chaotic.

We want to shed light on behaviors and practices that help maintain democracy and renew civic life in our state. Understanding these fissures — their causes and effects — is a critical first step toward combatting disinformation and rebuilding a functional society.

We examine multiple layers of the communication ecology together—from newspapers and television to talk radio and individual conversations to social media and mobile technology—and study how their interactions shape what people believe, want, and do.

What have we learned? In short, information matters. Experiments, surveys and in-depth focus group interviews reveal that what our leaders say and how they say it shapes our attitudes and who we blame for our problems. Our content analyses show that our news media choose to cover ideological extremists, skewing our perceptions of the divides between us.

Our harvesting of billions of tweets and thousands of public-facing Facebook posts shows that social media can be a place where toxic attitudes and dangerous misinformation spread with the ferocity and devastating consequences of a wildfire.

Moreover, our attitudes about the information we consume matters. One set of experiments we conducted showed that while journalistic fact-checks can help people become more accurate in their understanding of what is verifiably true, fact-checks are also perceived to be biased, potentially diminishing trust in the very news media doing the fact-checking.

Another survey experiment we conducted revealed that people think bad news—their preferred presidential candidate trailing in the polls—is biased while the same bad news, but for the other party's candidate, is unbiased.

We have also learned that information interacts with the contexts people live in. Linking county-level economic data with public opinion surveys, we found that when economic situations improved in Wisconsin counties, people living in those counties developed more polarized attitudes about leaders and political groups than those in counties that were hurting. That is, when things are good, many of us retreat to our partisan corners and when things are bad, we are willing to look across the aisle for help.

Besides hard times, what might help turn the tide of partisan polarization and political contentiousness?

At the individual level, our team's work suggests that a willingness to listen to others, efforts to foster an "accuracy motivation" (learning what is true) as compared to a "directional motivation" (looking for evidence that my side is right), a balanced information diet, and a willingness to admit what we don't know are critical factors that can improve what people know about politics and promote support for democratic processes and outcomes.

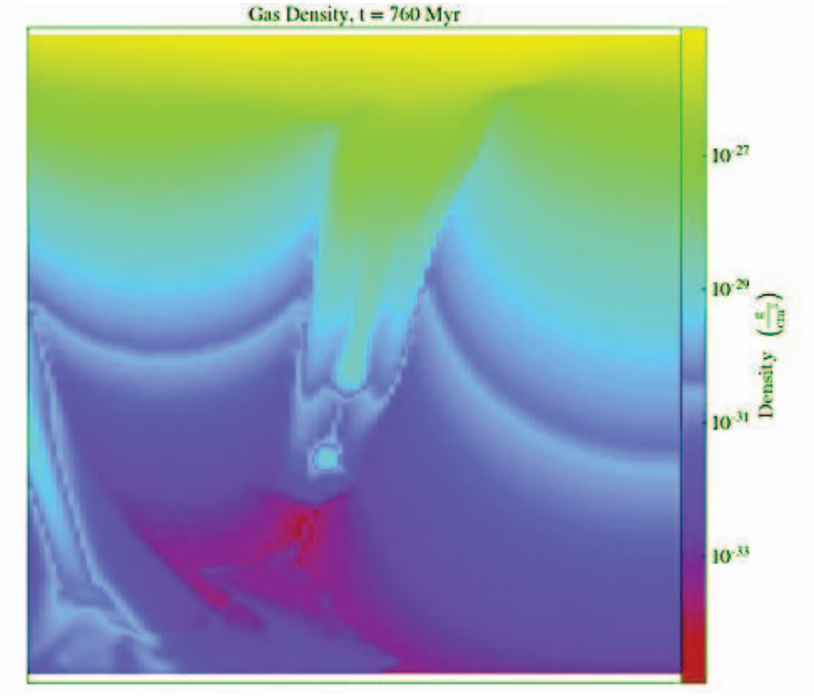
At the institutional level, there are many popular things our leaders can do to help rebuild civil society. For example, the public strongly prefers that our leaders make redistricting nonpartisan, ensure that the rules of governing do not change based upon who wins an election, and give a voice to those who are not in the majority.

We have shown that Wisconsin has been ground zero for the national divide. Our research also suggests it can be a leader for reknitting the civic fabric as well.

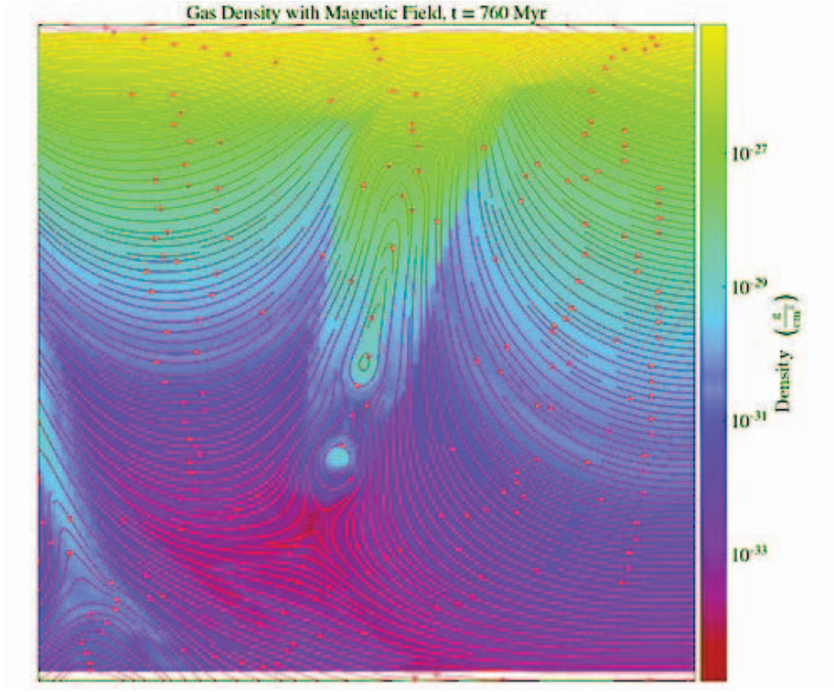
**We want to shed light on behaviors and practices that help maintain democracy and renew civic life in our state. Understanding these fissures — their causes and effects — is a critical first step toward combatting disinformation and rebuilding a functional society. We have shown that Wisconsin has been ground zero for the national divide. Our research also suggests it can be a leader for reknitting the civic fabric as well.**

Act 10 protests in Wisconsin, a time which kicked off an enormously contentious period in the state's politics.

DEPARTMENT OF ASTRONOMY




The gas bubbles shown in the center of this plot shoot out from the simulated galaxy at high speed and temperature. The bottom of the galaxy, shown in yellow, ejects some of its gas further into space to make this happen. Many similar structures appear above and below the galaxy.




