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Be Boulder.

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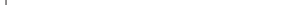
DO BOULDER





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Imagine shooting bacteria into space and getting gold in return.

Using biomining techniques — which involves mixing specialized microbes and water to extract metals from rock — it might be possible, according to Luis Zea of CU's College of Engineering & Applied Science.

On Earth, biomining accounts for 15 percent of the copper and 5 percent of the gold extracted. In space, there's opportunity for harvesting much more — and not just copper and gold.

"In space, there are virtually limitless amounts of some of the 44 endangered elements that could face supply limitations here," Zea, an assistant research professor in aerospace engineering, said over the summer.

Armed with a seed grant from the CU Boulder Research & Innovation Office, Zea and co-investigator Jesse Colangelo, a geological sciences research associate, will explore the effectiveness of biomining from lunar, Martian and asteroid sources using the bacterium *Shewanella oneidensis*.

Avery, founded in Boulder in 1993, employs several alumni, including classics lecturer and beer archaeologist Travis Rupp (MClass'10).

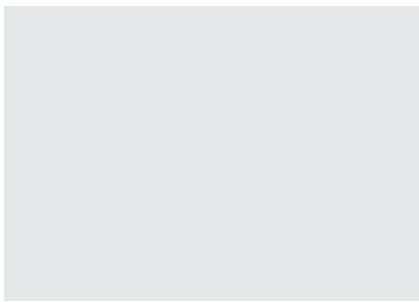
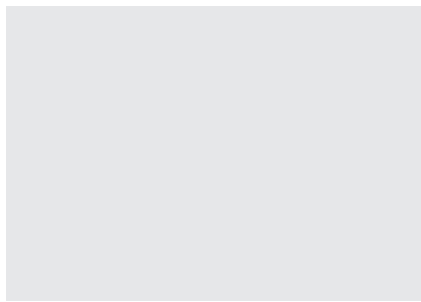
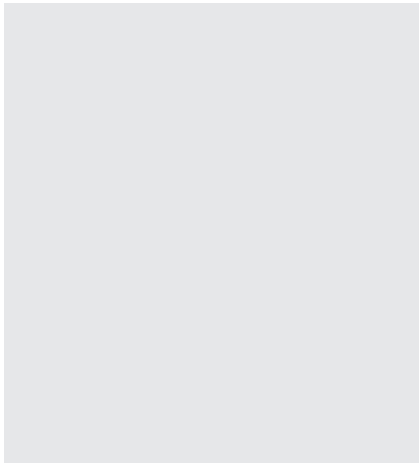
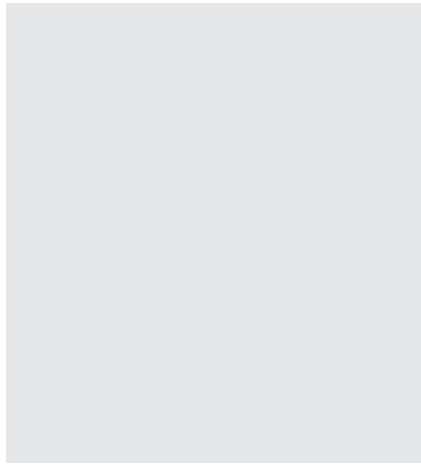
Nail Salon Hazards

Airborne chemicals in a nail salon are similar to those found in an oil refinery or auto garage, according to a study by the University of Colorado Boulder.

Here's My Card...

