

UNIVERSITY OF COLORADO BOULDER

ARTS & SCIENCES

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Think they're dead?
think again.

REPORTS OF THE ARTS AND HUMANITIES' DEMISE ARE GREATLY EXAGGERATED.
WHY THIS MATTERS TO STUDENTS OF TODAY AND TOMORROW



University of Colorado **Boulder**



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From identity crisis to career fulfilment.



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Visionary hopes to improve eyesight for millions.



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Lawyer, political science grad leaps into kelp farming.

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On the cover

Conventional wisdom has it that a broad-based education, particularly one focused in the arts and humanities or social sciences, is not useful in the workplace. The data say otherwise. (See opposite page.)

In this edition: We offer snapshots of great work being done by our faculty, alumni and friends.

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BY JAMES W.C. WHITE

Do you believe the liberal arts are dead? **think** again.

ADVOCATES OF THE LIBERAL ARTS RISE TO DISPUTE REPORTS OF THEIR DEMISE

Mark Twain once remarked that “reports of my death are greatly exaggerated.” That was funny. It was also memorable enough to have been repeated more or less constantly since. | But he didn’t say that, exactly. Let’s review the story and discuss why it matters | In 1897, a reporter at the New York Journal informed Twain, then in London, of a report that Twain was impoverished and dying. | Twain said he understood the genesis of the rumor, noting that a cousin had been quite ill: “I have even heard it on good authority that I was dead,” he said, adding: “The report of my death was an exaggeration.”

The idea that Twain, famous worldwide, would die penniless in London was a compelling story. But it was not true, and the newspaper wisely checked the evidence before spreading a falsehood.

The liberal arts in higher education have a Mark Twain problem: There are many exaggerated reports of their death. A steady stream of news stories, opinion columns, blogs and television pundits have informed us over the last two decades that the liberal-arts education is a few breaths away from its death rattle.

Headlines have variously proclaimed that “Liberal arts degrees are useless,” that “There is no case for the humanities,” and that, bluntly, “Liberal arts majors are screwed.”

None of that is true, but steady repetition can give fiction a patina of prophecy.

This much is true: The falsehoods told about the liberal arts affected students’ behavior. Enrollment in

these disciplines is down overall. Meanwhile, however, the career outcomes of liberal-arts graduates are good; the job market for workers with skills derived from the liberal arts is broad; and, importantly, those skills are key to students for the employment world of tomorrow.

Let’s first be clear on what we’re talking about.

THE LIBERAL ARTS HELPED BUILD WESTERN CIVILIZATION

We can thank the ancient Greeks for democracy, the foundation of our form of government, and a key feature of our system of education. To have a properly functioning democracy, the Greeks believed, a society must prepare citizens to think critically and make informed decisions.

As the Greeks conceived of it, grammar, logic and rhetoric (later called the trivium) formed the core of

this education, along with arithmetic, geometry, music theory and astronomy (the quadrivium). Learning these things helped people become citizens who could effectively engage in public debate, defend themselves in court, serve on juries and in the military.

Cicero called these disciplines *liberalis ars*, the liberal arts. The term is often misunderstood, particularly as civic discourse increasingly devolves into partisan rancor and the word “liberal” is conflated with one modern political identity.

Quite simply, the term “liberal arts” underscores the idea that free people—*liberalis*—must share basic knowledge of art or principled practice—*ars*—to be effective citizens and stewards of democracy.

Today in the College of Arts and Sciences, the liberal arts—updated to include a broader range of subjects—remain central to the education of all students. But the reports of their demise have had an effect.

ENROLLMENT HAS DIPPED

The Great Recession of 2007-09 was a tipping point. When the economy sputtered, American college students began turning away from degrees in history, philosophy and political science and opting to study science, technology, engineering or math—often called STEM.

Since then, U.S. college enrollment in liberal arts degrees has seriously declined. Nationwide, the numbers are stark:

- Philosophy and religious studies: down 15%.
- English literature and composition: down 22%.
- History: down 25%.

The trend has hit harder at CU Boulder, as these numbers show:

- Philosophy and religious studies: down 12%.
- English literature and composition: down 49%.
- History: down 57%.

Meanwhile, enrollment in the natural sciences, math and engineering has soared. Those trends are alarming because we need a broad range of workers—from all disciplines—in the new and emerging workplace.

I say this as a scientist who has spent decades studying how our planet functions and how the Earth’s climate is changing. Because humans are the major agents of change on the planet, this work has required that I understand how humans operate—the sphere of fields ranging from economics to ethics.

I’m a scientist who knows that a broad liberal-arts education is widely applicable, greatly needed and

significantly helpful to job-seekers and the companies that hire them.

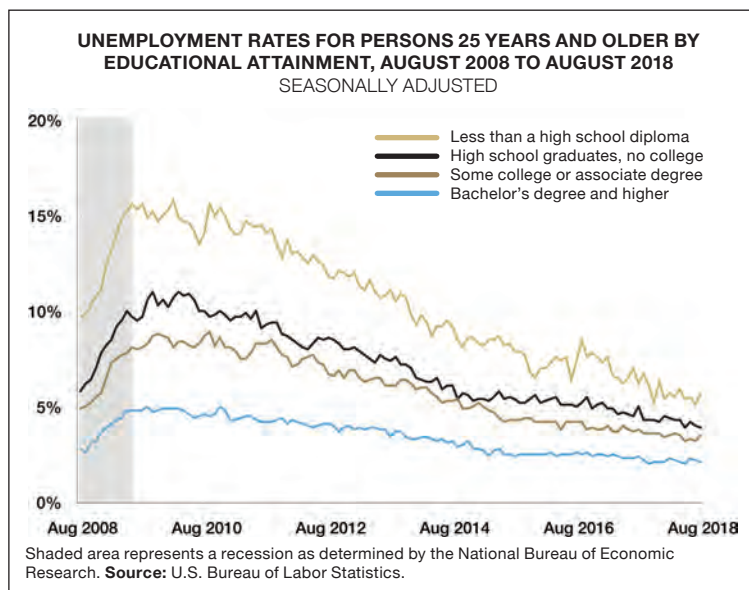
A liberal-arts education—one that exposes students to the breadth of human knowledge—conveys skills in critical thinking, communication and adaptability. As the pace of social and technological change inexorably quickens, these skills are indispensable, not only to the employee possessing those skills, but also to the society in deep need for its citizens to exercise those skills.

That’s my well-grounded opinion. But don’t take my word for it. Reams of evidence buttress this point.

JOBS, SALARIES AND DEBT: BETTER THAN YOU THINK

First, people with college degrees—regardless of whether those degrees were in the arts and humanities, social sciences or natural sciences—enjoy consistently lower rates of unemployment than the rest of the workforce.

Second, getting a college degree pays big dividends: On average, college graduates earn \$1 million more over the course of their careers than those who have only a high-school diploma.



Third, student debt is a real issue, but one that CU Boulder works hard to manage with scholarships and other support. For those Colorado residents who graduated from CU Boulder with a bachelor’s degree in 2018, the average debt was \$24,400. For out-of-state students, the average was \$32,100.



Phoebe S.K. Young, associate professor of history, talks with a student about archival material from Earth Day from the 1970s through the 1990s at Norlin Library on campus; the class teaches historical thinking and writing and uses Earth Day as a lens to examine the coalescence of ideas, individuals and movements around issues of nature in the latter half of the 20th century. CU Boulder photo by Glenn Asakawa.

Those numbers are nothing to sneeze at. For in-state students, however, the debt is lower than the cost of a new Ford Taurus, and for out-of-state students, it's about equal to a new Taurus with all the options.

Of course, the value of the Taurus will depreciate, while the college degree's value will appreciate by almost a factor of 50. In short, your Taurus won't take you nearly as far as your degree.

It must be noted that students who major in scientific, technological or engineering fields tend to earn higher salaries than those in the arts and humanities. It's also true that starting salaries of students who majored in the arts and humanities tend to be lower than those in the natural sciences.

But let's compare those who major in professional or pre-professional degrees with those with liberal-arts degrees:

When they reach their 50s and 60s, former students who majored in the social sciences or arts and humanities earned more, on average, than their peers who majored in professional or pre-professional fields, research from the Association of American Colleges and Universities concluded in 2014.

Data from CU Boulder alumni buttress this finding. Consider an exhaustive study of alumni who graduated from the CU Boulder College of Arts and Sciences in the last three decades.

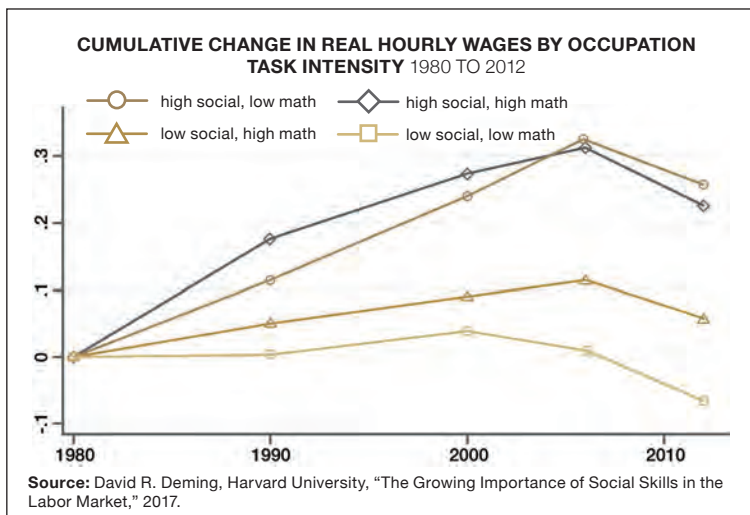
That research, conducted by Emsi Alumni Insight, surveyed more than 25,000 alumni who graduated with bachelor's degrees between 1989 and 2018 and calculated their average salary in 2018 as follows:

- \$79,626: arts and humanities alumni
- \$78,065: social sciences alumni
- \$80,796: natural sciences alumni

By comparison, median household income in Colorado was \$62,520 in 2017, the U.S. Census Bureau reports.