The magnetic field lines in red imply that the gas bubbles are strongly influenced by magnetic forces. The small loops imply that the motion of the gas bubbles is driven by magnetic reconnection, when field lines cross and change shape.

# Revealing new mysteries in galaxy formation

SHERRY WONG

New developments in software and increased computer capabilities have given researchers better tools. I am using computer simulations to understand how galaxies form and evolve over millions of years. I originally came to UW-Madison seeking research opportunities, and I was fortunate enough to be matched with Ellen Zweibel, a professor of astronomy and physics, as a freshman. My research question is based on how magnetic fields and cosmic rays can affect a galaxy over time.

Like a bar magnet, the Earth has a magnetic field with north and south poles. Galaxies also have a magnetic field that can affect how particles move in space. Over time, this magnetic field can evolve and shape the gas in it.

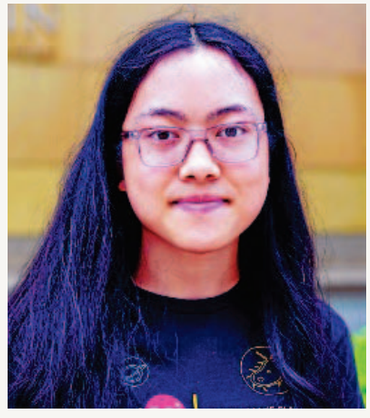
Cosmic rays are energetic particles that move close to the speed of light. They are released by energetic events like supernovas and active galactic nuclei. They also affect how particles move by adding heat or kinetic energy. Both factors can affect gas clouds and determine a galaxy's thickness.

In my research, I am studying the evolution of hot, dense gas bubbles that shoot out from the simulated galaxy. They are driven by magnetic reconnection and cosmic rays. Magnetic reconnection occurs when magnetic field lines cross and change shape, resulting in heated, accelerated gas.

This reconnection is a result of something called the Parker instability. In galaxies, the Parker instability models how magnetic fields will warp as they are weighed down unevenly by gravity. It is this warping that draws magnetic fields together and causes reconnection. Reconnection is responsible for solar flares on our Sun, a phenomenon that occurs when the Sun ejects some of its mass into space.

We want to know more about the forces that drive these bubbles, their features and how they can affect the larger galactic system. By running simulations, we can attempt to answer these questions. Astronomers have already observed hot gas bubbles in space, but we know little about bubbles created by reconnection. I have been learning about the physical phenomena that drive the behavior modeled in these simulations, and how to unpack those behaviors from the simulations. I am currently in the process of learning how to run these simulations myself using resources from the Center for High Throughput Computing at UW-Madison.

Working with Professor Zweibel and graduate student Roark Habegger has taught me things about the world of research that can only be learned through experience, like how to reach out to other researchers, what it means to be a scientist, how to set your own goals and how to work with tools and knowledge that are always changing.



## About the author

**Sherry Wong** is from New York, N.Y. She is majoring in computer sciences, but is also interested in astrophysics and data science. She expects to graduate in May 2024.

DEPARTMENTS OF CHEMISTRY AND ASTRONOMY

# The chemistry of space

SUSANNA WEAVER

One of my most vivid memories is receiving a telescope for Christmas when I was in kindergarten. My Dad and I spent Christmas night with the telescope set up on a snow drift in our front yard, looking at the moon, Venus and Mars. I was fascinated by the beauty and complexity of the surfaces of these celestial objects. I found myself wondering what they were made of, and what else was out there in space.

I spent the rest of my childhood and adolescence pursuing as much space-related knowledge as I could acquire. I was convinced I wanted to be an astronaut. Then I took science classes in high school and discovered hands-on experiments. My high school chemistry teacher encouraged my curiosity in this area. It was from this same teacher that I learned that I could combine my love of astronomy with my passion for chemistry in the new and rapidly growing research field of astrochemistry.

The discovery of astrochemistry as a field of research and the potential for astrochemistry research as a career option set my path in life. As an undergraduate, I spent four years analyzing meteorite samples. I joke that in graduate school my choice was between rocks (more meteorite studies) or telescopes (observational astrochemistry). I chose the latter and that has been the focus of my career.

I am now the Vozza Professor of Chemistry and Astronomy at UW-Madison, where I lead a research team that explores the chemistry of space through laboratory experiments, astronomical observations, and modeling. My research team examines the chemistry of star and planet-forming regions in space. We use our observations and knowledge of chemistry to predict what molecules might form. Most of our searches focus on what are called "prebiotic" molecules—the small molecules that make up the ingredients of life as we know it on Earth.

DZIKA_MROWKA

What astrochemists have learned thus far is that the chemistry in space ranges from the bizarre to the conventional.

Our research tries to answer these questions: Which molecules might form in space and can we detect them? How and where are these molecules formed? What other interesting chemistry might occur beyond that which we see on Earth? If we find prebiotic molecules in other solar systems, what does that tell us about the chances of finding life elsewhere in the universe? Are there other planets like Earth that could be harboring their own unique version of biology?

What astrochemists have learned thus far is that the chemistry in space ranges from the bizarre — highly reactive and unstable species that cannot be isolated under normal laboratory conditions on Earth — to the conventional — molecules that we use in every undergraduate laboratory class at UW-Madison.

We even find molecules that you have in your cabinets at home! Glycolaldehyde is the simplest sugar-related compound, and my research has led to the detection of it in several star-forming regions. We know that space also has large quantities of methanol and ethanol, more commonly known as wood alcohol and alcohol. Some regions of space also contain acetone, which is used as nail polish remover; ethylene glycol, commonly used as antifreeze; and ethyl formate, which smells like raspberries.

The list of known molecules keeps growing, and each new molecule that we find gives astrochemists more clues to the fascinating chemistry and perhaps biology that might be out there in the far reaches of space.

The next time you look up at the night sky and wonder what is out there, don't just think about the stars and planets that you can see with your eyes. Remember that there is an incredible variety of other material yet to be explored.

## About the author

**Susanna Widicus Weaver** is the Vozza Professor of Chemistry and Astronomy. An expert in astrochemistry, molecular spectroscopy, and observational astronomy, her research explores the formation of prebiotic molecules during star- and planet-formation. Her work combines laboratory, modeling, and observations to examine the chemistry of space and explore the origin of life in the universe.

DEPARTMENTS OF AFRICAN CULTURAL STUDIES AND COMPUTER SCIENCES

# The Ubuntu approach to research

SHERIFF M. ISSAKA

As a first-generation college student in a new country, there were so many unknowns with respect to culture, conduct, academics, interests, foods, accents and more. However, these pale in comparison to navigating a colossal college machinery of more than 45,000 students to find an understanding of myself and the world.