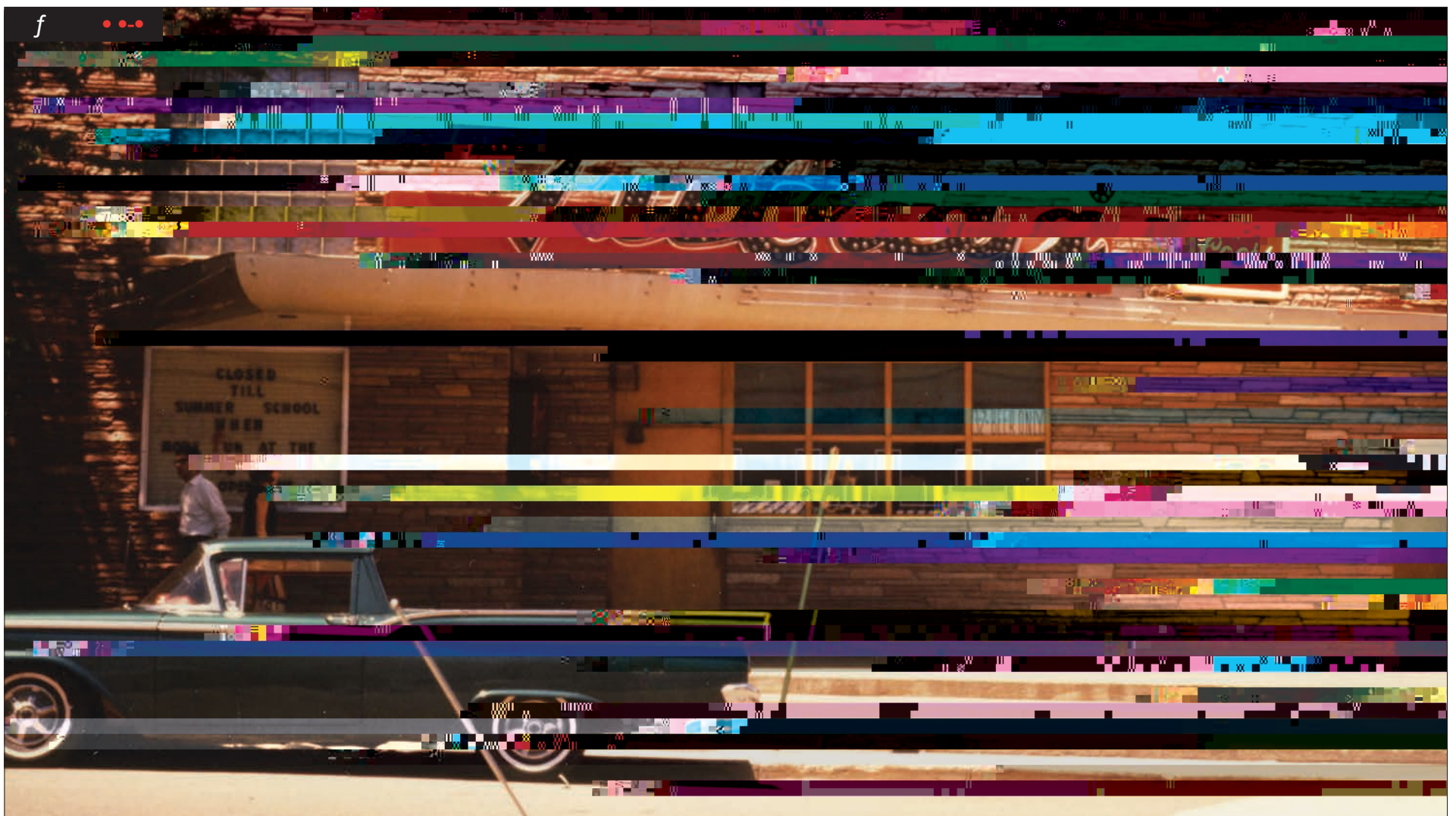
Visiting cards, also known as calling cards, were popular among both men and women in the 19th century. People making a social visit to a home would present themselves by leaving a card, often with a domestic servant. Specific etiquette depended on age and status. Whether plain or elaborately decorated, the card typically listed only the bearer's name, leaving space for a message.

These cards belonged to Timothy Stanton (1883), a member of CU's Prep School in 1877-78. Stanton subsequently enrolled at CU, graduating with the university's second class. He went on to a distinguished career in paleontology.



21st-Century Dorm

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The Tule

uring winter break 1971, around Christmas, a disheveled band took the Tulagi's stage on The Hill. The heater was broken, the club was frigid, the crowd was small. One of the musicians strummed a banjo in gloves.

G. Brown (Jour'79), then a CU freshman, (legally) served 3.2 Coors beer from the bar and listened skeptically.

"I remember them saying, 'We're going to be the biggest band in the world,'" said Brown, now executive director of the nonprofit Colorado Music Experience. "I was thinking, 'What are you talking about? There's 30 people here.'"

Less than a year later, the band toured the country with "Take It Easy."

"The Eagles were on to the races to become the biggest American band of the 1970s," said Brown.

In its 1970s heyday, Tulagi, located at 1129 13th St., hosted star acts, including the Doobie Brothers, Linda Ronstadt and ZZ Top.

"Bonnie Raitt was the only artist to help me clean up," said Brown. "She picked up a broom."

Founded in the 1940s, it was first located in what is now the Fox Theater, according to Boulder's Daily Camera. In 1948, the owners changed the name to Tulagi, after one of the Solomon Islands. (A tropical painted mural served as the stage backdrop for the venue's entirety.) The club moved next door in 1951.

"We did quite a bit of dancing at the Tule, 'cause it had a nice dance floor," said Larry Knadle (Bus'60).

In 1969, Sink owner Herb Kauvar took over Tulagi, said his son Rick Kauvar (EPOBio'75). Music promoter Chuck Morris brought in the famed 1970s performers.