If you want to learn more about these stats, see the data visualization at <http://bit.ly/alumstats>. Those who seek evidence that the liberal arts are faltering will have to look elsewhere.

Diving into the data deepens the picture. As The Washington Post noted recently, it's true that the typical computer-science major earns more right out of school than does the typical English major.



But in 2017, young English majors had a lower unemployment rate than math or computer science majors. And the pay gap closes as higher midcareer salaries in management and business occupations kick in—professions with larger numbers of liberal arts majors.

SIGNS AND REASONS FOR LIFE

Despite all the bad press, there are great reasons the liberal arts are still alive and kicking. First among them is that employers see the value in skills students derive from a liberal-arts education. And they're willing to pay for those skills.

More than 84% of employers surveyed by the American Association of Colleges & Universities said recent graduates who wanted to win promotions and enjoy long-term success should have field-specific knowledge and a broad range of knowledge or skills.

Further, 93% of those employers said that job candidates' ability to think critically, communicate clearly and solve complex problems well is more

important than their undergraduate major.

Many other studies tell the same story: Companies need employees with well-honed skills in critical thinking and communication.

A particularly compelling example comes from Google, which is, at its core, an engineering firm, one that assumed the best workers would—obviously—be engineers.

Google being Google, it tested its hiring hypothesis by crunching every bit and byte of hiring, firing and promotion data accumulated since the company's incorporation in 1998, The Washington Post reported.

"Project Oxygen shocked everyone by concluding that, among the eight most important qualities of Google's top employees, STEM expertise comes in dead last," the Post noted.

The seven top characteristics of success at Google are all "soft" skills: being a good coach; communicating and listening well; possessing insights into others (including others' different values and points of view); having empathy toward and being supportive of one's colleagues; being a good critical thinker and problem solver; and being able to make connections across complex ideas.

Other studies reinforce this point. In 2019, economists Catharine B. Hill and Elizabeth Davidson Pisacreta, with support from the Andrew W. Mellon Foundation, issued a detailed analysis of the economic payoff of a liberal-arts education.

"Critics claim that a liberal arts education is worth less than the alternatives, and perhaps not even worth the investment at all. They argue that increasing costs and low future earnings limit the value of a liberal arts education, especially compared to alternative options such as pre-professional programs that appear to be better rewarded in the current labor market," says the report, adding:

"Existing evidence does not support these conclusions."

But money is only part of the picture. Other studies show that graduates of the humanities are not only gainfully employed but also—importantly—happy. A report issued by the American Academy of Arts & Sciences in 2018 notes that while humanities majors do make less money as they begin their careers than engineers or natural scientists, they felt comparable levels of satisfaction to those in engineering with the money they earned.

Why? The likely answer is that more than 70% of both humanities majors and engineers felt "deeply interested" in their work. We're not all born to be engineers or STEM majors; doing what you love to

do is far more important in the end and a much better predictor of success than chasing the lure of a higher salary.

All of this underscores the fact that the liberal arts are neither dead nor dying.

BUT WHAT ABOUT TOMORROW?

The past is often prologue, but the blistering pace of technological and social change today complicates our accuracy in predicting the workplace of tomorrow.

There's good evidence, however, that students now in school can expect to change careers five to seven times. In many cases, the jobs they will perform do not yet exist, and skills they'll need may have yet to be developed.

Preparing for such a world will require more than technical skills, as important as they are. Preparing for such a world means learning how to learn, to adapt and to articulate complexity clearly.

In other words, skills in critical-thinking and communication will be necessary.

We see evidence of this already, in the workplace of the last decade. If the conventional wisdom about STEM education were true, we'd expect to see a particularly high demand for employees with math or technical skills but not other skills.

A recent study found just the opposite. That study, by Harvard University economist David Deming, found that jobs requiring high math and high social skills are rising, while jobs that require neither are shrinking, observations that should surprise no one.

However, the observation that jobs that require high social skills but low math skills are growing—while jobs requiring high math skills and low social skills have been declining for the past several decades—may indeed surprise people. The bottom line is that social skills and critical-thinking skills are both valuable and highly marketable.

Similarly, Deming found, pay for people with high social skills has been rising.

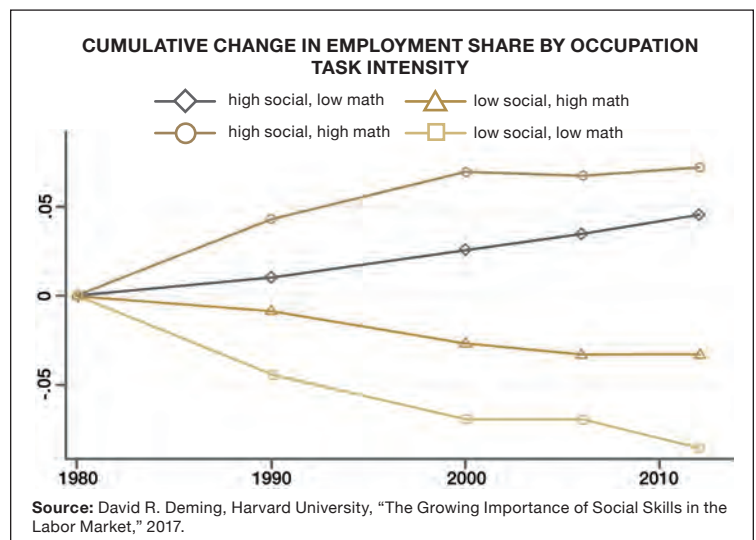
Let's be clear here: We need specialists, engineers, scientists and technicians. We also need historians, philosophers, poets, economists, linguists and political scientists.

ARE LIBERAL-ARTS MAJORS UNEMPLOYED?

thinkagain.

In 2017, people aged 25-29 with degrees in English had a lower average unemployment rate (3.4%) than those with degrees in physical sciences (3.7%) and engineering (3.7%). Those with degrees in history had a lower unemployment rate (3.8%) than those with degrees in mathematics (3.9%) and economics (4.0%).

Source: Employment Outcomes of Bachelor's Degree Holders, U.S. National Center for Education Statistics, 2019.



Thriving in our rapidly growing and increasingly intertwined world requires that all of us pursue our passion and purpose. Our success as a representative democracy depends not only on clever technological advances, but also on our ability to understand ourselves, our humanness, our strengths and our weaknesses.

Next time you try out a particularly frustrating app that seems to be designed for a very technically literate human that does not commonly exist, remember that.

As we have seen, public opinion has wrongly portrayed the study of the liberal arts as irrelevant and futile. Drawn from hyperbole, that view is a myth. I'm happy to say that I'm not alone in pointing out the truth. In the last two years, a large and growing number of op-eds, news stories and blog posts have made the points that I've made here.

This brings us back to Mark Twain. When confronted with a rumor about Twain, a New York journalist checked the facts and published the truth. That's my mission here.

That's the kind of critical-thinking skill the world needed then, needs now and will need tomorrow. It's the kind of critical thinking skill that is part of the core of a liberal arts education. And that's one of many reasons that reports of the liberal arts' demise are, in fact, an exaggeration.

The ancient Greeks would be proud. ↪

James W.C. White is interim dean of the College of Arts and Sciences.

BY SARAH KUTA

One reason we don't see eye to eye

THOSE WHO WANT TO RESTRICT TRAVEL FROM MUSLIM COUNTRIES OR SALES OF ASSAULT WEAPONS USE ONE RATIONALE TO BUTTRESS THEIR ARGUMENTS AND A DIFFERENT ONE TO DISMISS THEIR OPPONENTS', ACCORDING TO NEW RESEARCH FROM CU BOULDER

In our politically polarized country, we often hear this common refrain: If people on both sides of the aisle could simply look at the same facts, they'd be able to see eye-to-eye, have measured discussions and enact reasonable laws and policies. | New research from the University of Colorado Boulder, published in March in the journal *Cognition*, suggests that when people with differing political views are provided with the same statistics—and they believe that those facts are accurate—they prioritize the information differently, based on their existing opinions.

The findings provide one explanation for the sharply diverging opinions people have when it comes to polarizing policies—we literally perceive the facts differently.

"We often assume when dealing with the partisan divide that if we could give everyone the same information and get them to believe in the accuracy of that information, we would reduce partisan conflict," said Leaf Van Boven, a CU Boulder professor of psychology and neuroscience. "But what this research shows is that even when you give people the same information, they can have very different partisan reactions to that underlying information."

Van Boven and a team of co-authors set out to study people's reasoning using "conditional probabilities," or the likelihood that something will

occur based on one or more conditions having occurred.

More specifically, they looked at what statistics people considered to be the most important when contemplating policies that restrict broad categories of people or actions to lower the risk of rare events, such as a travel ban for immigrants from majority-Muslim countries to reduce terrorist attacks and a ban on the sale of assault weapons to curb mass shootings.

The researchers were inspired, in part, by how politicians and pundits used conditional probabilities to defend restrictive policies. After the Sept. 11 terrorist attacks, for example, conservative commentator Ann Coulter advocated for the expulsion of Muslim immigrants from the country, writing that "all terrorists are Muslims."

"We're particularly interested in these policies involving rare events because policymakers often use conditional probabilities to explain why a policy is useful, and there's a lot of research suggesting that people actually have a tough time thinking about conditional probabilities," said Jairo Ramos, CU Boulder graduate student in social psychology and one of the study's co-authors.