I identified early on that merging my African background with my computer sciences training would help facilitate my navigation and growth process.

I didn't hesitate to tackle difficult and challenging topics. After presenting on the bigotry promulgated by Artificial Intelligence (AI) systems, including denying people kidney transplants, tagging them as apes and giving them longer prison sentences largely because they were Black, my class instructor introduced me to Reginold Royston, an assistant professor of African Cultural Studies whose work, he said, might interest me.

He was not wrong. Professor Royston's work sought to merge two seemingly unrelated fields: technology and African Studies. Through the Undergraduate Research Scholars (URS) Program, I worked with Professor Royston on examining technologies and their transnational influences, with a focus on AI in sub-Saharan Africa. This research, driven by a qualitative and humanities-based approach, allows me to analyze technologies with an eye towards equity and accessibility, and to see technologies as channels through which issues of gender, race, creed, and class can be perpetuated or mitigated.

After a year of working with Professor Royston and advancing my technical and analytical understanding of AI, I started my second research project with Professor Michael Ferris of the Department of Computer Sciences.

In this research, I use data from dairy farms across the Midwest to create machine learning models that attempt to effectively predict how well cows convert feed into milk. This research gives me a fundamental understanding of advanced technologies and algorithms.

Both of my research mentors' insistence on optimal results pushes me to learn and grow daily. This growth process involves understanding that those most affected by technologies are those least represented in their creation, and that I am not too small to influence change.

Inspired by this premise, I started the AI4Afrika@UW project, which allows undergraduate students to engage in research geared towards creating responsible, equitable and accessible technologies. Currently, students on this project are building machine translation systems for African languages, creating a mobile application that is optimized for minimal hardware and internet, and building a chatbot that provides instant and reliable information on mental and menstrual health issues. Researchers on this project are guided by the African ideology of "uBuntu" that affirms the positive values of community, difference, anti-racism, hospitality, and openness to others.

As I wrangle data and scratch my head to build robust systems and analysis for my research projects, I know that every second spent brings me closer to understanding myself and my community. Leveraging these humanities and technical dimensions beyond my research, I am able to navigate my world knowing I am growing into a better student, a better leader and a better member of society.

HENRY OBENG

Some of the amazing faces behind AI4Afrika. From left to right: Dr. Patrick Jackson, Dr. Reginold Royston, Sydney Abrahamson, Dr. Whitney Sweeney, Sheriff Issaka, James Sutanto, Jason Sutanto, Dr. Steven Wangen, Zhaoyi Zhang, Rukaiya Abdullah, Siyu Huang, T Leah Spencer, Zhengzhi Chen, Dr. Steve Goldstein, Keyi Wang.

## About the author

**Sheriff Issaka**, from Ghana, is majoring in Computer Science with certificates in Entrepreneurship and African Studies. He is an undergraduate researcher with Professors Reginold Royston and Michael Ferris, in the African Cultural Studies and Computer Science Departments respectively. He expects to graduate in May 2022.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DEPARTMENT OF GEOSCIENCE

UW-Madison researchers at Saskatchewan Glacier in Banff National Park. From left to right: Collin Roland, Dougal Hansen, Emily Schwans, Nate Stevens and Luke Zoet.

# Studying glaciers, from field to freezer

LUCAS (LUKE) ZOET

Glaciers move, and relative to other geologic processes, a "glacial pace" is quite fast. Glacial ice flows downhill much like a slow-motion river, but unlike a river, most of the motion comes from the ice slipping over the material below.

Envision placing an ice cube on an inclined board and watching the pull of gravity causing it to slip downhill. This glacial slipping action causes the glacier to shape the ground underneath it. Most of the land in Wisconsin was overridden by glaciers during the Wisconsin glaciation, and so the shape and appearance of the landforms are a direct result of glacier slip, from the rise up to the State Capitol and Bascom Hill to the shape of the four lakes of De Jope.

Glacier slip is also the main way in which glacier ice is discharged into the ocean and is a primary contributor to sea-level rise. Although the impacts of glacier slip are integral to our lives —from the formation of landscapes to the rising oceans — the process is poorly understood by scientists.

Over the decades many theories have been proposed to interpret glacier slip, and countless heroic field campaigns have been conducted to gather the necessary observations, but it can be difficult to directly test the theories from field data.

To address these limitations, we have constructed one-of-a-kind laboratory devices at UW-Madison that are capable of directly simulating glacial slip in a controlled environment. These devices have allowed us to test the existing theories, and we have used them to develop new theories where existing ones have fallen short. One such apparatus is a large-diameter cryogenic ring shear housed in a walk-in freezer.

The ring shear can spin a ring of ice (60 cm in diameter) over various materials commonly found at the bases of glaciers. We can spin the ice ring at a range of velocities and stresses, simulating the full span of conditions that natural glaciers experience.

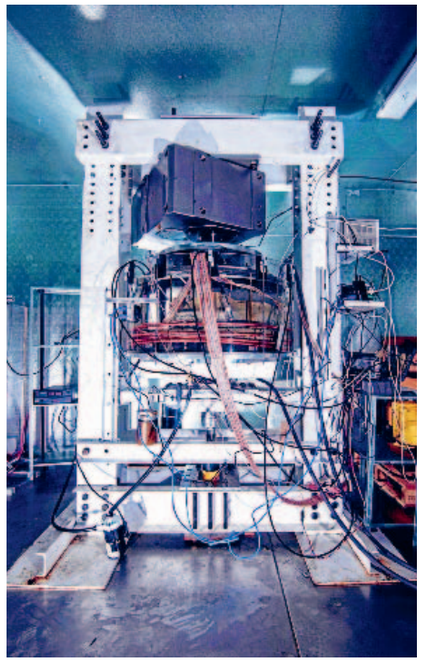
This approach is new in glaciology, a field that has virtually no experimental branch, and from these devices we have been able to test and observe the fundamental mechanics of glacier slip in order to determine the correct theories for predicting glacier motion.

We are then able to check these theories against field observations.

To examine glacier slip from the field, we pack up a wide range of geophysical

BRIAN BARBER, CC BY-SA 4.0 <HTTPS://CREATIVECOMMONS.ORG/LICENSES/BY-SA/4.0>, VIA WIKIMEDIA COMMONS

Saskatchewan Glacier.



ETHAN PARRISH

Large-diameter cryogenic ring shear housed in a large walk-in freezer.

instrumentation (seismometers, GPS, water pressure transducers, weather stations) and make our way to existing glaciers to deploy them. Graduate students at UW-Madison have led such projects over the past few years on glaciers in Banff National Park, in Canada, and in Alaska's Chugach Range.

Over two seasons in Antarctica, we plan to place more than 200 seismometers on Thwaites Glacier, possibly the most important glacier in the world because of its potential to destabilize the West Antarctic Ice Sheet. From these field observations we can validate and refine our theories created in the lab.