After Morris left to open his own nightclub, Tulagi struggled, Rick Kauvar said. In 1973, Herb sold it to three men who defaulted on the lease, and the club changed hands again.

And again.

Still, Tulagi endured into the early 2000s, hosting acts like Big Head Todd & the Monsters and The Samples.

Anne Thurman (Mktg'87) met her husband of more than 30 years there.

"It was April 1987 ... Bahama-Mama Tuesday," she said, recalling that David Thurman (Fin'87) called her by the wrong name after their initial introduction. "He was calling me a couple days later asking for a date. Luckily, he then remembered my name is 'Anne.'"

The end came in 2003, when state tax agents seized Tulagi, according to the Camera. The Fox Theater bought the business. The building's owners converted it into commercial rental space. Today it's occupied by a yoga studio and a pizza parlor.

The Tulagi sign, in its slanting script, remains — a reminder of good times past.

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Teresa DeAnda had just gathered her family for dinner in the backyard of her modest home in California's Central Valley when her eyes and throat began to burn.

At first, she joked that her homemade salsa must be too spicy.

Then things took a serious turn.

All across the dusty farm community of Earlimart, residents began to fall ill that warm evening in November 1999. Some vomited or felt short of breath. Many called 911.

"People were scared," said CU Boulder sociologist Jill Harrison. "No one knew what was happening."

By the time Harrison interviewed DeAnda two years later as part of her doctoral research, the mystery had been solved: Earlimart residents, including DeAnda, had been exposed to a toxic fog of metam sodium, an agricultural pesticide that had drifted into town after application on a nearby field. Ever since, the working-class, largely Latino community had been afflicted by a wave of miscarriages, cancer diagnoses, asthma and birth defects.

While it's impossible to say how much that night's exposure contributed to these health outcomes, DeAnda herself ultimately died, at age 55, of liver cancer.

"That experience really changed me," said Harrison, looking at a photo of herself and DeAnda. "It made me realize that, notwithstanding all the accomplishments made in terms of wilderness

Some, including children and elderly women, were rounded up by emergency responders, taken to a school playground, told to strip down to their undergarments and hosed down before TV cameras.

California fined the applicator \$150,000. Metam sodium remains in use today.

“This never would have happened this way in Beverly Hills,” said Harrison.

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While environmentalists concerned about pesticides often prioritize buying and eating organically grown food (which is grown without pesticides but involves only about 1% of farmland), this step alone has done little to help low-income agricultural communities like Earlimart avoid pesticide drift, Harrison’s research suggests.

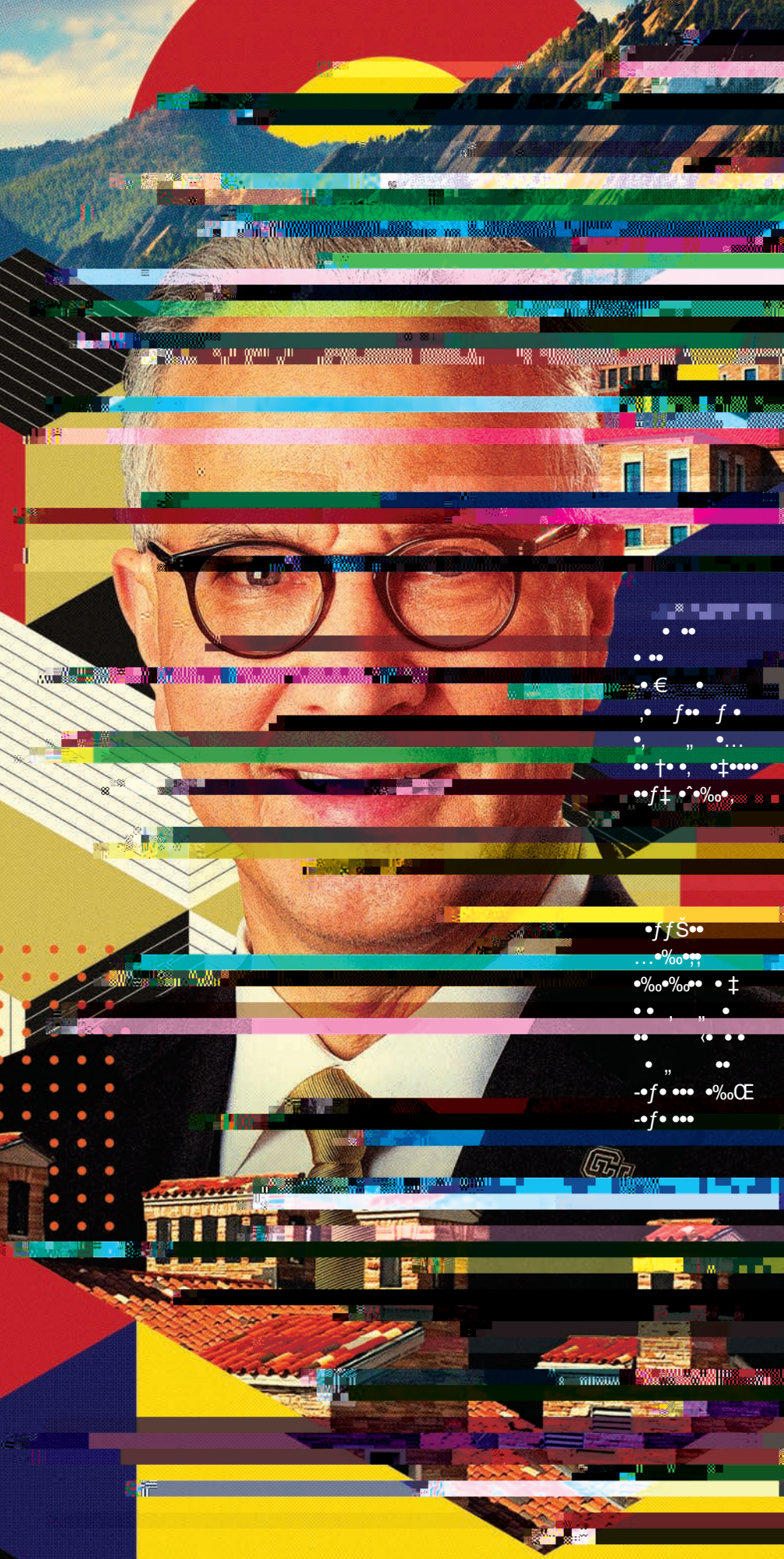
She advocates for pesticide buffer zones around schools and neighborhoods, greater restrictions on which pesticides can be used and how, and providing farm neighbors with drift catchers, small devices for monitoring the air for pesticide residue.