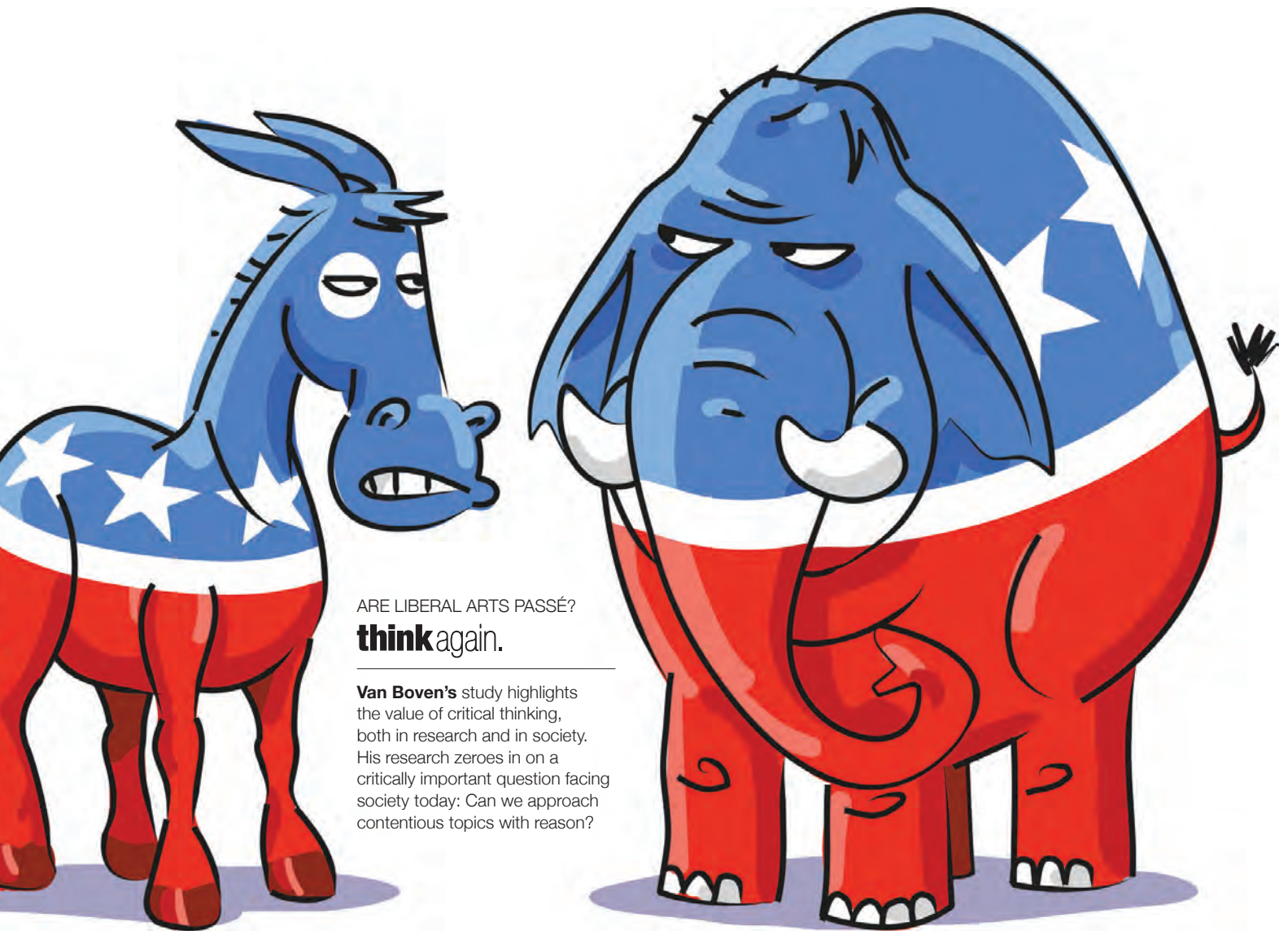
When evaluating the effectiveness of a policy intended to reduce terrorism, for instance, it's more relevant to consider the vanishingly small fraction of Muslim immigrants who commit terrorist attacks, rather than the fraction of immigrant terrorists who come from Muslim countries, the researchers write.

In essence, because the percentage of Muslim immigrants who are terrorists is extremely small, banning all Muslims from entering the country would reduce an extremely small threat to a somewhat smaller threat, the researchers explain. And yet, many



Leaf Van Boven.





ARE LIBERAL ARTS PASSÉ?

thinkagain.

Van Boven's study highlights the value of critical thinking, both in research and in society. His research zeroes in on a critically important question facing society today: Can we approach contentious topics with reason?

people are motivated by statements like the one made by Coulter—that the proportion of immigrant terrorist attacks are committed by Muslims is relatively high.

The researchers asked more than 500 American adults to review a list of statistics related to terrorism or mass shootings, then select which statistic they considered the most important for evaluating policies meant to reduce the risk of those events. Participants also considered this question from the perspective of an unbiased expert and someone with an opposing viewpoint to their own.

As expected, participants selected the probability that supported their existing stance on the policy.

For example, when considering a Muslim travel ban, a supporter of the policy was more likely to point to the fact that 72% of immigrants who commit terrorist attacks come from Muslim countries. But an opponent of that same policy was likely to prioritize the probability of an immigrant from a Muslim country being a terrorist is 0.00004%.

Problem: “When you give people the same information, they can have very different partisan reactions to that underlying information.”

Similarly, someone who supported an assault weapons ban placed more value on the fact that two-thirds of mass shootings were committed by people who owned assault weapons. An opponent of that same policy pointed to the probability that of the 12 million American adults who own assault weapons, just four committed a mass shooting. ⇐

Learn more: Read Van Boven's *New York Times* op-ed on partisan polarization at <http://bit.ly/vanboven>

BY DOUG McPHERSON

From ‘major identity crisis’ to career fulfillment

HOW? A LIBERAL-ARTS DEGREE WAS KEY

The first three semesters as a psychology major at the University of Colorado Boulder couldn't have been better for Caroline Lynch (Psych'07). The classes were stimulating and gratifying—even fun. And her grades were high.

“I've always had a passion for psychology and so I applied to CU as a psych major,” Lynch says.

“What drew me in was the diversity ... I was studying everything from organizational development to learning processes, and I really found all of it applicable to everyday life.”

But then, in the middle of her sophomore year, she had what she called her “major identity crisis,” not a crisis of identity, but a crisis of major, as in which one to choose for a career.

“I began feeling pressure about what I wanted to do when I graduated, and I started to question if my psych degree would get me there,” she says.

She wasn't even sure where “there” was. She did know she didn't want to be a psychologist, so she

considered switching majors or at least adding a minor in marketing or communications.

She had a marketing internship lined up for the coming summer with a Boulder startup, so she decided to take some communications courses in her second sophomore semester. A few weeks in, she was miserable. “The content

wasn't as interesting or fulfilling as psych classes,” Lynch says.

After more soul searching she returned to psychology. The experience—as prickly as it was—has become a valuable life lesson. “I realized it's important to follow what you love ... and it's OK to try something else, pivot and take risks and even pivot back. Curiosity, exposure to many diverse experiences, and being open all serve me well.”

Today, Lynch will tell you she has zero regrets for sticking with the liberal arts.

Right out of Boulder, Lynch landed a job with the top beauty company in the world, L'Oreal. And over

the next 10 years, she rose through the ranks from entry management to an assistant vice president's post. Last fall she left L'Oreal, where she was managing a team to being the team—of one—as director of sales planning in personal care at Method Products, PBC, a pioneer in green consumables.

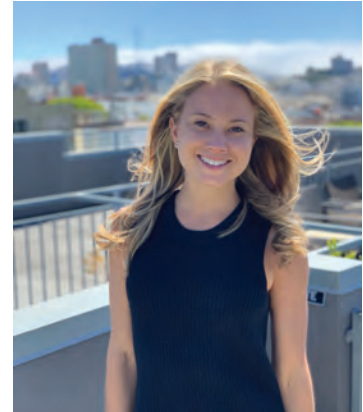
She says both companies have helped her build her career and skills—skills she first discovered at CU Boulder, and skills that have proved essential every step along her path.

“Psychology helped build a foundation to evaluate raw data, organize it in clear, concise ways and make reasoned, rational decisions. It taught me to think critically, manage complexity, communicate clearly and solve complex problems.”

“Psychology helped build a foundation to evaluate raw data, organize it in clear, concise ways and make reasoned, rational decisions.”

As for skills employers want, Lynch says creativity along with entrepreneurial and innovative thinking top the list.

She adds: “A liberal-arts degree sets a strong foundation for all of these skills.” ↔



UNMARKETABLE SKILLS?

thinkagain.

CU Boulder students who majored in psychology hold a wide variety of jobs, including creative director, vice president, president, Navy officer and naturalist.

BY CLAY EVANS

Innovative spirit enriches Frito-Lay and alum's flock

AN INTEREST IN BIG-PICTURE QUESTIONS IS A COMMON THREAD IN BROCK LEACH'S SUCCESS IN BUSINESS AND MINISTRY

As a young man, Brock Leach was advised to gain life experience before entering the ministry. This he did, working 24 years at Frito-Lay and serving as its CEO. Now, he's followed the calling he had in high school: He's become a Unitarian Universalist minister. | The University of Colorado Boulder was his first stop as he launched his first career and, he says, instrumental in establishing his second. | Leach began to bloom upon entering high school the year his family moved to Colorado. | "For me, it was just a phenomenal, incredibly liberating experience in every way," says Leach (Econ'80) of coming to Colorado.



He also found liberation beyond school walls, through a church youth group engaged in outreach, or what is now often called social-justice work. The group traveled around the state to do stuff like work alongside migrant farm workers.

Leach was so moved that he pondered going into ministry, but his minister mentor suggested he first gain more life experience.

Leach acted on that advice, earning two degrees—a BA in economics from the University of Colorado Boulder and a master's in business administration from the University of Chicago—and building a stellar, 24-year career in the food industry before finally becoming a minister.

With no great prospects in human services on the horizon after he graduated, he worked briefly in hospital administration, then took a job with snack-food giant Frito-Lay, owned by PepsiCo.