Our field and laboratory work depend heavily on the efforts of UW-Madison undergraduate students, graduate students and engineers.

Ultimately, the work is helping us answer questions about how fast sea-level rise might occur, and why the places we live look the way they do. This understanding, critically informed by work at UW-Madison, will help scientists create more accurate models to predict and plan for our future.

Every time you ride your bike up around the Capitol Square or Bascom Hill, remember to thank a glacier for the workout.

**Every time you ride your bike up around the Capitol Square or Bascom Hill, remember to thank a glacier for the workout.**

## About the author

**Lucas (Luke) Zoet** is an associate professor in the Department of Geoscience. He is an expert in surface processes, focusing on the physics of glacier motion and coastal erosion. His work develops physically-based mathematical rules that describe how glaciers move and shape landscapes and how the Great Lakes alter their shores.

MEAD WITTER SCHOOL OF MUSIC


Ad for Pathé recordings of James Reese Europe and army band.

Aida Overton and George Walker Dancing the Cakewalk in London c. 1903, published in the London *Tatler*.

# The mad, 'bad' world of Ragtime

SUSAN C. COOK

Ragtime music, characterized by distinctive energetic syncopation, and the social dancing that went along with it, was always about more than music and dance.

Ragtime achieved transatlantic popularity in the late 1800s, at a time of great social and technological change, so studying its history opens up a host of other issues to explore: recording technology, new kinds of public spaces, commercial entertainments, urban industrial lifestyles, the changing roles of women, the formative presence of Black American professional entertainers, and the place of the United States as an emerging superpower.

I am interested in how ragtime music and dance became part of a larger process of transition and change in American life across the multiple boundaries of gender, race, class, citizenship, education, and national identity.

What is ragtime? Most of us know it as the lively, upbeat piano solos of Scott Joplin, but ragtime was performed on all kinds of instruments and by groups, including John Phillip Sousa's band. At the time, ragtime and its surrounding culture raised considerable concerns.

Many found the music offensive, the dancing objectionable, and the popularity of both with young people verging on a mental health crisis. Why? As my research shows, the disdain and even fear directed towards ragtime came from its origins in the music and dance of formerly enslaved African Americans. Following emancipation, Black performers, both male and female, occupied increasing central roles in popular entertainments. While many of these entertainments continued to rely on the racist caricatures central to the blackface minstrel show, some African American performers found ways to call blackface stereotypes into question through ragtime, and to create their own shows that depicted a complex view of Black American life.

Given the minstrel show's transatlantic popularity, many Black performers achieved notable success with their entertainments overseas. This angered U.S. critics, who resisted an American music defined by African Americans and rooted in the traumatic legacy of slavery.

As a way to demonstrate just how important and culture-changing these musical and kinesthetic activities were, I looked for ragtime's presence on our own campus. The student newspaper, the Daily Cardinal, provided abundant evidence of opportunities to dance to ragtime and advertisements demonstrate the easy availability of ragtime recordings.

The university archives reveal faculty concerns about what young people were

Publicity photograph of James Reese Europe and His Society Band, c. 1912. Europe is seated at the piano.

up to, and there's evidence that this white, educated, elite group wished to reassert control. Was dancing a healthy pursuit, as many had argued over the centuries or, like a social disease, did ragtime bring risks to young, unsuspecting, working women and "co-eds" caught up in its intoxicating whirl?

My research largely ends with the entrance of the U.S. into World War I and the advent of the postwar "jazz age." Trench warfare, mass destruction and the realities of shell shock, of course, were more horrific than any of the dance "madness" social critics feared. Black musicians, like composer James Reese Europe, who worked with white ragtime dancers Irene and Vernon Castle, volunteered for the U.S. war effort, and as part of Black Army bands, continued to share their distinctive music with allies.

Following the war, these musicians provided American popular culture to Germany, Russia and Scandinavia. World War I, however, did not bring the hoped-for racial equity that Black soldiers and their families at home sought through enlisting. And the Roaring Twenties, with its new sounds and dances, further overshadowed their earlier dance and music contributions as more white performers took up jazz and its dances.

However, I argue that the power of ragtime, and its identification with African American practices and an emerging youth culture, remained at play through jazz, blues, rock 'n' roll, disco, and hip hop. Ragtime gave rise to the sounds of the 20th century.

**The power of ragtime, and its identification with African American practices and an emerging youth culture, remained at play through jazz, blues, rock 'n' roll, disco, and hip hop. Ragtime gave rise to the sounds of the 20th century.**

## About the author

Music historian **Susan C. Cook** is director of the Mead Witter School of Music and has been a faculty member since 1991. Her research focuses on American musics of all kinds and demonstrates her commitment to feminist methodologies, interdisciplinary cultural criticism, and to demonstrating the power of music to create meaningful change.

COLLEGE OF LETTERS & SCIENCE

## About the authors

**DeVon Wilson** (top) is the inaugural Associate Dean for Diversity, Equity and Inclusion in the College of Letters & Science at the University of Wisconsin-Madison. Throughout his 30-year career, he has advanced strategic inclusion, equity and diversity priorities in areas that include systems and innovation, program administration, and policy.

**Hannah E. Bailey** is Director of the Undergraduate Research Scholars program and an Assistant Dean in the College of Letters & Science. A 2010 graduate of UW-Madison, she is now writing a doctoral dissertation that explores racial and ethnic identity formation during the Atlantic slave trade and the implications those colonial identities have today.

# Undergraduate research opportunities ignite passions

DEVON WILSON AND HANNAH BAILEY

**DeVon:** On April 6, 2021, I jubilantly received my second vaccination shot, and then sat for those necessary 15 minutes of observation feeling happy and relieved, yet bittersweet. I reflected on the past year navigating life with a mask on; working remotely using new technologies; quarantining away from family and friends; missing those who passed away in isolation; and thinking I would not see this day of vaccination because of my own struggles. I remembered the frustration of trying to convince family members to get vaccinated, and the sadness for those who died because of the virus.

Shortly after this, I learned that one of the scientists whose work is responsible for the life-saving vaccine is Dr. Kizzmekia "Kizzy" Corbett, a Black female viral immunologist at the National Institutes of Health (NIH), National Institute of Allergy and Infectious Diseases, Vaccine Research Center (VRC).

At a time when the number of Black undergraduates receiving degrees in science, technology, engineering, and math (STEM) fields is rapidly declining, I felt enormous personal gratitude that Dr. Corbett refused to quit on her dream. We can all be thankful to those faculty, staff, mentors, sponsors, family members, fellow scholars, and friends who supported Dr. Corbett's journey in science.