“Jill seems to be the only person studying this at all. Period,” said Emily Marquez, a staff scientist with the Berkeley-based Pesticide Action Network, which works to counter pesticide drift. “These frontline communities already know they’re being poisoned, but the general public isn’t aware.”

As far as other pollutants go, Harrison believes that, first and foremost, existing

regulations should be strengthened to red31 other (y1 (.bo215 s (er)26 ()23 (w)15 (oul

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“ ‘Early bird. During high school, I worked summers in a small-town bakery starting at 1 a.m. Since then, I have always found it valuable to get an early jump on things.

” ‘Coffee. Born caffeinated, I did not start drinking coffee until later in life. I now find it indispensable to the start of every day.

•• ‘Häagen-Dazs’ rum raisin.

• “ ‘I am haunted by Kai Fu Lee’s AI Superpowers. I am left with grave concerns that the United States is not taking the actions necessary to preserve our innovative edge, and that losing that edge will have profoundly negative consequences for our prosperity and security. This leaves me even more motivated to work hard to ensure America has the talent and the discovery necessary to keep our technological lead.

€ ‘360° — I have always striven to gain an ever-broader view.

• ‘I may never get used to driving along cliffs with no guardrails.

Ž — I began life in Murdock, Minn., population less than 300, and at age 4 moved to Pequot Lakes, population around 450. I began working at age 14 picking strawberries, washing dishes and pumping gas. I was in band, choir, plays, student government, Boy Scouts and played in the area jazz ensemble. I lettered in basketball, track and field, setting a school record in the mile run, and managed the football team. In 4-H, I won trips to the state fair with my beef, electric and photography exhibits. My wife and I met as 4-H Ambassadors. It is hard to match the breadth of experiences available in a small town.

• ‘I miss being in the midst of the debate on the most serious issues facing our nation. I enjoy raising money and advocating for policies I believe are important, both of which I do in my role as president of CU. I don’t miss purely

partisan groups poised to attack every time you reject the extremes.

• ‘Those who travel by car with me are surprised that I regularly sing during the journey, normally beginning with “I am just a plain old country boy...”

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Focus a little less on extracurricular activities and a lot more on striving for A’s. As a first-generation college graduate, I had no one to coach me. My undergraduate activities included work-study, dishwashing in the cafeteria and shelving books in the library, touring with the chorus, playing in the pep band, organizing an undefeated co-ed volleyball team, being captain of an intramural basketball team and serving on the student senate. My acceptance to Michigan’s MBA program provided a second chance. I took off Friday or Saturday evening, never both.

