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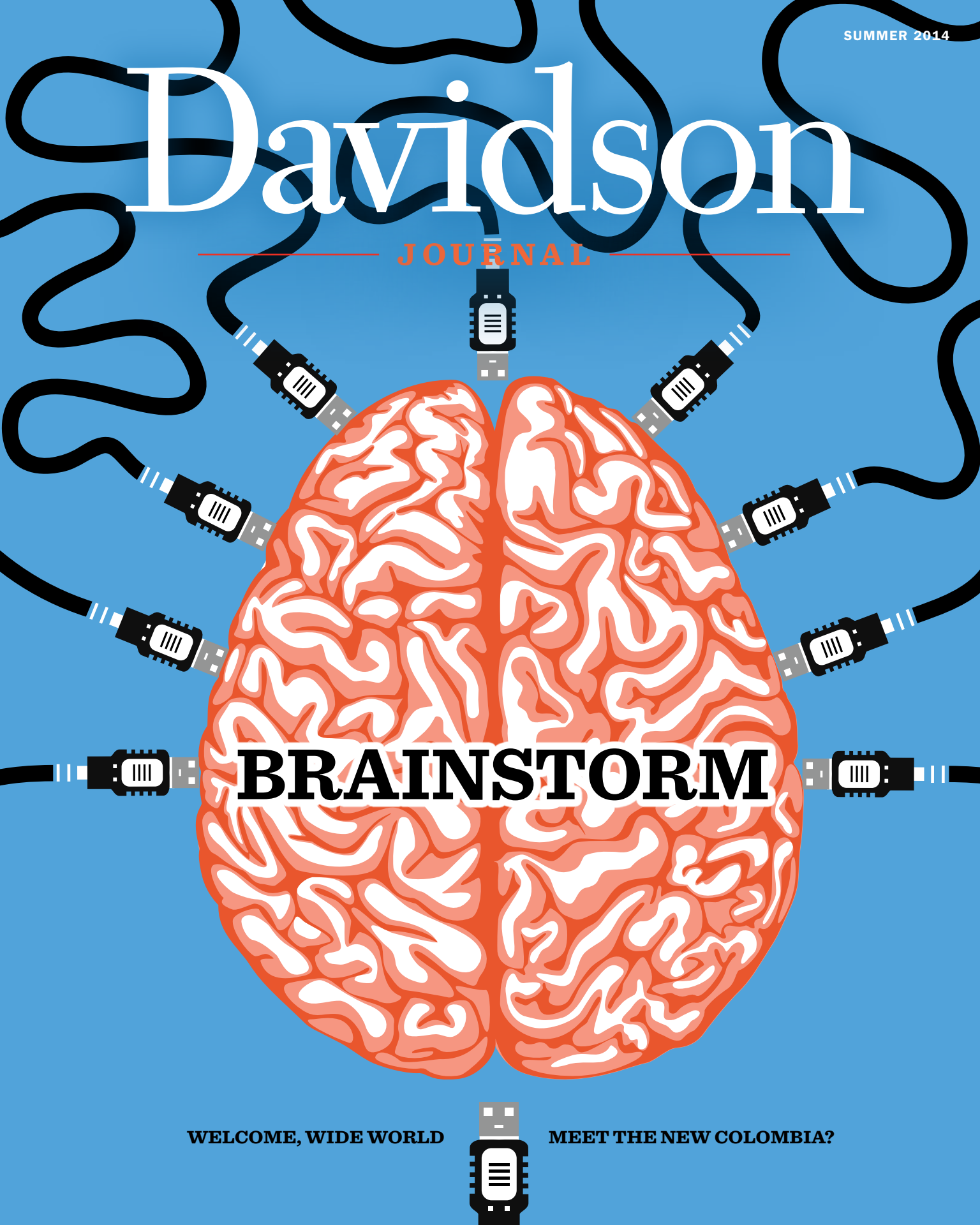

BRAINSTORM

WELCOME, WIDE WORLD

MEET THE NEW COLOMBIA?

Research in Brief

By Robert Abare

THIS SUMMER, NEARLY 100 students remained on Davidson's campus for summer research projects, either of their own design or a faculty member's. The projects are ambitious and transdisciplinary, ranging from the study of mass extinction to the effects of e-cigarette vapor. Most student-led projects are supported through the Davidson Research Initiative (DRI), created in 2007 with the aim of expanding research opportunities and fostering student/faculty collaborations. DRI projects are denoted with an asterisk.

Just Blowing Vapor*

You've probably started spotting them in restaurants or on park benches—people sucking on metallic tubes that glow blue or red before they exhale a jet of vanishing mist. They're called "vapers," i.e. people who use electronic "e-cigarettes," because they are inhaling watery, nicotine-infused vapor instead of smoke. It's for this reason that many e-cigarette companies claim their products provide a healthier alternative to conventional cigarettes, though researchers are far from supporting that conclusion. Kaki Bennett '15, under the guidance of Associate Professor of Biology Karen Bernd, may soon shed some much-needed light on this issue. Bennett has begun exposing rat lung cells to e-cigarette vapor and observing how the cells react to the substance. She places the cells in small exposure chambers, which are attached to e-cigarettes, and then fills the chambers with measureable quantities of vapor. Although e-cigarettes come in an array of flavors, Bennet is testing only classic tobacco and menthol varieties. Preliminary findings show that the lung cells do suffer some damage from the e-cigarette vapor, but it remains to be seen whether the effects are less severe than those caused by cigarette smoke. Bennett and Bernd hope to provide a valuable base line for future studies, as more scientists begin to investigate the health implications of the rapidly growing e-cigarette industry.