**Hannah:** In the College of Letters & Science, we are committed to supporting the next Dr. Corbett by engaging in high-impact practices such as undergraduate research under the guidance of world-class faculty. The Center for Academic Excellence (CAE) and the Undergraduate Research Scholars (URS) program are co-leading an effort to broaden participation in STEM. Our "STEM Runway" offers students in the College of Letters & Science the opportunity to identify their pathway in STEM, by participating in experiences such as a summer "bridge" program, a STEM-focused arrival program in August, STEM-focused learning and living communities, faculty-guided research experiences and opportunities for career exploration.

L&S faculty are examining issues that impact society, from developing healthy minds to climate change. We attract students who are also committed to pursuing these important questions, as well. Those who participate in research early in their undergraduate journey refine their academic interests, build a strong scholarly network, and are more likely to pursue challenging opportunities after graduation.

Research indicates that these trends are even more significant for students who are mentored by faculty and near-peers, and for students from historically underrepresented groups, including BIPOC, first-generation, LGBTQ+, and low-income students. With enthusiastic support from L&S Dean Eric Wilcots, colleagues from CAE and URS re-launched the Letters & Science Summer of Excellence in Research (LASER) program this year, providing course credit, financial support, and continued mentorship for students conducting research during the summer between their first and sophomore year.

As these students studied tumor immunology, gas bubbles in galaxies, and early diagnostic testing for Alzheimer's disease, they gained confidence and a sense of their power as producers of knowledge and leaders on campus, as well as pride in their embodiment of the Wisconsin Idea.

**DeVon:** The COVID-19 pandemic has changed society. We have all faced the threat of this virus and seen how science can offer a way forward and out of danger. As we pursue solutions to society's greatest problems, we have created opportunities for those compassionate and inquisitive young people from Milwaukee, Bad River, Rhinelander and many other locations around our state, who may be dreaming of running experiments, analyzing data, or discovering new frontiers in science. We offer them the guidance, support and space to flourish in the College of Letters & Science at UW-Madison.

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**BRYCE RICHTER**, UW-MADISON

Courtney Robinson, associate professor in the Department of Biology at Howard University and UW-Madison alumna, along with instructors from eight UW System schools and more than a dozen other colleges and universities take part in a Small World Initiative (SWI) workshop inside the Wisconsin Institute for Discovery at the University of Wisconsin-Madison on Jan. 9, 2018. Founded by WID director Jo Handelsman, the SWI is an educational, crowdsourced search for new antibiotics. The workshop provides the student instructors experience in real-world laboratory techniques while they search for soil-dwelling bacteria that might produce the next antibiotic. The student instructors will return to their institutions to become active partners in the program by adding the curriculum to their introductory biology courses.

SUCCESSWORKS

# Internship fund kickstarts careers

REBEKAH PRYOR PARÉ

"Get an internship so you can put it on your resume."

I often hear this advice for students. Internships give students concrete experience to be competitive for full-time jobs after graduation. But in the College of Letters & Science (L&S), we show students that internships can do so much more — they create opportunities to discover their interests and strengths while actively exploring various career paths.

During internships, L&S students are challenged to delve into the culture of an organization, learn about occupations and apply the skills they are learning in college in a practical setting. It is thrilling to talk with students as they navigate these transformative experiences.

## About the author

**Rebekah Pryor Paré** is Associate Dean and Founding Executive Director of SuccessWorks and the Letters & Science Career Initiative. She has a passion for helping students translate their personal interests and classroom experiences into lifelong professional success after graduation. Since opening its doors to students in 2017, SuccessWorks has served over 40,000 L&S students.

With 65 undergraduate majors to choose from, L&S students develop in-demand skills like analytical thinking, creative problem solving and communication. During his internship at the U.S. State Department, Gerald Cox ('09) learned how to understand complex issues and speak on behalf of people thousands of miles away. These skills for empathy, combined with the analytical and cultural sensitivity skills built through his economics and Middle Eastern studies majors, are useful for reaching different audiences and helped him "understand how the world works," according to Cox.

Adding an internship to the UW experience isn't always easy. Many are unpaid and living expenses and transportation costs add up quickly. It's no surprise that many students face barriers to participation.

When we launched SuccessWorks at the College of Letters & Science, we sought to ensure all students have access to essential workforce preparation experiences like internships. My team and I weren't interested in limiting opportunities to the privileged few. Through the generosity of motivated supporters, we raised funds to put internship experiences in reach for more students.

Gerald Cox intentionally sought an internship outside of Madison to push the boundaries of his experience. "Washington, D.C. is a great place, but it's very expensive and my internship came with no pay," he says. "I come from a family that didn't have a lot so I couldn't rely on them for financial support. I thought I wouldn't be able to take the internship because it was too expensive." With internship funding support from L&S, Cox made his internship dreams a reality.

Tamia Fowlkes ('22) received funding from SuccessWorks for her internship at the Milwaukee Journal Sentinel this summer. "It is so amazing that this opportunity is available to students to alleviate some of the burdens," says the journalism and political science major. "I am immensely grateful for the support the internship has given me. Doing nitty-gritty work like public records requests and more down-to-earth tasks like in-person interviews both lend well to the wide breadth of knowledge I've gained here at UW in my journalism courses, and prepare me to continue working in this field," she adds.

Tamia Fowlkes ('22) is a Journalism and Political Science major who received internship funding support for her position at the Milwaukee Journal Sentinel in the summer of 2021.

These internship funds also give students access to social capital and networks. Cox remembers a conversation with a State Department director who advised him to work in the private sector before working in the public sector. "You can make an impact when you know how the world works," he says. "I gained a lot of perspective from that conversation."

Gerald and Tamia represent just two of the 285 students who have received over $780,000 in internship support from L&S since 2006. When we extend opportunity to our students, they do amazing things. This is the work that makes my work so fulfilling, and I'm proud that L&S has invested in student self-discovery and career preparation.

Cox's internship helped him secure a subsequent internship in the private sector, then a full-time role with a Fortune 25 company as a market researcher. Today, he is Senior Manager of Insights & Analytics at Kellogg Company for the Cheez-It Brand, which he calls "one of the most fun brands on the planet." "Without the funding support, I would not have had the many opportunities I've gotten since," he adds.

For her part, Tamia Fowlkes has her whole future ahead of her, and I look forward to seeing where she takes it. For now, her goal is to pursue a career in journalism and to "pass down the knowledge that I have gained to aid the next generation of journalists and world-changers to make a difference."

DEPARTMENT OF COMPUTER SCIENCES

# Making AI safe and reliable

SHARON YIXUAN LI


An object detection model trained on the self-driving car datasets produces overconfident predictions for out-of-distribution objects (helicopter and cow), resulting in safety and public trust concerns in ML models deployed in the real-world.