“ ... “ With most of today’s students likely to work during their lifetime in jobs not yet invented, it is ever more important that CU cultivates students’ critical thinking, teamworking skills and cultural awareness by getting students to wrestle

with difficult questions and fostering an environment of inquiry and debate. We should seek every opportunity to embrace adaptive learning technologies that supplement classroom dialogue led by knowledgeable professors with digital offerings that know what learners already understand, what they struggle with, how they respond to different teaching methods, what incentives drive them to excel. Today’s digital natives will increasingly rebel against being forced to learn at the same speed, in the same way, at the same place and at the same time.

• • ‘As a president who called CU to stay true to its heritage of taking bold steps into the future, challenging it to not be trapped

Rodney Sauer knew it would be a heavy lift: He'd signed up to haul 5,000 pounds of vintage sheet music in 60 large boxes from Los Angeles to his Colorado home, driving the distance alone and loading and unloading on each end.

The pianist and sometime-accordionist had looked into shipping the whole lot, but the boxes weighed more than UPS would handle.

So, in September 2013, Sauer (MChem'89), bought a one-way plane ticket to L.A., rented a U-Haul and recruited five people he'd never seen convene at a storage facility between Interstate 5 and the Los Angeles River, just north of Dodger Stadium. There, in unit B749, he beheld the treasure he had purchased sight unseen and come a thousand miles to collect: Nearly 4,000 musical scores from silent-era L.A. movie theaters.

"The music is really hard to find," said Sauer, former member of the Los Angeles Philharmonic, one of the nation's premier orchestras of music. "When it becomes available, you buy it."

The first successful feature-length sound film, *The Jazz Singer*, hit theaters in 1927. By 1929, silent film was passé. Most of the films are lost, as is most of the music.

Sauer, enlisted through an internet search, lent the first one of

home amid heavy rain deluging the Boulder area. It would lead to historic flooding, evacuations, destroyed homes and more than a half-dozen deaths. A day later, a bridge into Louisville collapsed.

Sauer left the music in the U-Haul until the rain stopped, checking periodically to make sure the truck wasn't leaking. Afterward, he and friends moved the boxes inside.


Over the next few years, Sauer pored over the scores, most of them from the early 20th-century Grauman theater chain, which included the Metropolitan and Grauman's Chinese Theater (now called the TCL Chinese Theatre), the Hollywood Boulevard site of generations of glamorous awards ceremonies. Sauer digitally scanned many pieces, cataloged most and began performing some of his favorite finds.



Tom Garfinkel, a big success in the business of the NFL, proves a Buffalo can become a Dolphin.

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A NEW



CU Boulder's soul-stirring vistas are legendary. John Steele couldn't avoid them if he tried. For the past 19 years he's been repairing and replacing the red-orange clay roof tiles that are a hallmark of CU's campus.

"Best place in the world, I've always said," said Steele, the senior roofer in CU's Facilities Operations and Services division.

With 160 tiles in a 10-square-foot area, and at least half of the school's 3 million square feet of rooftop covered in clay, Steele and a partner are responsible for keeping on top of millions of tiles.

Along with CU Boulder's signature sandstone walls, limestone trim and black metal accents, the Mission-style tiles were the inspiration of Philadelphia architect Charles Klauder, who in 1919 produced CU's first campus master plan. He ultimately designed 15 buildings in what he called "Colorado style" and former campus architect Bill Deno calls "Tuscan Vernacular." Boulder's landscape reminded Klauder of a bike ride he'd taken through northern Italy.

In 1921, Hellems Arts and Sciences went up as the first campus building in the new style, a departure from Klauder's previous collegiate gothic work.

"He stressed that Colorado would be the first educational institution in the West to attempt a uniform building style," Deno said in *Body & Soul*, his book about Klauder's influence on CU. "He promised them that his building plan would make Colorado's campus one of the most beautiful in the United States, and he delivered."

In the early 20th century, the clay for the tiles came from local quarries, a factor for the ever-frugal Klauder. Most have since closed. Today the handcrafted, kiln-fired tiles come from an Ohio firm,

Ludowici Roof Tile Company. Each comes with a 75-year warranty.

CU replaces between 50 and 75 tiles each year. But a lot of the originals, now nearly 100 years old, are still in place.

"That's what tile roofs do — they last a long time," said Steele, who's been on top of nearly every building at CU Boulder. "You're paying for longevity."

When CU gutted and renovated the 81-year-old, Klauder-designed Ketchum Arts and Sciences building in 2015, workers pulled out, examined and reused almost every tile. Besides the exterior walls, the tiles are now among the only original elements, campus architects said.

It's not just the tiles' mixture of clays that make them strong. Their curvature helps mitigate hail damage by distributing the force of impact.

Hardy as they are, their most striking feature is their color — colors, really.

To the careful observer, there are sometimes subtle but usually harmonious variations from rooftop to rooftop. Duane Physics has only a few red and orange tones in a generally flat nish, for example, while Clare Small has ivory and deep brown tiles, some with glossy finishes. CU Boulder's architectural style guidelines, while strict, are not rigid.