He eventually became CEO of Frito-Lay North America. Leach's tenure as CEO covered everything from the curious rise and fall of Olestra, a calorie- and fat-free fat-substitute developed by Procter & Gamble, to his "claim to fame as the father of Tostitos restaurant-style" tortilla chips.

He also served as CEO of Tropicana shortly after PepsiCo acquired the beverage maker in 1998. He was later named chief innovation officer for PepsiCo.

Through it all, Leach never forgot the powerful experience of helping others he'd experienced with his church youth group in Colorado.

"I'd done what I wanted to do. I was really lucky; I could afford to quit and go to seminary," he says.

He went on to earn a Master of Divinity degree at Meadville Lombard Theological School, a Unitarian Universality seminary in Chicago.

Now executive consultant for innovative ministries for the Unitarian Universalist Association, he is focused on how to support people who are seeking something other than a traditional, Sunday-morning-go-to-church model of community.

He credits not just his liberal-arts education, but also his broad, real-world experience at CU Boulder with preparing him for his two divergent careers. →

IS ECONOMICS PASSÉ?

thinkagain.

Employment of economists is expected to grow 8% from 2018-2028, faster than average for all occupations.

Source: U.S. Bureau of Labor Statistics.

BY CLINT TALBOTT

Kids learn poetry through pop music

AS THEY LEARN HOW WRITERS REVISE THEIR WORK AND USE LITERARY DEVICES, THE STUDENTS GEAR UP FOR A SCHOOL ASSEMBLY LED BY AN AUSTRALIAN RAP STAR

When superstar Taylor Swift writes a song, she deploys the same creative tools used by a girl named Henley, a Denver fourth grader. | In a first draft of her hit song “Out of the Woods,” for instance, Swift repeats the phrase “I remember” three times in a row. In the studio recording, however, she sings it once. | Henley noticed the difference when she and her classmates were in a sound room at the University of Colorado Boulder comparing an early version and final rendition of Swift’s song and others. She said the final version is better. And that’s the point of the exercise: learning that writing well means revising carefully.

This is one of several eureka moments during a half-day poetry boot camp organized by Adam Bradley, CU Boulder English professor and director of the Laboratory of Race and Popular Culture—or RAP Lab. The lab’s Pop Lyrics in the Classroom program brought kids from Asbury Elementary School in Denver to Boulder recently.

But why teach elementary-school kids about rhyme, meter and the process of revision? What do popular songs have to with the art of language? And who cares about poetry?

Bradley and teachers at Asbury Elementary strive to help kids learn—and love—writing, which can be equally wonderful and laborious. Popular songs are crammed with literary devices, and students who understand this are more likely to love wordplay, or at least feel comfortable tackling essays, book reports and, later, professional writing.

In previous years, Bradley ran a program called Hip Hop in the Classroom, which worked with high school and middle school students. This year’s program, which culminated in May with a school assembly





Literary devices in pop songs? Yes! Here's an example of from Taylor Swift:

"He's got a one-hand feel
On the steering wheel
The other on my heart"

"Our Song"
Taylor Swift, 2016

She uses zeugma, where a single word governs multiple clauses.

Above, Taylor Swift in concert. Shutterstock. Below, Henley performs her poem "Bullies Stand Down" at Innisfree Poetry Bookstore and Café in Boulder. On opposite page, Australian Hip Hop artist Nelson Dialect poses with a group of Whittier Elementary School students in Boulder. Photo courtesy of Nelson Dialect.

led by Australian rapper Nelson Dialect, focuses on younger children.

Desi Kennedy is a personalized learning coach at Asbury who taught Bradley's daughter in Boulder and has known Bradley's family for years. At Asbury, Kennedy's role is to connect students' learning to "authentic real-world experiences."

As Kennedy devised the fourth-grade poetry lesson plan with an Asbury literacy teacher, "we brainstormed and imagined ways we could integrate rap music and

poetry in collaboration with our music teacher."

Then they consulted Bradley.

Pop in the Classroom dovetails perfectly with those aims, Bradley says. The goal is to use the comfort students have with rap and popular music of all types as a way to open the door to literary studies, the practice of composition, the discipline of close reading—"all the things we want them to learn in the language arts."

Pop songs are laboratories for language," Bradley says. "The songs kids love teach them the tools of poetry—rhythm, rhyme, figurative language—without the intimidation that some students feel when approaching a more conventional work of literature. I'm not saying that Ariana Grande should replace Shakespeare, but her songs can help us read Shakespeare—and everything else—better."

Henley, the fourth grader, has gotten that message. She said she hopes next year's fourth-grade class will be able to do the field trip, too. Her favorite part: "making rap and poems out of similes. And the sound room." ↩

THINK YOU DON'T
NEED TO WRITE WELL?

thinkagain.

82% of employers say writing skills are what they most want to see on candidates' resumés.

Source: National Association of Colleges and Employers, Job Outlook 2019 survey.



BY CLAY EVANS

Grad licks problem of slippery cell phones

HER INVENTION AND NEW COMPANY, CATTONGUE GRIPS, WAS BORN BECAUSE NO OTHER PRODUCT OFFERED GRIPPINESS WITHOUT SCRATCHING

In March 2015, Matt Kelly walked into a Verizon store in Park City, Utah, to upgrade his phone. When he commented to a salesperson how easy it is to drop a phone, slippery as they are, she offered to sell him an expensive insurance plan. | Instead, Kelly—who grew up in the skater and surfer culture of San Diego—drove over to a nearby skateboard shop, bought some grip tape, and slapped it on the back of his new phone. | “I said, ‘What have you got going on here?’” recalls his wife, Missy Kelly (PolSci, IntAf’94). “He said, ‘I love this thing. It grips and it’s not sliding around.’”



There was just one problem: “It felt like a cat tongue...and the sandpaper surface was going to scratch up everything in the house!” she says. So he challenged her to find him something online that would measure up

to grip tape, minus the scratching.

“I couldn’t find anything,” Missy Kelly remembers, “so we decided to make it.”

Two and a half years later, CatTongue Grips, a soft, self-adhesive, anti-slip accessory that can be easily applied and removed from the back of any mobile phone, debuted on Amazon Exclusives.

The company racked up more than \$65,000 in sales its first year and is now available in 45 college bookstores around the country, multiple retail outlets, the company’s online store and Amazon. CatTongue Grips has also partnered with numerous organizations to create branded grips, from the University of Southern California to U.S. Ski & Snowboard and Spartan.

But CEO Missy Kelly—her husband is executive vice president—says it took time to get the material and product just right.

“It took us six months just to get a meeting with the largest manufacturer of non-slip solutions in the world,” she says. “They said ‘We’ve never seen anything like it. We’ll get scientists on it and make it for you.’”

One year and eight prototypes later, they had a product. “Not only did it feel good in the hand,” Kelly says, “It gripped and didn’t pick up hair, lint or dirt.” And of course, it didn’t scratch.

No, that phone is not slipping off the car.
Photo courtesy of Missy Kelly.

The company now has a patent pending on the material and recently launched its second product line, the Phat Cat Grip Collection, for tablets and laptops. It plans to introduce rolls of material so that users can cut to whatever size desired for home improvement, tools, rugs on wood floors, sporting, boating, camping—“Anything that needs a grip!” Kelly says.

CatTongue Grips now has a team of 12 people and was certified as a Woman Owned Business in October 2018.

Kelly grew up in San Diego and came to CU Boulder for a change of scenery.

She double-majored in political science and international affairs. Following graduation in 1994, she returned to San Diego, where she met her husband and started a family. She earned her teaching credential and started a tutoring company.

Kelly credits CU Boulder with catalyzing her transition from beach girl to mountain woman and successful CEO. ↗

IS POLITICAL SCIENCE UNMARKETABLE?

thinkagain.

Missy Kelly’s entrepreneurship is not unusual. Among CU Boulder poli sci alums, most common job titles include “vice president,” “marketing manager,” “executive director” and “president.”



BY DOUG MCPHERSON

Visionary hopes to improve eyesight for millions

ALUMNUS' SKI TRIP SPURS INSIGHT TO GIVE THE WORLD'S POOR BETTER EYESIGHT

The idea for a potentially game-changing way to help impoverished people see better hit Philip Staehelin as he floated above a peaceful snowscape on a ski lift in the Czech mountains. Staehelin (IntAf, Econ'91) got glasses at age 9 and suffered from poor vision until he had laser surgery about 15 years ago. "I went from roughly 20/500 to perfect vision—which was life changing," he says. | Then about 10 years after that surgery, the University of Colorado Boulder alum's vision deteriorated to 20/40, and he needed glasses again. This is where the ski lift comes in.

"I don't like to wear my glasses under my ski goggles, so I just went without—which isn't a big deal when you have 20/40 vision. But there was a point during the day when the moguls got a bit hard to see, and as I was riding back up the mountain ... I thought it would be cool if I could just buy some off-the-shelf lenses to pop into my ski goggles to improve my vision. I thought just a bit of improvement would be good enough, because I didn't need perfect vision for skiing."

After a few more runs, it struck Staehelin that "good enough" might address the developing world's vision problem—what some call the biggest health crisis you've never heard of.

The World Health Organization says untreated vision problems cost the global economy \$200 billion annually in lost productivity, and the Vision Loss Expert Group says 1.1 billion people need eyeglasses but don't have them: people unable to drive, read, work or just enjoy the orange glow of a setting sun.

When Staehelin got home, he did some research and calculated he'd only need five lenses to give up to 90% of people "good enough" vision, i.e., getting people to at least 20/40 vision.

"I was excited, and I literally felt like I had an obligation to society to give it my best shot."

It would take his best shot—and patience. After more than three years and plenty of design failures, he finally had his ultra-cheap, one-size-fits-all frames—and his social enterprise, DOT Glasses (dotglasses.org), was born.