While artificial intelligence systems have recently achieved remarkable success, they do not necessarily know what they don't know. As artificial intelligence (AI) expands its role in our lives and reaches society at large, the need for safe and reliable decision-making is increasingly critical. To be trusted with such decisions, our AI systems must be aware of their own uncertainty and limitations and be able to communicate those limitations so that we know when to trust these systems and their predictions.

In machine learning (ML), there exists a major gap between what the model was trained on and what the model will encounter in reality. We typically teach the models by feeding them so-called training data, such as photographs with corresponding class labels (like "dog" or "cat").

Most machine learning models assume that the data that they'll see in the future will look a lot like the data they've seen in the past (during training). Yet AI systems will inevitably encounter unfamiliar out-of-distribution (OOD) data, which involves new labels and scenarios that were not in the training data. Unfortunately, artificial intelligence in use today can produce overly confident predictions on such OOD data points, even when those data points look nothing like what they've seen.

The resulting overconfidence can lead to catastrophic consequences. For example, a medical AI system trained on a certain set of diseases may encounter a different disease (OOD) and cause mistreatment if not detected and handled with caution.

The goal of my research is to bridge the gap. My lab is developing novel deep learning algorithms that enable safe and reliable decision-making for AI in the real world. My research is driven by the following fundamental problem: how can we make modern AI systems know what they don't know in the face of novel situations and environments, and learn new knowledge over time?

As identified by the Computing Research Association, the problem is largely unexplored and central to the roadmap of artificial intelligence research in the next 5-20 years. My grand vision is to transform deep learning from a closed-world to an open-world setting, where intelligent systems can have an awareness of uncertainty, a mandate to confront unknown situations with caution, and further, a proactive improvement of existing knowledge by learning from the unknowns.

My research will lead to improved safety, reliability, deployability, and durability of modern intelligent systems in realistic open-world environments. My research stands to benefit a wide range of societal activities and applications, including medical diagnosis (such as unseen disease identification), autonomous vehicles (such as unseen object detection), and consumer businesses (such as platform content integrity). We have already made some exciting breakthroughs.

My research is largely inspired by my prior experience developing and deploying real-world machine learning models that are currently serving billions of users. Before joining UW-Madison, I was fortunate to spend some time at Facebook AI as a research scientist. The exposure to real-world ML reinforced my belief in the importance of the problem. My research philosophy is "inspired by the real world, built for the real world." I am grateful for my current job, which allows me to provide direct educational benefits to train the next-generation workforce.

My long-term goal is also to integrate my research with teaching, bridging the educational gap between the fundamental and real-world aspects of modern machine learning approaches. In Fall 2020, I developed and launched a new open-source deep learning course, which covers the building of safe and reliable models. I have also been redesigning the undergraduate AI curricula to reflect these tight connections.

It is a largely unexplored area with so many interesting problems to solve, and I couldn't be more excited about the journey ahead. I would like to thank the Department of Computer Sciences, the Wisconsin Foundation and Alumni Association and American Family Insurance for sponsoring my research.

## About the author

**Sharon Yixuan Li** is an assistant professor in the Department of Computer Sciences. Her research focuses on developing fundamental algorithms and understandings for uncertainty-aware deep learning, which improves the reliability of modern neural networks. Her research broadly impacts and enables safe decision-making in the real world.

DEPARTMENT OF ASIAN LANGUAGES AND CULTURES

# Dictatorship on trial

TYRELL HABERKORN

Judges and historians both construct narratives about who did what, when, and to what end. Historians often treat legal decisions as a source of evidence about state violence, as I do in my research. I may read a case file and then, in my scholarly narrative, offer a different interpretation of the series of events or a different conclusion than the one reached by the judges.

An alternative vision of justice may emerge from a rereading that lays bare a coverup in cases of state violence perpetrated against the people by vicious dictators, or even injustice perpetrated against the people by the court itself, either intentionally or by sleight of hand.

What if the historian stepped out of scholarly narrative and wrote in the voice of a judge and in the format of a decision? Past events or evidence in a decision might be ordered, or even constituted, differently. The evidence needed to hold state perpetrators to account could be brought to the fore, rather than suppressed (in order to exonerate bad actors). Instead of a critique, scholars could offer an alternative vision of justice —and highlight the gap between the law as practiced and law as ideal. I have decided to try this approach.

Inspired by feminist legal scholarship, I recently "picked up the judge's pen" to write a condensed history of the five years of dictatorship under Thailand's most recent coup regime, the National Council for Peace and Order (NCPO). The NCPO launched a coup on May 22, 2014, Thailand's 13th since the end of absolute monarchy in 1932. The NCPO remained in power until July 10, 2019, when a new civilian cabinet was sworn in following elections.

The NCPO's favorite tool of repression was the law, and hundreds of civilians were prosecuted in political cases for peaceful protest and for simply daring to think differently from those who held power. Anti-coup protests were swiftly shut down. Dissidents were summoned for interrogation and re-education. Activists were sentenced to lengthy prison terms. Law, rather than the extrajudicial violence favored by previous dictatorships, gave the NCPO's repression a veneer of legitimacy. The junta responded to criticism by stating that they were merely enforcing the law.

Reimagining the meaning of the law in the aftermath of dictatorship is therefore part of moving towards democracy. I selected eight decisions in cases in which the law was used to suppress, rather than support, human rights, and am rewriting them to be more just. Vastly different outcomes are possible under the very same body of law.

Writing in the voice of a judge, and in the form of a decision, has been full of simultaneous discomfort, uncertainty and fun. The contest over law goes from being theoretical and hopeful, to being real and present on the page beneath my pen. As I struggle, sentence by sentence, to rewrite the judges' decisions, I am learning that the legal decision is not merely a source of evidence for the history I write, but the very site in which to imagine the future anew.

TEERA NOISAKRAN

Thailand: Anti-government protesters, holding up three fingers in joining the "CAR MOB" event to drive Prime Minister Prayut Chan-o-cha on the Thanon Vibhavadi Rangsit, Bangkok, on Aug. 1, 2021.

## About the author

**Tyrell Haberkorn** is Professor of Southeast Asian Studies in the Department of Asian Languages and Cultures. She researches state violence and human rights in Thailand and works to use knowledge to challenge injustice. Her most recent book is *In Plain Sight: Impunity and Human Rights in Thailand* (University of Wisconsin Press, 2018).

LANGUAGE ACQUISITION


EVGENIY SHKOLENKO

The world language classroom is a great place to provide guidance on how to market learning experiences in professional settings and how to encourage language use outside of the classroom.