Way of the Dodo

Typically, conservation biologists aim to prevent extinction, but Assistant Professor of Biology and Environmental Studies Kevin Smith and his student researchers Thomas Pederson '15 and John Overall '15 are actively attempting to cause it. But by causing extinction, they also may discover the secret to preventing it. The problem of diminishing biodiversity grows more pressing as species die at a faster rate than any other time in recorded history. To speed things up a bit (and then, hopefully, slow them down) Smith's team has set up outdoor ponds, ranging from three to 10 feet in diameter, which serve as giant petri dishes in which to cause and observe the process of extinction. The ponds also provide a way to examine extinction repeatedly, something unattainable in nature. "When studying natural cases of extinction, scientists struggle to pin down a definitive cause," Smith explained. "Once a species dies, it's gone for good." To cause extinction in his ponds, Smith has introduced invasive species, droughts and chemical contaminants. These stimuli, in turn, can cause extinctions and affect the variety of species living in the ponds, which include zooplankton, insects, snails, amphibians and fish. So, what makes a species more susceptible to extinction? Smith said simply being in the wrong place at the wrong time is part of the answer, but that some species do worse than bad luck alone would predict. Smith and his students will continue to hunt for answers, but in the meantime we can all help minimize species' bad luck by ensuring they remain prolific and never dwindle to small populations and locations.

Memory Joggers *

Think. What's the first thing you remember? Is it eating cookies at your grandmother's house? Scribbling on coloring books in preschool art class? These seemingly insignificant recollections of your single-digit years may, in fact, shed light on the important cognitive functions of your brain. This summer, Kathryn Kemp '15 and Professor of Psychology Kristi Multhaup are conducting a human study in order to understand the correlation between autobiographical memory and other examples of the brain's cognitive functions, like attention and language. Through surveys conducted online and perhaps including members of the Davidson community, Kemp and Multhaup will attempt to address the questions raised by this complicated topic. For instance, why can some individuals remember events as early as age three, while others can't recall anything before they were eight? Science is a series of questions, Multhaup points out. "Every time we learn something, we raise more questions than what we have answered," she said.

Imagine That *

Imagine defying the laws of gravity and soaring through the sky like a bird. Easy, right? Now imagine committing a violent crime, like murder, and being completely okay with it. To most, that's almost impossible. Philosophers refer to the difficulty individuals face when thinking up hypothetical situations as "imaginative resistance." But why do morally complicated situations create far more imaginative resistance than amoral ones? This summer, Jeong-Hwan Bae '16, with the help of Associate Professor of Philosophy Meghan Griffith, will attempt to answer that question by drawing on the philosophy of René Descartes. This proves a difficult task, partly because Descartes does not consider the imagining of morally problematic situations in his writings. Descartes' oft-quoted proposition, "I think, therefore I am," succinctly contends that pure thoughts are the essence of existence. Forcing yourself to imagine an unlikely moral situation, therefore, removes you—or your essence—from the equation. Bae intends to argue, on the other hand, that greater imaginative resistance in moral cases occurs due to increased personal involvement in the act of imagining. In other words, picturing yourself as a soaring bird doesn't require you to make a personal judgment; imagining committing carefree murder, however, turns a hypothetical question into a deep-rooted quandary.

X-rays Mark the Spot*

In 1997, state archaeologists and historians shocked the nation when they announced the discovery of an early 18th-century shipwreck, identified as the remains of the Queen Anne's Revenge, the flagship of the infamous English pirate known as Blackbeard. Thousands of artifacts have since been recovered from the ship's resting place at Beaufort Inlet and are currently being treated at the N.C. Department of Cultural Resources' QAR Conservation Laboratory. The objects include coins, firearms and metal tools, though most are thickly encrusted with more than 300-years-worth of sandy muck, thus making it difficult to examine them with the naked eye. QAR researchers are now hoping that Ryan Kozlowski '16 and Professor of Physics Dan Boye can unravel the mysteries of these valuable items by using their Digitome® non-destructive x-ray imaging system. As opposed to traditional x-ray systems, which create single, two-dimensional images, the Digitome® system relies on recording several different perspectives of a single object. The system's software can quickly assemble the different views such that any mathematically defined contour of the object can be viewed. The Digitome® software is also lean enough to be used on a portable laptop, while the mounting fixture and image plate Kozlowski uses to produce x-ray images are easily removable for transport to remote locations, like the QAR Conservation Lab. Kozlowski's project may soon allow archaeologists to peer through centuries of oceanic detritus to learn more about the cargo once carried by Blackbeard, while also building an unlikely bridge between disciplines.