exposure to advertising for specific brands and the consumption of those brands—something the researchers will tackle next, with help from a four-year, $2.4 million grant from the National Institute on Alcohol Abuse and Alcoholism.

The current research, says Siegel, is similar to work done around smoking, which identified certain companies that were targeting young smokers. After years of pressure from antismoking groups and the Federal Trade Commission, the Camel brand ended its popular cartoon-based "Joe Camel" campaign in 1997. In 1998, the major US tobacco companies and 46 states signed a settlement agreement that specifically banned targeting youth.

"It was this line of research, into the relationships between brand-specific advertising and underage smoking, that provided the strongest evidence that marketing was affecting youth habits," Siegel says.

The study authors say their work could similarly inform policy efforts to reduce underage drinking, writing, "Alcohol prevention programs and policies can now target specific brands, and advocacy efforts can focus on specific companies that manufacture the products most involved in problem drinking behavior among youth."

Siegel says the study showed that several brands of flavored alcohol—among them Smirnoff's malt and Mike's—were very popular with young drinkers, yet not similarly favored by adults. Many other drinks that ranked high in the survey also are popular among adults, as expected.

"It really begs the question: what is it about these brands that makes them disproportionately popular among underage drinkers?" Siegel says. "We want to look into the reasons—and certainly one of the potential reasons is marketing."

TARGETING YOUTH Michael Siegel says the research on youth alcohol marketing is similar to that done on smoking, which in 1998 resulted in an agreement between major US tobacco companies and 46 states specifically banning the targeting of youth.

CYDNEY SCOTT

CYDNEY SCOTT

EARLIEST BARBECUE Clay balls the size of plums, uncovered in Yucatán, Mexico, by archaeologist Stephanie Simms, held traces of starch from maize, beans, and squash, a strong indicator that they had been in contact with food.

Cooking Tips from the Ancient Maya

CLAY BALLS WERE USED TO RETAIN AND DISTRIBUTE HEAT

BY SUSAN SELIGSON

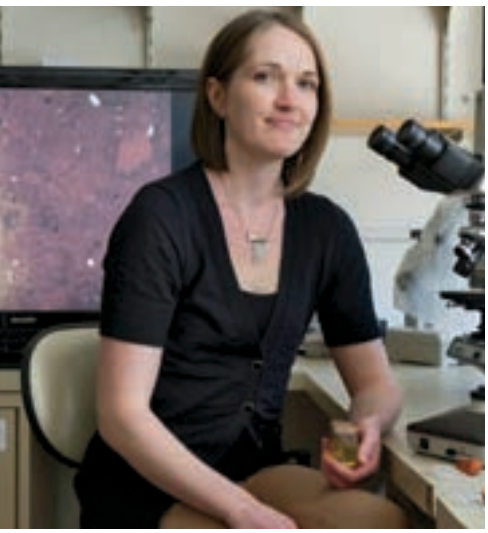
ARCHAEOLOGIST Stephanie Simms was digging at the Escalera al Cielo site in a hilly region of rural Yucatán, Mexico, when she discovered a trove of clay balls the size of plums. There were hundreds of them, buried at the edge of what functioned as a Maya kitchen 1,000 years ago.

Ball-shaped artifacts are not uncommon, and Simms (GRS'13) likes to joke that male researchers tend to theorize that they are ammunition, while women envision domestic uses. In this case, the location and appearance of the balls—they were found with burn marks in what was presumably a cooking area—indicate that they were used for distributing and prolonging heat in pit ovens.

Months later, at a College of Arts & Sciences laboratory, an analysis of the balls' mineral composition strongly supported Simms' theory. The ancient narrative etched into their material properties suggests that the balls, crafted from the local, clay-rich earth, were dried in the hot sun and then cooked, like reusable coals, again and again and again, at heat as high as 1,300 degrees Fahrenheit.