# Linguistics research empowers world languages students

SAKUNI EGODAWATTE

World languages skills are in demand in both the public and private sector, and they have multitudes of benefits beyond just the ability to speak another language. Yet many world languages students don't fully realize the breadth of their skills, or how to market them in a job interview. Researching the career pathways of world languages students at UW-Madison with PhD candidate Ryan Goble in Second Language Acquisition allowed me to understand and tackle this issue—and taught me something important about myself as well.

During the 2019-2020 academic year I was able to sit in on in-depth, recorded interviews with students to find out their perceptions of the language learning classroom and their future career plans. We also had the opportunity to listen to sessions between students and their academic advisors. We closely transcribed these interviews and advising sessions, marking them for significant statements and noting things like hesitance and laughter. Essentially, we learned the hopes and fears of 44 brilliant language students.

We also learned that most students hesitate to be positioned as "fluent" in their world language. They struggle to understand how their many language experiences culminate in skills that they can highlight in interviews, despite advisors giving them lists of what those skills could include. The students were having difficulty seeing themselves reflected in those lists, despite having command over their target languages.

We recognized that the world language classroom is a great place to address these challenges that students are facing, by providing direct guidance on how to market their language learning experiences in professional settings and encouraging language use outside of the classroom.

This experience helped me realize that research wasn't the insurmountable task that it seemed to be when I first heard about it. It helped me see that research isn't just people in white coats locked away in a lab, and that it looks vastly different depending on the topic. I learned that the research I conducted could have a direct impact on those around me, and even reach people far away who are looking to improve their own language programs. Who could have known that the late nights spent transcribing hours of other students' voices could somehow connect me to people I will probably never meet? Empowering my peers through research empowered me, too.

## About the author

**Sakuni Egodawatte** is majoring in computer sciences and linguistics. Her most recent research was at a Research Experiences for Undergraduates site studying automatic sarcasm detection, to ultimately aid people on the autism spectrum improve social interactions. She grew up in Naperville, Ill., and expects to graduate in May 2022.

THE CAP TIMES *LIVE*

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DEPARTMENT OF COMPUTER SCIENCES

# What is a camera now?

MOHIT GUPTA

We have witnessed a remarkable evolution of camera technology over the past century. Perhaps one of the most profound shifts is that these days, photographs are increasingly created by algorithms, with the role of cameras being merely to capture light. The "raw light capture" is algorithmically and computationally transformed in multiple ways before a photograph is created and consumed. Most modern cameras can thus be thought of as "computational cameras" — they are routinely able to create high-quality photographs even with low-cost devices including cell phones, thus commoditizing a powerful form of visual expression.

Beyond capturing aesthetically pleasing images, such cameras are playing an instrumental role in augmented reality, digital communication, medicine, scientific imaging, and robotics. Robots enabled by such computational cameras are now beginning to autonomously drive cars, explore space, and manage our factories, marking a radical shift in how we go about our daily lives.

With the most common cameras today, such as the one in your cell phone, one can think of each pixel as a light bucket which collects photons. For such cameras, each pixel typically requires capturing hundreds to thousands of photons per pixel to create a reasonable image.

But what if there are cameras that could record individual photons?

There is an emerging class of single-photon cameras that promise such single-photon sensitivity. Single-photon computational cameras capture images that are algorithmically manipulated at the granularity of individual photons (the minimum amount of measurable light).

For such single-photon cameras, each pixel is like a teaspoon that fills up as soon as it detects a photon. Due to their high sensitivity and (relatively) low costs, single-photon cameras are driving an imaging revolution.

A new generation of devices is emerging, with novel functionalities that were hitherto considered impossible: imaging at a trillion frames-per-second, being able to image around corners, and capturing high-quality images in almost complete darkness. Imagine a camera mounted on a telescope being able to locate a dim astronomical object even in a distant galaxy, or a high-performance scientific camera tracking high-speed cell deformation for facilitating cancer research. Although these single-photon cameras were long relegated to niche scientific applications, recently they have started making their way to consumer domains (including the new Apple iPhone), placing this exciting technology at the fingertips of billions of people worldwide. Werner Heisenberg, the noted physicist, once said: "What we observe is not nature itself, but nature exposed to our method of questioning."

By zooming in to individual photons, single-photon cameras allow us to ask some of the most fundamental visual questions from nature, thus getting us closer to its most intimate truths.

On the one hand, the realization that next-generation cameras and algorithms can work synergistically to generate new kinds of photographs, functionalities and visual experiences has profound positive implications — including for photography, robotics, computer vision, medical imaging and AI. On the other hand, this also raises questions about the nature of reality. Can we trust what we see?

It is becoming easier to create photographs and videos of people and events that never were. These include fabricated videos of political speeches, falsified photographic evidence in legal cases, pornography, and manipulated news reel images. Such photos and videos can potentially be weaponized, posing a serious societal risk.

Following these examples, it is easy to picture computational cameras as dangerous devices. However, as scholar Issac Asimov said, "I could not bring myself to believe that if knowledge presented danger, the solution was ignorance. To me, it always seemed that the solution had to be wisdom. You did not refuse to look at danger, rather you learned how to handle it safely. Any technological advance can be dangerous.