"When a new architect arrives, we don't hand them a stylebook, like at other places," current campus architect Bill Haverly said. "We walk them around."

Sometimes it can take Steele and a partner up to an hour to change a single three-pound tile.

"It depends," said Steele, who does most of the work in summer. "If they're the pans, which are the bottom tile, then you have to take out the caps all around it to get to that one piece. And then you have to put it all back together."

It's the dedication of people like Steele that helps CU Boulder maintain its reputation as one of America's most beautiful universities. Without the red clay roofs, it wouldn't feel the same.

For Steele, that's satisfying. So is the feeling that he's contributing in a practical way to the university's academic mission.

"I like helping to keep people's heads dry while they are learning and advancing their life," he said.

Comment? Email the editors at editor@colorado.edu.



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Brittany Bonner (MMus'20) exhales. She glances in a mirror to observe signs of tension in her body. She inhales deeply, picks up her oboe and plays again.

The oboist from Mansfield, Texas, is practicing her vibrato — a gentle-but-regular variation in pitch — to add natural-sounding depth to her tone. A convincing vibrato requires controlled breathing, and muscular tension can interfere or cause it to disappear.

Fortunately, Bonner's got James Brody to help sort things out.

"Musicians move athletically," said Brody, the CU Boulder music professor who founded CU's Musician's Wellness Program, which helps students avoid or recover from injuries caused by repetitive motions and quirks of technique, setting themselves up for longer periods of peak performance.

Brody, also an oboist and the program's primary faculty instructor, sees more than 100 CU students annually. Some have injuries such as tendonitis or vocal cord dysfunction, which, if unaddressed, can compromise a musician's future and sense of identity.

"Music students lead complicated lives," said Brody, who also refers them to a network of on-campus physicians, physical therapists and counselors, as necessary. "What they do is tied very closely with their vision of themselves."

Established in 2003, the wellness program offers students individual consultations and academic credit courses, all of which involve the Alexander Technique. It's a method of releasing tension through adjustments to posture and movement based on body awareness.

Students use yoga balls, mats and mirrors in Brody's office, where he keeps, as an instructional aid, a full-size model human skeleton. The program will move to bigger quarters in 2020, once the music school's \$57 million, 64,000 square-foot addition opens.

CU was among the first universities to offer a music wellness program, according to Brody, who convinced administrators the

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Alexander Technique and other wellness approaches could equip music students for success. The (w)riseT whrer (ses 1 (y)25 (a)3er)31 (("d)19 (ev)JT versities to o nen 100 25-5 ()JT31 ()CUd [ver,j 0.(er (sceJ T* [(their bigg)th 31 (m)1

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f course the engineers invited the drones.

They performed brilliantly.

Given a starring role in the formal Aug. 26 debut of CU Boulder's \$101

What Keeps You Up at Night?