During the first field trial in Angola in August 2018, the team saw just how much the glasses could change lives. They met Samuel, a young man who had lost his job—literally the previous week—because

Philip Staehelin.



“I was excited, and I literally felt like I had an obligation to society to give it my best shot. ... I want to prove that a 700-year-old technology like eyeglasses can still be disruptive with innovative thinking.”

his eyesight had worsened so much that he could no longer do his work.

They tested his vision and fitted him with the first pair of DOT Glasses—a 3-D printed prototype.

They ran into Samuel on the street a few days later, purely by chance, wearing his new glasses.

“He was incredibly happy because he had found another job. He was absolutely beaming. Just telling that story gives me chills. It was the first realization after more than three years of often lonely work that we were really on to something that could change people’s lives in a truly tangible way.”

By late summer of 2019, about 1,000 people like Samuel were wearing DOT Glasses. And after a recent commercial launch, sales are promising with strong worldwide interest.

Stahelin’s vision for the future: fit millions of glasses annually.

“I want to prove that a 700-year-old technology like eyeglasses can still be disruptive with innovative thinking.” ⇌

WILL TECH KILL THE HUMANITIES?

thinkagain.

“A liberal education is not so much about learning to do a job as it is about learning to learn, and to love learning.”

Scott Hartley, author of *The Fuzzy and the Techie: Why the Liberal Arts Will Rule the Digital World*

Above right: An eye in focus. Image by Mohammad Hosein Mohebbi on Unsplash. At right, the components of DOT Glasses, designed around one stock frame size with snap-together parts. Image courtesy of DOT Glasses.

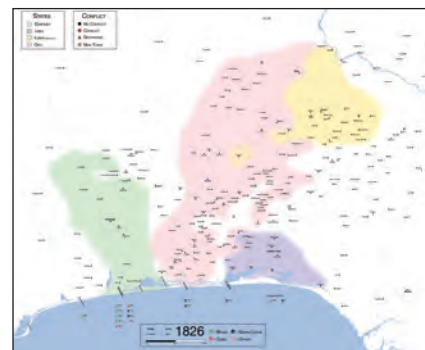




BY CAY LEYTHAM-POWELL

Maps of fallen kingdom shed light on Atlantic slave trade

NEW MAPS OF PRE-COLONIAL AFRICA PROVIDE CONTEXT ON THE SLAVES WHO DEPARTED FROM THE BIGHT OF BENIN



Those who boarded slave ships from the Bight of Benin, or the Slave Coast of Africa, lost their freedom, homes, identity and lives. New maps of a former kingdom made by a University of Colorado Boulder professor, though, may help shed some light on the centuries-old question of where they came from. | These 21 maps, including one that is animated, are the first of their kind to give boundaries to the kingdom of Oyo—which was in present-day southwestern Nigeria, parts of Benin and Togo—right around the time of the kingdom’s collapse.

Rather than serve as a definitive source, the hope is that these maps, published recently in the *Journal of Global Slavery*, along with data analysis by CU Boulder’s Laboratory of Interdisciplinary Statistical Analysis or LISA, will provide a degree of clarity for this turbulent time during the Atlantic Slave trade.

“I think having visualization really clarifies a lot of things. It’s clarified a lot of my own research, so I can only imagine how it can clarify this particular period in history in a place that had a huge impact on the Americas that people just don’t get because there aren’t maps,” said Henry Lovejoy, the study’s author and an associate professor of history at CU Boulder.

At its peak, the Yoruba kingdom of Oyo was one of the largest and most influential West African states. It was established in roughly the 13th century, and is best known for its cavalries that would patrol the forested savannas. The kingdom became infamous for its role in the African slave trade.

The kingdom of Oyo began simply as the city of Oyo, and while it steadily grew on its own, the slave trade out of the Bight of Benin brought it wealth and prosperity, leading to even greater conquests of nearby peoples. During this period, an estimated 128,000 people were captured by these cavalries during these conflicts, enslaved

and sent to the Americas—particularly Brazil and Cuba.

But the question remained: from where?

Present-day maps cannot be applied to pre-colonial Africa, and what other maps do exist are inconsistent or fragmented at best. Lovejoy decided to fix that through a Historical GIS (Geographic Information Systems) experiment.

He obtained geographic and historic data from established primary and secondary sources, like the Trans-Atlantic Slave Trade Database, and then imported that data into Quantum GIS, which is an open source version of the popular mapping software. He then used a plug-in to plot the creation and disappearances of towns surrounding and within Oyo when it was at its largest and to show the routes of slave ships.

Using these techniques, Lovejoy was able to show the general uncertainty surrounding Africa’s political boundaries at this time, including the approximate ebb and flow of Africa’s pre-colonial boundaries and the general human migrations at play due to the slave trade.

Lovejoy just cautions that these maps should be used only as approximations and not the end-all-be-all of maps for the Oyo kingdom. But it’s a start.

Lovejoy plans to work with LISA to use these maps and the conflict data to start creating mathematical formulas and heat maps to estimate where people may have originated from. By doing this, he hopes to provide a better history and understanding of not just this region of West Africa, but also of the Americas. →

IS NOTHING NEW IN HISTORY?

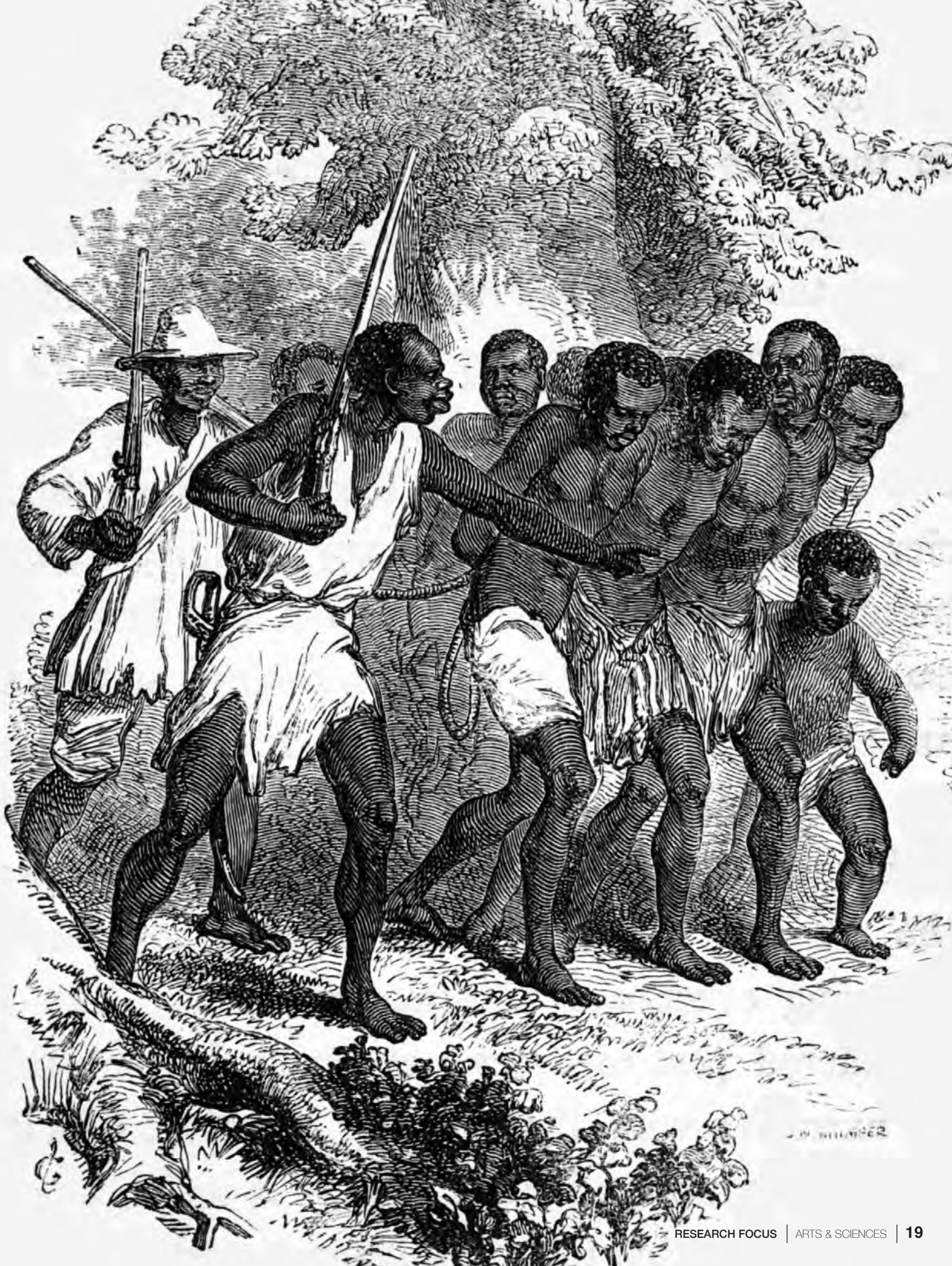
thinkagain.

Why fuse history and tech?

“To create the amazing future that technology is enabling, we need our musicians and artists working hand in hand with our engineers. It isn’t either one or the other; we need both the humanities and engineering.”

Vivek Wadhwa, distinguished fellow and professor, Carnegie Mellon University School of Engineering at Silicon Valley

Above: Lovejoy’s maps fuse statistical analysis and history. **Opposite page:** An image from the slaveryimages.org site, which Lovejoy directs.



J. W. BULLOCK



BY SARAH KUTA

‘Til death do us part

CU BOULDER RESEARCHERS FIND LINK BETWEEN MARRIAGE QUALITY AND MORTALITY

If you’ve taken the plunge, you’ve likely heard some variation of the popular marriage expression: “Happy spouse, peaceful house.” But research from the University of Colorado Boulder suggests that the phrase doesn’t go far enough and that the quality of your marriage may be linked to how long you live. A trio of CU Boulder researchers in the psychology and neuroscience department recently set out to explore the connection between marriage quality and mortality. The findings of their study were published in the journal *Health Psychology*.