"It was this wow moment," says Simms, whose research and dissertation focus is on pre-Hispanic Maya food production, collection, preparation, and consumption.

Like stones, clay is an efficient retainer of heat,



CYDNEY SCOTT

▪ Stephanie Simms found that the clay balls she discovered in Maya ruins had been heated to temperatures comparable to those in an open fire pit.

and today the Maya still line pits with stones, build a fire on top, and cook root vegetables or corn. Even before the balls' history of exposure to high heat had been confirmed, Simms extracted residues from cracks in the balls and found traces of starch from maize, beans, and squash, a strong indicator that the balls had been in contact with food.

In the lab, Simms used samples of Yucatán clay to re-create the work of the Maya. "I cooked the balls in different places at different temperatures and saw these interesting iron depletion patterns," says Simms, who ran the experiment in a closed environment—a furnace—as well as in an open outdoor fire pit.

The next step was to enlist the help of Francesco Berna, a CAS adjunct assistant professor of archaeology and an expert in ancient pyrotechnology, as well as of a state-of-the-art analytic tool called Fourier transform infrared spectroscopy (FTIR). When rocks and clay are exposed to extreme temperatures, their mineral composition changes; FTIR, guided by a microscope, can meticulously graph those changes.

With the test balls as reference, Berna calibrated the thermal behavior of soil from the site, which served as a point of comparison when he analyzed the excavated samples. The most common mineral in the Yucatán soil, kaolinite, survives up to 500 degrees Celsius (932 degrees Fahrenheit), while smectite and mica survive up to 700 degrees Celsius (1,292 degrees Fahrenheit). Knowing the concentrations of these minerals in the starting materials, Berna was able to "map" the balls' histories of heat exposure. He and Simms found that the balls from the site burned at temperatures comparable to the test balls they burned in an open fire pit.

Based on the evidence, which they outline in the 2013 issue of the *Journal of Archaeological Science*, Berna and Simms are fairly certain the Maya formed the balls with clay left over from crafting pottery. "Kaolin is really good for this purpose," says Berna. "It's nonswelling and won't crack, so it's perfect for pottery and ceramics." The researchers also believe that because the grain residue is small and random, the balls probably had little direct contact with food and were used mainly to control the distribution, and extend the life, of the oven's heat. The balls could also have been used for "hot-rock" boiling, either placed in water or in bean pots, a technique Native Americans still use, but with stones rather than clay.

Simms next will turn her attention to identifying and analyzing the elusive cooking hearths, if any survived. And more analysis is needed to determine whether use of the fired clay balls was restricted to the Puuc region, where they were found, or was a common practice among all the Maya. It seems clear that for at least these hilltop settlements, the clay balls formed an important part of what the researchers call "the culinary toolkit."

Opening Movements

YOUR NEXT SECURITY ID MAY BE A DEFINING GESTURE

BY RICH BARLOW

TO THE CASUAL passerby, Janusz Konrad may seem a bit fanatical about tai chi: standing in his office, waving one arm, then spreading both arms and bringing them together. Duck inside, however, and you'll notice he's not stretching for his health; he's stretching for a camera, and images on a computer monitor are responding to each gesture—zooming in and out of photos or leapfrogging through a photo series.

Konrad, a College of Engineering professor of electrical and computer engineering, and Prakash Ishwar, an associate professor, designed the computer's algorithms to recognize specific body motions. They're not making video games. This, they hope, is the future security portal to your smartphone, tablet, laptop, or the locked door: software programmed to recognize a gesture, from your torso, your hand, or perhaps just your fingers.

Armed with an $800,000 grant from the National Science Foundation

THE NEW CYBERLOCK? Janusz Konrad demonstrates the kind of body motion his computer algorithms recognize. He and his colleague Prakash Ishwar hope that this is the future security portal to your smartphone, tablet, laptop, or the locked door: software programmed to recognize a gesture, from your torso, your hand, or perhaps just your fingers.