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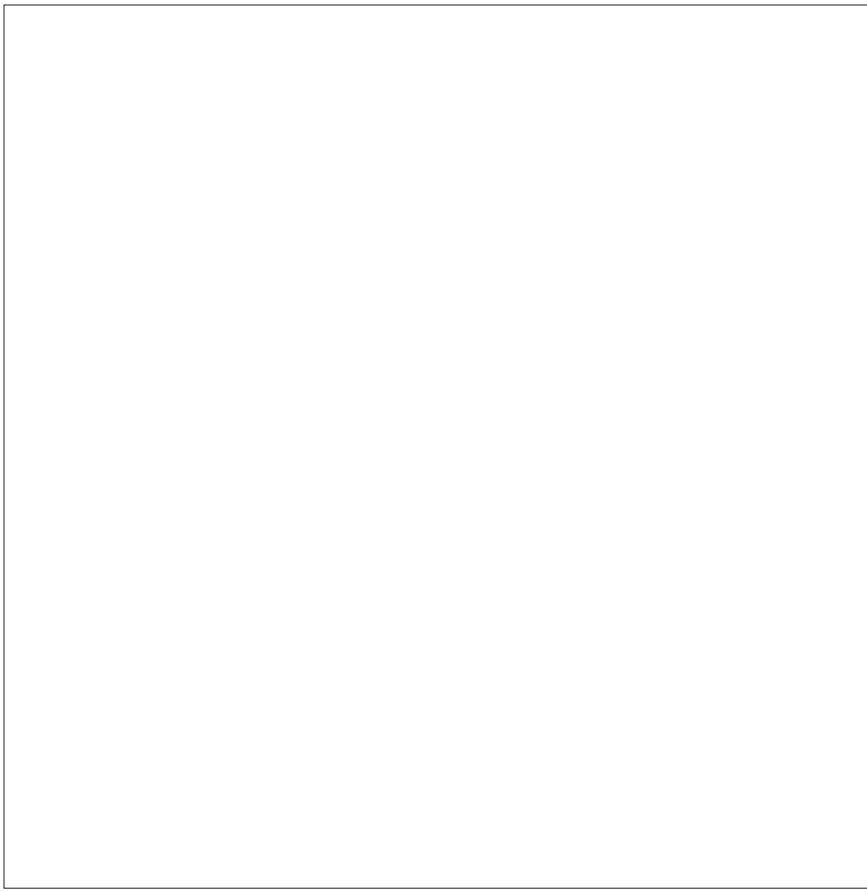
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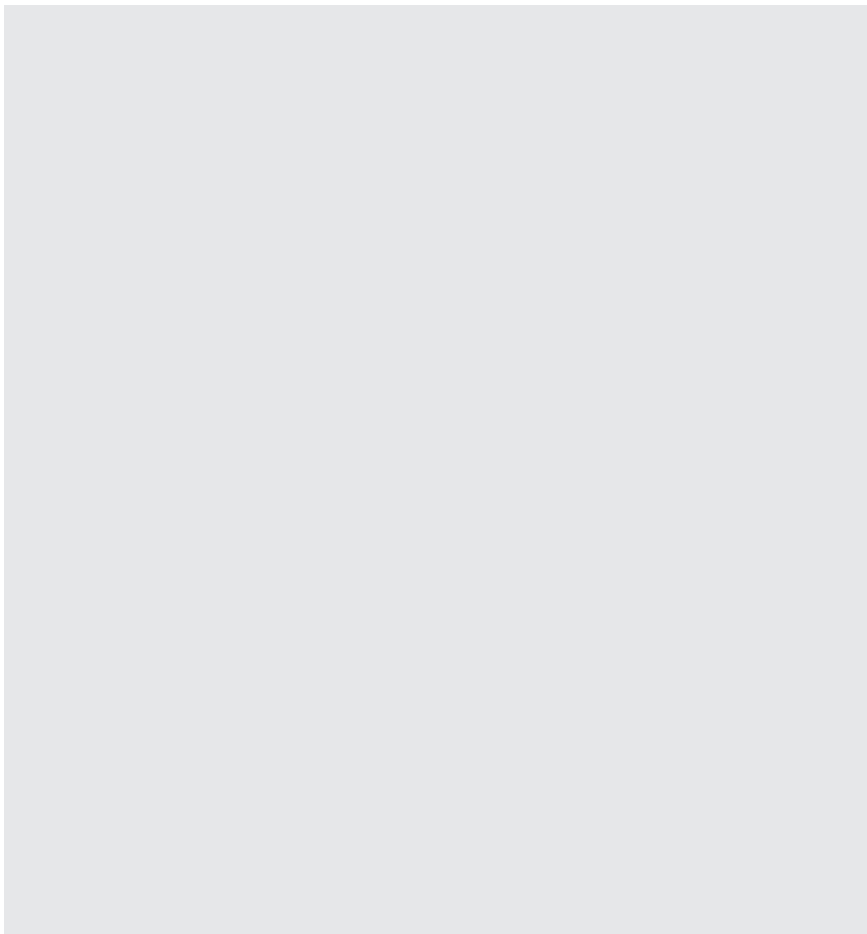
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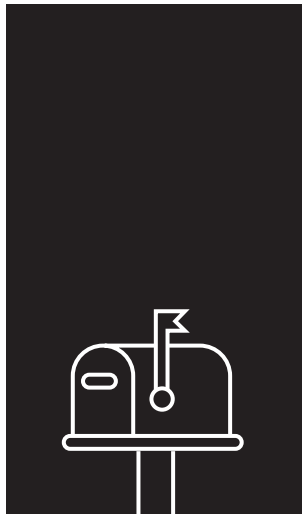
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Brain Health



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Linda Sasser (MA'79; PhD'81) researched memory as a CU doctoral student and built a career as a national speaker helping people improve their brain health and strengthen their memory power. She lives in Peoria, Ariz.