“We found that the odds of dying for married people who described their marriage as ‘not too happy’ was 25% greater than the odds of dying for people who rated their marriage as ‘very happy’ or ‘pretty happy,’” said Mark Whisman, a CU Boulder professor of psychology and neuroscience and the study’s lead author.

Past research has found a connection between the quality of our marriages and our physical health. In

addition, other studies have measured the link between marital satisfaction and mortality in people with pre-existing conditions, such as cardiovascular disease and renal disease.

But Whisman, who also serves as the department’s associate chair for undergraduate education and director of undergraduate studies, wanted to understand whether a connection exists between relationship quality and

“Everyone knows that being physically inactive is bad for your health and can lead to a reduced lifespan, but you don’t really hear doctors talking about your relationship with your partner as something you should boost to potentially live longer.”

death by any means, a “downstream” health outcome, in a sample of the general, healthy population.

To do that, Whisman and graduate students Anna Gilmour and Julia Salinger analyzed data from the General Social Survey, a long-running national survey of American households led by the University of Chicago with funding from the National Science Foundation. They focused their attention on data gathered from more than 19,000 married individuals between 1978 and 2010.

As part of the survey, these married participants were asked, “Taking things all together, how would you describe your marriage? Would you say that your marriage is very happy, pretty happy, or not too happy?” The participants then selected one answer to rate their relationship.

Whisman, Gilmour and Salinger linked this survey data with information from the National Death Index, a database of national mortality statistics maintained by the National Center for Health Statistics.

Even after factoring in participants’ household income and self-rated health, the results showed a connection between marriage quality and mortality rates — those who were in happier marriages had lower odds of dying than those in not-so-happy marriages. The findings seem to support past studies led by Whisman, including research that linked divorce to a biological indicator of early aging.

“Mortality is arguably the most detrimental health outcome and so even though there are a lot of studies

showing that relationship quality can be impactful on less-severe health outcomes, it was really intriguing to see that we did find a significant difference even for mortality,” Gilmour said.

It’s important to note that the CU Boulder research showed a correlation between marriage quality and mortality, not a causal relationship, meaning that bad marriages don’t necessarily cause death, Whisman said.

The researchers pointed out that the magnitude of the association between marriage quality and mortality is similar to that of physical inactivity and mortality, which suggests that we should consider paying just as much attention to the health of our marriages as we do to hitting the gym regularly.

“Everyone knows that being physically inactive is bad for your health and can lead to a reduced lifespan, but you don’t really hear doctors talking about your relationship with your partner as something you should boost to potentially live longer,” said Gilmour. ➔

THINK PSYCHOLOGY’S IMPRACTICAL?

thinkagain.

All of these (world problems at the end of the day are human problems ... It's all about giving people the tools and controls that they need to be comfortable sharing the information that they want. If you do that, you create a very valuable service. It's as much psychology and sociology as it is technology."

Mark Zuckerberg, Facebook founder and former Harvard psychology major



BY CLINT TALBOTT

Runner, scholar sought the ‘life you ought to live’

MIKE SANDROCK EARNED DEGREES IN BIOLOGY AND BUSINESS AT CU BOULDER, BUT HE'D CHOSEN THOSE FIELDS FOR THE WRONG REASONS, HE SAYS; TAKING ANOTHER PATH HELPED HIM FIND MEANING IN ART AND LIFE

For Mike Sandrock, getting to Africa in 1986 had come at a price. He'd quit his job, sold all his belongings, walked away from his training in biology and business—just to make it to Cameroon, where he represented the United States in a marathon. Twenty miles in, however, he hit “the wall,” when a runner's glycogen—or stored energy—is depleted, when legs become lead. It was bad luck and good fortune. That episode symbolized his choice to run the road less traveled. Over time, that choice has made a difference to him and thousands of people in developing countries who have benefitted from his philanthropy, which began that day.

On the rocky dirt road, Sandrock, then a 26-year-old runner and recent University of Colorado Boulder graduate, struggled in vain to keep pace. As barefoot African runners bounded past him, he marveled at their grit.

Sandrock's running partner for the 10 miles before he hit the wall wore only light sandals that cut his ankle. Despite the man's deficient footwear, the African beat Sandrock by 45 minutes, then stood at the finish line in the withering heat, neither showering nor eating, only waiting.

“He stood and waited because he didn't want to miss me,” Sandrock recalls. “I was floored, because I was driven by the ego and had to achieve and achieve.”

For the African, “It was about me, not him.”

The African gave a hug to Sandrock, who was so moved that he gave the man his running shoes. When he returned to Boulder, Sandrock—sleeping on a friend's couch at the time—founded Shoes for Africa, a nonprofit that collected used running shoes, washed them, and shipped them to Africa. In the three decades since, the nonprofit—now called One World Running—has given tens of thousands of shoes to people in developing countries.

Sandrock has made a career as a newspaper journalist, book author and freelance writer. He has also been inducted into the Colorado Running Hall of Fame, alongside such household names as Olympians Frank Shorter and Lorraine Moller.

That background raises questions: Why did he get degrees in biology and business? Answer: He studied what was valuable to others, not himself. How did

that training help Sandrock chart his life's journey? Answer: Mostly, it showed him what he did not want to do.

His real passions were writing, traveling and running. That day in Cameroon cemented his desire to follow his heart.

Sandrock grew up in Chicago with four siblings and his mother, a single mom who worked as a teacher in Catholic schools. Once a year, she drove the family to Snowmass, Colorado, for vacation.

When Sandrock enrolled in CU Boulder, he picked a major by asking an advisor to name the hardest course of study on campus. The answer was engineering or molecular, cellular and developmental biology (also known as MCDB).

He graduated from CU Boulder in 1980, earning a bachelor's in MCDB along with a degree in general studies (humanities) *cum laude*.

After graduation, he took a job in a laboratory of Marvin Caruthers, the biochemistry professor who founded Amgen, the biotech giant.

“It was the most money I ever made, but I didn't have a passion for it,” Sandrock says.

So he changed course.

ARE THE HUMANITIES DEAD?

thinkagain.

“As we strive to create a more civil public discourse, a more adaptable and creative workforce, and a more secure nation, the humanities and social sciences are the heart of the matter, the keeper of the republic—a source of national memory and civic vigor, cultural understanding and communication, individual fulfillment and the ideals we hold in common.”

From *The Heart of the Matter*, a special report from the American Academy of Arts & Sciences



Above: Sandrock presents shoes to a finisher at the 2018 One World Running Cuba La Farola Run. Below, Sandrock collects donated shoes in the 1980s, finishes the Pearl Street Mile, and celebrates with fellow runners. Photos courtesy of Mike Sandrock.

At the advice of his brother, Sandrock left the lab and began studying for his master's in business administration, which he earned from CU Boulder in 1984.

Toward the end of his coursework, Sandrock found himself in a class discussion in which fellow business students were each asked what they wanted to do after graduation. His well-dressed cohorts talked about working as financial advisors or in the stock market. Sandrock's answer: "I want to write and travel."

Running became his first ticket to travel, and a CU Boulder humanities professor opened the door to a life in letters.

As a student, Sandrock had competed on the CU track team. Later, he clocked 2 hours and 24 minutes for the marathon, averaging a pace of 5:30 per mile. He hit a personal best of 30:29 (4:55 per mile) for the 10K.

Those times landed him an invitation to run for the United States in Yaounde, Cameroon.

His passion for the humanities flourished under the tutelage of the late Walter Weir, professor of philosophy and director of the CU Honors Program.

Sandrock took Weir's classes for a decade, even after graduation, until Weir's death in 1991.

"That's one reason I feel like I need to give back," Sandrock muses. Besides his nonprofit, he tutors student-athletes at CU Boulder. "I was fortunate enough to be with Wally, a world-class scholar, world-class person with what Boris Pasternak called a 'talent for life.'"

Sandrock started in journalism as a free-lance sports writer at the Colorado Daily and has spent three decades writing for that paper, the Daily Camera, Runners' World and other running publications. He has written a book, *Running With the Legends*, that Booklist described as "among the most fascinating books on runners and running."

Sandrock's ruminations often return to Joseph Campbell, a literature professor who famously counseled people to "follow your bliss," which would put them on a path that is "waiting for you and the life you ought to be living."

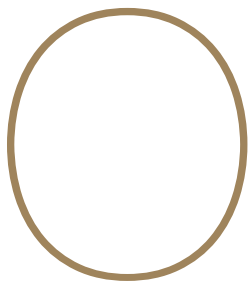
Sandrock's bliss led him to a dusty road in Africa, and he says that has made all the difference. ➔



BY LISA MARSHALL

Evidence of climate-driven conflicts is piling up

CLIMATE HAS PLAYED A SMALL BUT IMPORTANT ROLE IN FUELING CIVIL WARS AND OTHER CONFLICTS, RESEARCHERS FIND



In a sweltering July afternoon in the remote village of Daaba in Northern Kenya, CU Boulder Geography Professor John O'Loughlin was stood up by a tribal chief. | O'Loughlin and his colleagues had driven for hours along dusty roads in the drought-ravaged region to interview the local leader about if, and how, climate change is impacting violence levels there. The moment they pulled up they got some answers. | "We were told he'd been gone three days," O'Loughlin recalls, describing how 30 raiders had swept through the village earlier that week, stealing 100 head of cattle and prompting the chief and an armed party to go after them. "My guess is, if they caught up with them, it ended in violence."

The recent, mid-summer raid in Daaba is among countless small-scale clashes igniting across the African continent and elsewhere around the world as shifting rainfall patterns, rising temperatures, natural disasters and other climactic shifts help push simmering ethnic, religious and political tensions to a violent boiling point.