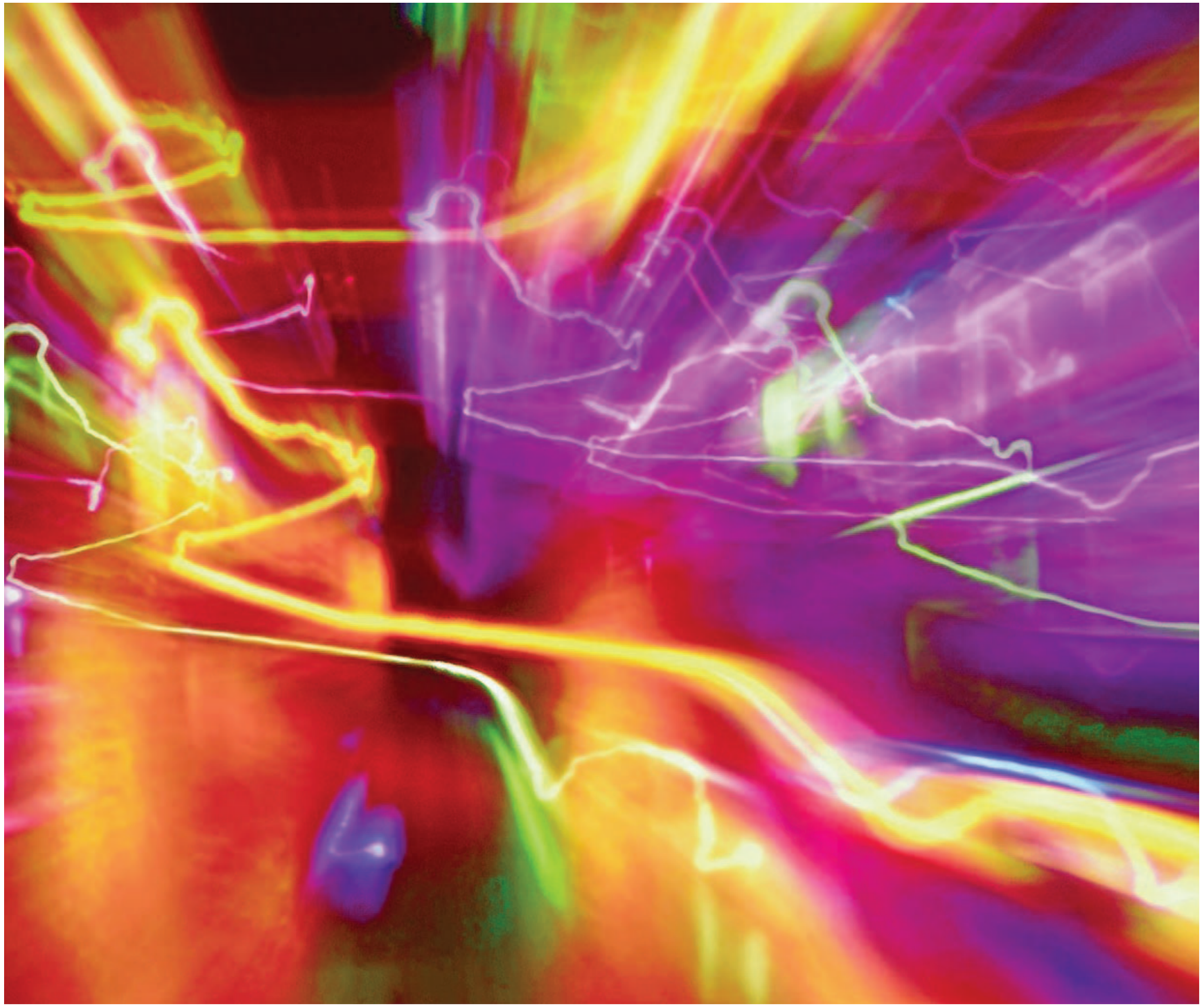
Fire was dangerous from the start, and so was speech —and both are still dangerous to this day —but human beings would not be human without them."

As with any technology, we need the necessary checks and balances in place so that cameras are used responsibly. If we can do this successfully, this new breed of computationally enhanced super-cameras will enable us to see the wonderful world around us in a new light.

## About the author

**Mohit Gupta** is an assistant professor of computer sciences. He directs the WISIONLab with research interests in computer vision and computational imaging. His recent work in computational single-photon imaging is opening up new possibilities for computer vision systems that work in extremely low light, with applications in robotics, scientific imaging and human-computer interfaces.

**As with any technology, we need the necessary checks and balances in place so that cameras are used responsibly. If we can do this successfully, this new breed of computationally enhanced super-cameras will enable us to see the wonderful world around us in a new light.**



BARBOL88

There is an emerging class of single-photon cameras that promise single-photon sensitivity. Single-photon computational cameras capture images that are algorithmically manipulated at the granularity of individual photons (the minimum amount of measurable light).

DEPARTMENT OF AFRO-AMERICAN STUDIES

# The 'Free Joan Little' campaign highlights familiar struggles

CHRISTINA GREENE

In the summer of 1974, an imprisoned 20-year-old woman named Joan Little defended herself with an ice pick against sexual assault by a white jailer and fled from a rural North Carolina jail. When she learned that the jailer had died and that she had been declared a fugitive — meaning anyone could shoot to kill her on sight — the young, destitute escapee turned herself in to authorities. A grand jury never heard evidence of recent sexual crimes against Little in her jail cell before quickly indicting her for first-degree murder. If convicted, Little faced execution in the state's gas chamber.

My forthcoming book from the University of North Carolina Press, tentatively entitled *To Whom Will She Cry Rape: Joan Little, and Women's Anti-Violence & Prison Organizing*, moves beyond the rape-murder case to cast new light on the intertwined stories of sexual violence, systemic racism and mass incarceration.

The campaign to free Little drew on Black women's long legacy of anti-rape organizing and testimony, and attracted feminists of all stripes, traditional civil rights and Black Power activists, students, politicians, and prison reformers. Little's trial featured a pro bono defense team, headed by a white male attorney from her hometown, and included one of the first Black women to graduate from Duke University Law School. The case quickly became a national and international cause célèbre, hailed by the Washington Star newspaper as the "biggest civil rights trial of the '70s."

Sounding themes that have re-emerged in recent years, the "Free Joan Little" campaign drew attention to the narrow, legal definition of rape; a woman's right to lethal self-defense against sexual violence; and the under-representation of women and Black men on juries. It also highlighted a racially discriminatory criminal legal system that imprisoned and executed disproportionate numbers of African Americans, and that held special dangers for incarcerated women. After a five-week trial in August 1975, a majority female jury, composed equally of Black and white jurors, deliberated for 78 minutes before acquitting Little.

In researching Little's courtroom victory, it became clear that her treatment by law enforcement and in the courts prior to her more well-known rape-murder trial was far more typical of Black women's experiences in North Carolina and across the country. Joan likely was a target of racial profiling by local police when she was a teenager and subjected to racially biased sentencing practices.

Joan Little at women's prison.

Many writers focusing on mass incarceration have either ignored female imprisonment or claimed that women prisoners did not engage in organized protest the way men did. My book joins the growing scholarship on women's prison activism, often inspired by Little's case, on both sides of the prison walls. Anti-rape activists, stirred by Little's predicament and the 1970s trials of other women of color, expanded grass-roots organizing and scored some of their most impressive legal reforms in the 1970s and 1980s.

Despite funding cuts and the decline in rape crisis centers, African American women found creative ways to advocate for their sisters throughout the 1970s, 1980s and beyond. Groups like the newly formed National Black Women's Health Project (NBWHP) organized women across the country and around the world. NBWHP founder Byllye Avery recalled that violence—rape, incest and intimate partner abuse—soon became their number one issue. Building on the long arc of Black women's organizing legacy, groups like the NBWHP and the Black feminist Combahee River Collective adopted a multi-issue agenda.

They understood that protection from sexual violence had to encompass access to health care and public transportation, reproductive justice, LGBTQ rights, affordable housing and childcare, a living wage, and an end to racially biased policing and imprisonment.

Nearly a half century before the #MeToo, #SayHerName, and Black Lives Matter movements emerged, African American women raised their voices and took action on the issues at the center of the 21st century's battles for democracy and justice.

## About the author

**Christina Greene** is a Professor in the Afro-American Studies Department. Her research and teaching focus on the history of women's activism, Black freedom movements, and race and incarceration in the United States.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