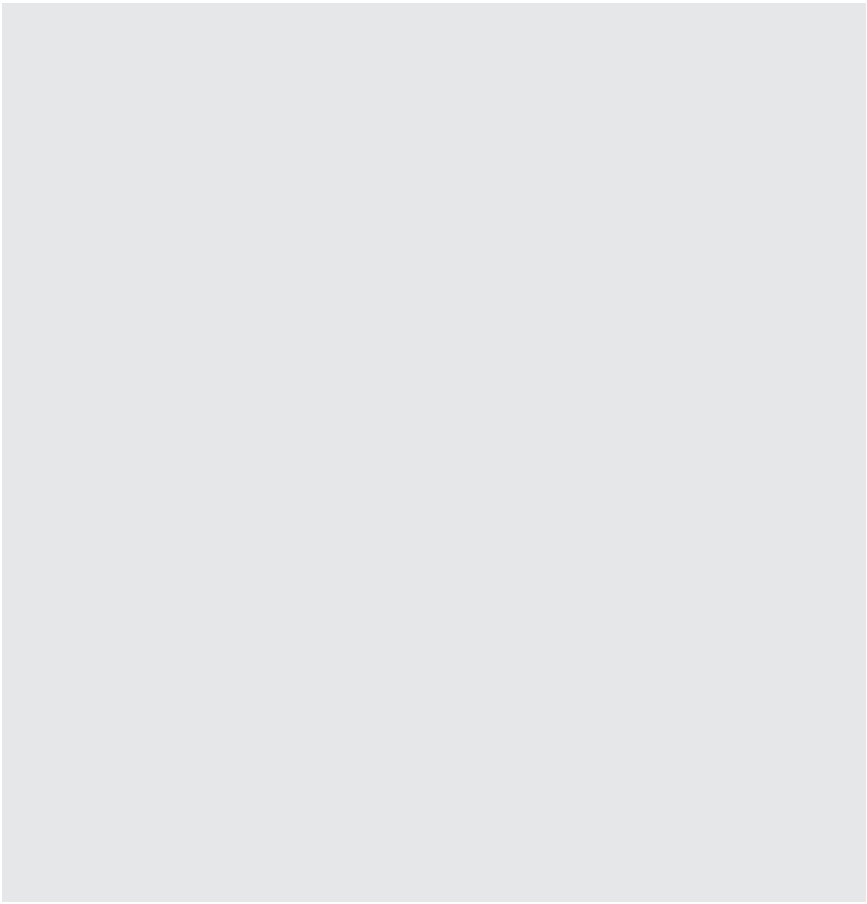
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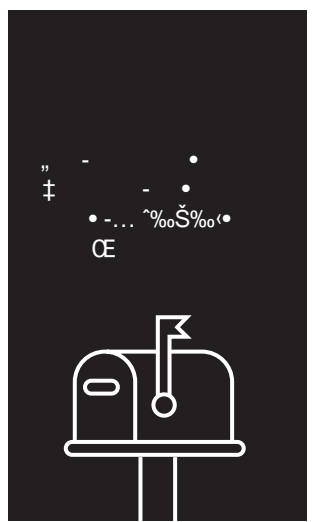
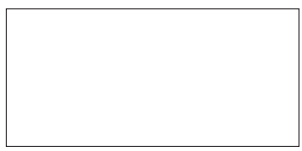
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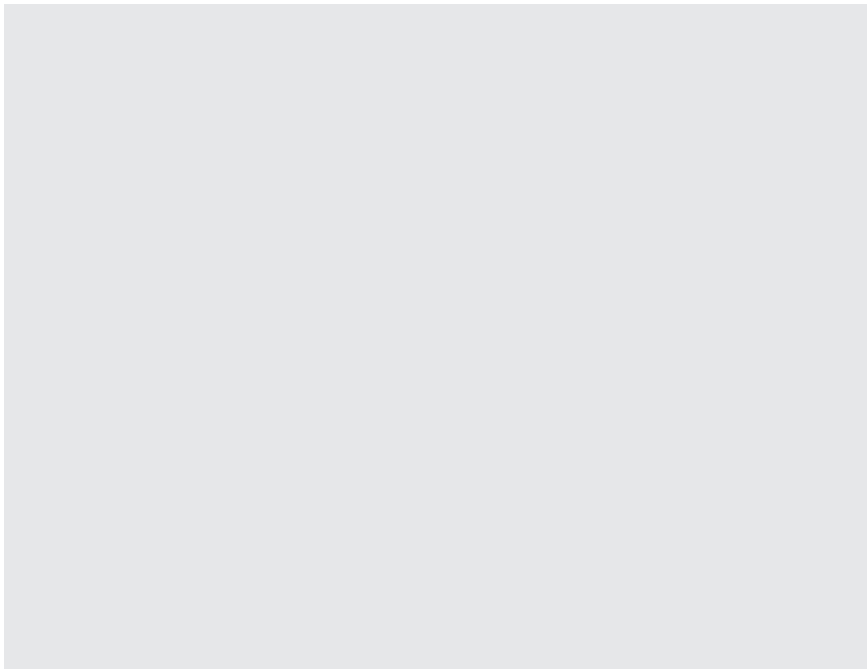
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