In recent decades, climate-related factors have played a small but important role in fueling civil wars and other armed conflicts, influencing between 3% and 20% globally, according to a June study co-authored by O'Loughlin and published in the journal *Nature*.

But with global temperatures projected to rise 7.2 degrees Fahrenheit by century's end (in the absence of substantial greenhouse gas emission reductions) one in four armed conflicts will soon be a result of a changing climate, the paper suggests.

"These will be the wars of the future," says O'Loughlin, a researcher with the Institute for Behavioral Science and a leading scholar in the study of so-called "climate wars." "I have done dozens of interviews with local elders in Africa, and there is a general sense that, while they have managed to

share resources and cooperate so far, it is getting harder and harder to keep a lid on the violence due to climate change."

THE FINAL SPARK

The link between climate change and armed conflict has been hotly disputed. Some scholars have pointed to conflicts in Syria and Darfur (Sudan as quintessential climate wars fueled by drought-sparked migration. Others, including O'Loughlin, have been more skeptical in the past, pointing to corrupt regimes, poverty and ethnic and religious differences as the primary culprits.

But the new *Nature* paper—a Stanford-led collaboration between 11 experts from political science, economics, environmental science, peace studies and other disciplines—marks a newfound consensus on the matter. It's bottom line: Yes, climate change helps fuel violent conflict, and it's poised to get worse.

"Climate change is not, in and of itself, a risk, but it works through other risks creating a multiplier effect," O'Loughlin says.

"I have done dozens of interviews with local elders in Africa, and there is a general sense that, while they have managed to share resources and cooperate so far, it is getting harder and harder to keep a lid on the violence due to climate change."



He still believes that things like unstable government, vast economic inequalities within societies and a history of violence are all bigger and more certain drivers of conflict.

But as he has seen firsthand through his field research, piling drought or flooding or loss of crops—and the suffering that results—on top of those vulnerabilities can push things over the edge, leading more young men in particular to take up arms.

But he believes many worst-case scenarios can be prevented through investments in things like crop insurance, post-harvest storage facilities and more resilient water systems in regions hit hard by shifting weather patterns.

“The question now is: To what degree will the developed world ignore this issue and to what degree will it get involved?” ↩

THINK GEOGRAPHY’S UNVIABLE?

thinkagain.

Geographers have employment options: Michael Brown, CU Boulder BA ‘90, has summited Mount Everest five times and made dozens of films on location from the highest peaks in the world, from South America to Antarctica. He’s also a teacher and founder of the Outside Adventure Film School in Boulder. *Outside* magazine has called him a “swashbuckling librarian.”

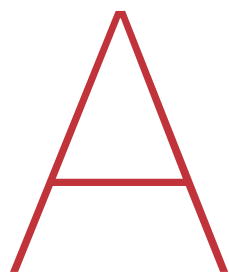


Above: A young girl stands amid the freshly made graves of 70 children, many of whom died of malnutrition, in Dadaab, a refugee camp in Kenya. Children have walked for weeks across the desert to get to Dadaab, and many perish on the way. Others have died shortly after arrival. **Below:** Livestock carnage. Photos by Andy Hall/Oxfam.

BY KENNA BRUNER

Lawyer, political science grad leaps into kelp farming

'KELP IS THE FUTURE OF FEEDING THE WORLD,' SAYS MARKOS SCHEER, AS HE LAUNCHES WHAT HE BELIEVES WILL BE THE LARGEST U.S. KELP FARM



As the world's population continues growing from its current 7.7 billion people, finding innovative ways to provide food will be critical. Experts say aquaculture will be key to feeding the world's burgeoning population, which is why CU Boulder alumnus Markos Scheer is launching a new career in kelp farming. | Scheer (PoliSci'90) was an attorney at Williams Kastner & Gibbs, a Pacific Northwest law firm. For 20 years, as he represented clients whose livelihood was based in wild-caught seafood, Scheer learned about the untapped opportunities of mariculture, or the cultivation of fish and other marine life for food, in Alaska.

The National Oceanic and Atmospheric Administration Fisheries estimates that the United States imports more than 80% of the seafood people eat. About half the world's seafood comes from aquaculture. The U.S. imports more than \$200 million in kelp products a year, which shows its potential, Scheer said.

Riding the wave of popularity for seaweed products, Scheer recently launched the largest kelp farm of its kind in the United States—a 127-acre kelp and shellfish farm off of Prince of Wales Island in southeastern Alaska.

"Kelp is the future of feeding the world," Scheer said. "The reason I want to grow kelp is because it has so many uses. Kelp is an amazing plant with tremendous nutritional factors. It absolutely is a superfood. It's everything that kale is, and more. And, it tastes better. That's my opinion."

Scheer has lived an unconventional life on his own terms, which has informed his venture into aquaculture.

Scheer grew up in the forests of northern Idaho with his mother, a botanist and forester. They lived in cabins without electricity or running water. In 1982, when Scheer was 13, they moved to Prince of Wales Island in southeast Alaska, where his mother was involved in reforestation. They lived in remote cabins, including a floathouse, again without running water and electricity.

After graduating from CU Boulder in 1990, he moved back to Alaska and worked in management

and operations with a seafood company. In 1996, he started law school at the University of Idaho. After earning a law degree in 1999, he went to work for a firm focused on the seafood industry. With 12 years of practical experience and developing relationships in the seafood industry, he leveraged it all into a successful law practice for the next 20 years.

As part of his law practice at Williams Kastner, Scheer became involved with the nonprofit Alaska Fisheries Development Foundation, serving as a board member for several years and helping to establish the Alaska Maricultural Initiative in 2013.

After developing the business plan for the initiative and learning about the potential of mariculture, he realized that the initiative needed someone to implement the plan at commercial scale for the initiative's goals to be met.

"I realized I'm that guy," he said. "I spent a couple of years

THINK POLI SCI IS MORIBUND?

thinkagain.

Here's what CU alums are doing:

Pam Jenkins (BA'82), president of global public affairs at Weber Shandwick, a public-affairs and strategic communications firm in New York.

Joseph Neguse (BA, summa cum laude, '05), lawyer at Snell & Wilmer, former member of the CU Board of Regents, now a U.S. Representative for the Second Congressional District.

Carl Quintanilla (BA'93), CNBC journalist, co-anchor and anchor, respectively, of CNBC's morning programs Squawk on the Street and Squawk Alley.

Loren B. Jenkins (BA'61), won a Pulitzer Prize for international reporting in 1983.



CONTINUED > **Kelp Farming**

raising enough capital to get the plan off the ground. I got it started and now I'm a kelp farmer."

Kelp is a form of seaweed. It is a source of vitamins A, B1, B2, C, D and E, and minerals such as zinc, iodine, magnesium, iron, potassium, copper and calcium. Kelp farms can produce protein-rich foods with a significantly lower carbon footprint than a livestock farm, with no fertilizer or land.

"We believe that the carbon footprint for our grow-out will be negative, meaning the plants will be taking more carbon dioxide out of the water than we will burn growing and harvesting it," he said.

"My political science degree from CU led to me to law school," Scheer said. "All of the components in my life were part of the learning process that gave me the confidence to jump off the dock and do this. I had no anticipation when I was 20 years old and graduating from CU that in 2019, I would be a kelp farmer in Prince of Wales Island. You never know how things will turn out until you try."

Scheer's advice to CU Boulder students is to work hard, "believe in yourself, take risks but be deliberate and informed about it and don't wait for others to solve problems for you." ⇐

"My political science degree from CU led to me to law school. ... All of the components in my life were part of the learning process that gave me the confidence to jump off the dock and do this. I had no anticipation when I was 20 years old and graduating from CU that in 2019, I would be a kelp farmer in Prince of Wales Island. You never know how things will turn out until you try."





Left
Scheer enjoys a moment with his family, which includes his wife of 22 years, Hillary, and his sons Owen and Quinn.
Photo by Aimee Shull.

Top
Scheer examines a piece of bull kelp that features a frond (*Nereocystis Leukeana*) with sori (spore).
Photo by Hillary Scheer.

Inset Left
Scheer speaks about mariculture at a conference proceeding.
Photo by Heather Holt.

Inset Right
One of the rustic cabins, with no electricity or running water, that Scheer has lived in.

BY CLAY EVANS

Amsterdam to Boulder, by boat, bus and bike

CLIMATE RESEARCHER ESCHEWS AIR TRAVEL ON 8,000-MILE 'COMMUTE' TO TAKE UP INSTAAR POSITION

Climate scientist **Joep van Dijk** was excited when he received a postdoctoral appointment to the Institute of Alpine and Arctic Research at the University of Colorado Boulder. | But the news presented a conundrum: Concerned about his personal carbon footprint, he didn't want to fly from his home in Amsterdam to take up the new job. According to some studies, a round-trip flight from New York to Europe can create a warming effect equivalent to 2 or 3 tons of carbon dioxide per person, or nearly 16% of the average American's annual carbon output. | "I thought, 'I have three months, let's see if I can get to Colorado without flying,'" says van Dijk, who specializes in paleo-oceanography and paleoclimatology.

He'd soon come up with an ambitious plan: He'd sail across the Atlantic, then bike from his U.S. port of call to Boulder. And that's just what he did, in 87 days.

"I arrived by bike in Boulder Sunday, March 31," he says. "Monday was my first day of work."

The time and effort to make his more-than-8,000-mile journey was considerable, but worth it, van Dijk says.

More than anything, van Dijk wanted his slow-boat-and-bike trip to serve as an example.

"It's not that difficult. It takes a bit of energy, but it will make you pretty happy in the long term to know that you didn't contribute to the (climate change) problem," he says. "And I'm pretty sure that within a couple of decades, all these things I'm doing will become normal."

He took video and photos along the way, and is now crowdfunding to raise funds to produce a documentary titled, "Carbon Dioxide? That's Not Right!"

Climate scientist Joep van Dijk rides near Colorado Springs along Fountain Creek on his way to Boulder. Image courtesy of Joep van Dijk.





Joep van Dijk sails near the coast of St. Lucia in the Caribbean on his way to Colorado. Image courtesy of Joep van Dijk.

THINK CLIMATE TRUMPS
THE HUMANITIES?

thinkagain.

"I say this as a scientist who has spent decades studying how our planet functions and how the Earth's climate is changing: Because humans are the major agents of change on the planet, this work has required that I understand how humans operate—the sphere of fields ranging from economics to ethics."

James W.C. White, interim dean, professor of geological sciences and one of the world's most highly cited researchers in the realm of climate change

Van Dijk started his odyssey by searching online for someone to sail with. That's where he met Captain Robert Bachmann, a German man planning to sail his roughly 40-by-15-foot catamaran, Namaka—named after a Hawaiian sea goddess—from the Canary Islands to the Caribbean.

Van Dijk left Amsterdam by train Jan. 2 for Almeria, Spain, where he met Bachmann.

"He took me on for two reasons. He liked the idea of a documentary, and was a documentary maker himself. And if need be, he was

capable of doing the crossing himself, without help," van Dijk says.

The Namaka embarked from Las Palmas with Bachmann, van Dijk and two German passengers aboard on Jan. 18. They encountered mostly smooth sailing over the next several weeks, except for some doldrums—areas of low or no wind—that forced the captain to alter his route, and arrived in Barbados on Feb. 10.

From George Town, capitol of the Bahamas, he took three ferries to Florida, where he boarded a red-eye Greyhound bus for New Orleans. There, he bought a bike and began the final, 1,400-mile leg of his journey on March 11. Three weeks later, he showed up at INSTAAR to start his new position researching—as he put it in lay terms—"How did the earth's marine ecosystem respond to the meteorite that wiped out the dinosaurs?"

Van Dijk has been interested in climate science since high school, where he designed a solar panel with an eye toward fueling his school through solar energy. Undergraduate research in Spain showed him the importance of the geological record in understanding climate issues. As a graduate student, he worked in Switzerland helping to reconstruct the terrestrial climate of the early Eocene period.

His increasing knowledge about climate change inspired van Dijk to begin making changes to his lifestyle. He became a vegetarian—a 2016 study by scientists at the University of Oxford found that widespread adoption of a vegetarian diet would reduce carbon emissions from food production by as much as 63%, and a vegan diet by as much as 70%—and began to balk at having to fly to conferences and do field work.

Van Dijk recognizes how deeply ingrained luxuries such as air travel and meat-based diets have become in the lives of many Americans. But, he says, it's possible to make changes incrementally, such as by

"I'm pretty sure that within a couple of decades, all these things I'm doing will become normal."

starting with a "meatless Monday" then increasing the number of meatless days. And he believes that "slow travel" is ultimately more rewarding than winging it to a beach for a week and returning, exhausted and harried. ⇌

Meet our newest distinguished professors

THREE FACULTY IN THE COLLEGE EARNED THE DESIGNATION OF 'DISTINGUISHED PROFESSOR' THIS FALL

'SNOW AND ICE ARE COOL!' So says Mark Serreze, as he talks about being named a Distinguished Professor, how he got interested in the cryosphere, and why you should care about snow and ice

MARK SERREZE directs the National Snow and Ice Data Center (NSIDC), and his work has significantly improved our understanding of the Arctic's role in global climate.

He recently fielded questions about his research and life, and these are his answers:

If you were to briefly tell an audience of high-school students why they should study the cryosphere, what would you say?

Snow and ice are cool! The cryosphere acts as the natural refrigerator of our planet, and in many parts of the world, the water that slakes our thirst and that we

use for agriculture and other purposes comes from snow and ice.

Where would winter sports be without snow and ice? But it also presents hazards, ranging from avalanches to slippery roads to even ice cream headaches.

The world needs more people who know about the many facets of the cryosphere.

NSIDC is perhaps best known for tracking the Arctic sea-ice minimums each year; what would you like the general public to know about the center besides this?

The public needs to know that NSIDC has a mission:

'CLASSICS HELPS US UNDERSTAND WHO AND WHY WE ARE' Carole Newlands talks about being named a Distinguished Professor, reasons to study classics and why Ovid matters today

CAROLE NEWLANDS began learning Latin at the age of 11 as a schoolgirl in Scotland. As a university student, she discovered the poetry of Ovid.

At CU Boulder since 2009, Newlands is a scholar of Latin literature and culture and is one of the world's finest Latinists.

She recently fielded questions about her scholarship and life:

If you were to briefly tell an audience of high-school students why they should read Ovid, what would you say?

As my own students have commented, if you read

all the stories ever told in the whole world, you will find that Ovid told most of them first or best in the *Metamorphoses*, his great poem about metamorphosis, the change of one life form into another.

They should read him for his stories because they will come back and back to them in different forms throughout their whole life. ... Ovid wrote 2,000 years ago ... and yet he is astoundingly modern, a writer for all time whose characters live on in modern dress in film and TV today.

What argument would you make to prospective students about the value of a degree in classics?

The classical world permeates today's legal and

DON'T BE A SCIENTIST UNLESS YOU REALLY LOVE IT Min Han talks about being named a distinguished professor, what qualities mark the best scientists, and the benefit of flexible thinking and nimble work

MIN HAN knows that science can be very rewarding, but he wants prospective scientists to know that they really have to love the process of research, even when good results are elusive.

At CU Boulder since 1991, Han has distinguished himself as a national and international authority in molecular and developmental biology. He has run a highly dynamic research program in his lab, addressing cutting-edge problems in diverse biological fields related to human health.

He recently fielded questions about his research and life:

If you were to briefly tell an audience of high-school students why they should study molecular biology, what would you say?

This is a complicated issue that I have thought about for a long time and discussed with a huge number of early-stage graduate students (not high-school students) over the past 15 years.

The answer is not so simple as to use the fascinating new findings in biology as the bait to lure young students into the field. My main message today would be this: *being a scientist is absolutely wonderful*,

In September, the CU Board of Regents designated seven faculty members across the four-campus University of Colorado system as Distinguished Professors. It is the highest honor the university bestows on its faculty members. Three of the honorees are in the College of Arts and Sciences: Carole Newlands of classics, Mark Serreze of geography, and Min Han of molecular, cellular and developmental biology.

“To be the authoritative data management and science center for cryospheric data and research. We advance understanding of Earth’s frozen regions and the changes taking place to inform decision making in service to humanity and Earth.”

We are proud of what we do, because what we do is very important. And we are proud to pursue our mission as part of the University of Colorado.

When did you know that you would devote your career to the study of snow and ice?

I think that the real decision point was back in 1982, when I first visited the Arctic as a young graduate student.

It was a magical day when I stepped off that ski-equipped Twin Otter at the top of an ice cap into a world of pristine white. I knew that I had found my calling. ↔



political thought; it shapes our buildings; its words are stamped on American coins; campus itself is a Latin word in daily use; we follow the Roman calendar and Roman time.

By understanding such an influential ancient civilization, we can better understand the society in which we live now.

Classics majors learn marketable skills that are highly prized by employers in today’s volatile job market: how to read critically, think analytically, and communicate articulately. An education in classics also expands students’ knowledge and experience of the world and helps them develop important moral virtues such as empathy and tolerance.

Classics helps us understand who and why we are, and where we might or should be going. ↔



but only if you enjoy the process of doing scientific research, regardless of whether you achieve the goal (results) from your efforts.

I also believe that graduate programs in many places in the world, including in the U.S., need some reform; this system is not really attractive to intelligent students (also see below).

When did you know you would devote your career to molecular biology?

In graduate school. Biology was not my choice of major when I entered college, and I went to graduate school because it was my best option in life.

I started to like it towards the end because I realized that I was pretty good at research. The independence my advisor granted me also made the key difference. It is hard to enjoy doing science if all you do is follow someone else’s instructions. ↔



By the numbers.

Student Support



Willow Reed

What do homing pigeons, GPS and electrical grids have in common? They can all go haywire during a solar flare. That's why astrophysicist and Forever Buff Willow Reed is studying these celestial storms to help keep us safe on Earth.

Thanks in part to a scholarship, Reed is joining the next generation of scientists who work alongside talented CU researchers supported by generous donors.

The scholarship provided more than financial relief for Reed. It was a chance to share her research with others in her field. Now, as part of her career, Reed is hoping to increase science education and outreach in our communities.

Read her story >> giving.cu.edu/wonder



\$2,038,396

Total amount awarded in student aid by the College of Arts and Sciences in 2018-2019.

\$771,358

Total amount awarded in student aid by the Dean's Office through:

259 SCHOLARSHIPS

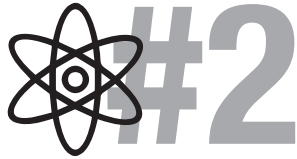
\$46,945,093

Total institutional aid for College of Arts and Sciences undergraduates for 2018-2019.

Academic Excellence



ranking of **geosciences publications** and the number of times they are cited by others
(Essential Science Indicators).



ranking of **atomic molecular and optical physics program 2020**
(U.S. News & World Report)



ranking of **geosciences program**
(Center for World University Rankings, 2017)



rankings in **ceramics, geology, physical chemistry and quantum physics**
(U.S. News & World Report, 2016)



National Professors of the Year
(physics Nobel laureate Carl Wieman, 2004, and physics Professor Steven Pollack 2013).



Fulbright Scholars



worldwide ranking for **scholarly citations and research impact**
(Leiden University, 2014).



Guggenheim Fellows



members of **National Academy of Sciences.**



members of **American Academy of Arts and Sciences**



ranking in **earth and marine sciences**
(QS World University Rankings, 2016).

College of Arts and Sciences

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