Hungry for love?

HOW FOOD AVAILABILITY IN THE RAIN FOREST DRIVES FERTILITY IN ORANGUTANS

— Story, page 10 —

The Class of 2011 made history this spring when more than 2,400 of its members gave to the BU Class Gift Campaign, prompting Dean of Students Kenn Elmore to jump into the Charles River.

Follow their lead. Make your impact. Give today at bu.edu/give (or 800-447-2849).
They will be able to learn and decide on their own and adapt to their environments. Modeled on the human brain, these “intelligent” uberrobots are in the works in BU’s Neuromorphics Lab, directed by neuroscientist Massimiliano “Max” Versace.
Perhaps you saw the stories earlier this year of the somewhat manufactured dustup between Bill Gates and Steve Jobs (who passed away just recently). No, it wasn’t about PC versus Mac, but about the value of a liberal arts degree.

Gates argued in a speech that state support of higher education should go to areas of study that “help fill jobs and drive that state economy in the future.” His comments were widely understood as an attack on investing in the liberal arts.

In contrast, Steve Jobs said, “It’s in Apple’s DNA that technology alone is not enough—it’s technology married with liberal arts, married with the humanities, that yields us the result that makes our heart sing and nowhere is that more true than in these post-PC devices.” Many parents worry aloud about whether a liberal arts education is as good a preparation for the future as study in a professional field. So is it Gates or Jobs?

The jobs future stands with Jobs. We now know something that no generation before us suspected: We cannot foresee exactly what the economic and social needs of society will be in twenty, forty, or more years or what the shape of our technology or atmospheric and earth systems will be. We therefore cannot predict exactly what our current or future students’ lives will look like and what challenges and opportunities await them.

We do know, however, that our students will need to be more capable of learning and changing throughout their adult lives than any previous generation. No matter what their individual interests, they will need a broad and deep platform of knowledge as well as intellectual and social skills, not merely to adapt to the new worlds, but to lead them. They will need to be capable of accessing, analyzing, interpreting, and using information of many sorts; to read well and critically; be proficient at computational and analytical tasks; and work with people from around the globe. They will need to go well beyond any specific fact or skill they learned in school.

This is exactly what an education in the liberal arts and sciences offers. What Bill Gates missed in his reflections is that if we are thinking long-term—and as a dean and a parent I certainly must—it is not studying the subject matter in a particular department or major that assures our students a bright future, but acquiring a liberal education, that, altogether, gives them this broad and deep platform from which to launch themselves and the critical skills that enable them to learn throughout their lives. It is no wonder that the majority of today’s entrepreneurs had liberal arts and sciences undergraduate educations. Those who question the utility of this kind of education are shortsighted.

Offering a first-class liberal arts and sciences education requires far more resources than we can possibly garner in revenue from tuition, even at today’s rates. Tuition does not cover nearly the cost of hiring and maintaining high-caliber faculty and support staff, such as advisors, librarians, and technology specialists; providing appropriate, up-to-date facilities; and enriching our students’ experience at Boston University.

Tuition doesn’t cover all that. Rather, we depend on the generosity of our alumni and other friends in their commitment to making a difference for this and future generations of BU students. Look through the list of alumni and other friends (p. 26) who have stepped forward already to invest in the future through BU and the costs of hiring and maintaining high-caliber faculty and support staff, such as advisors, librarians, and technology specialists; providing appropriate, up-to-date facilities; and enriching our students’ experience at Boston University.

Please consider joining them and investing in the future through BU. You can make a difference for this and future generations of BU students. Look through the list of alumni and other friends (p. 26) who have stepped forward already to invest in the future through BU. Please consider joining them and investing in the Boston University College of Arts & Sciences to help us create a great future for and through our students. You can make a difference.

Oh…and about that other question? Personally, I’m a PC.
The discovery of the manuscript for “New York (Office and Denunciation)” (above) by Christopher Maurer (right) revealed some of García Lorca’s telling revisions.

From “New York (Office and Denunciation)” by Federico García Lorca, translated by Greg Simon and Steven F. White, in García Lorca’s Poet in New York.

Maurer discovered that the manuscript had been a gift to poet José María Millares Sall, who, imprisoned by Franco and in financial need, sold it (through an American professor) at auction in New York, where Molenhausen bought it. Millares Sall, who died in 2009, never spoke of it to anyone, even his family. They were shocked by the revelation. “Behind almost every manuscript,” notes Maurer, “there is a story of human drama.” This fall, Maurer is giving a class focused on the treatment of manuscripts. “And how does someone open your desk drawer and say, ‘Hey, this is cool. Let’s put it on the Web’?” continued for an author’s final decisions is crucial.

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“I proposed the concept of aeroecology, which is a discipline for studying airborne organisms, in an attempt to draw together colleagues with a wide range of expertise—from meteorologists to biologists—and understand more about the air space. I’m confident that we can make more progress with cross-disciplinary work instead of staying in our own silos. We need to reach out and learn from each other.”

bu.edu/cas/magazine/fall11/kunz

“Of the most exciting, very recent breakthroughs was to discover a law that quantifies switching points in the stock market, when the market changes from going up to down—and vice versa. The new law describes exactly how this will happen.”

bu.edu/today/node/12559

“I’m involved in translation, both modernizing outdated texts and translating others that have never been available in English before, and also fragments of otherwise lost texts. Amazingly, the fragments of Aeschylus, Sophocles, and Euripides have only recently been translated. In all this, digital publication opens many possibilities for material unlikely to be published otherwise.”

bu.edu/today/node/12797

“Of the most imposing challenges for philosophy is the rapid expansion of scientific knowledge and information as well as growing intellectual exchanges between traditions and cultures globally. Not unrelated to this challenge is another, arguably greater one—that of maintaining and conveying the wonder and soul of philosophy in a world that seems increasingly prone to confuse itself with some engineered or marketed picture of a world.”

bu.edu/today/node/12820 —jessica owen


The researchers stress that they are not trying to re-create animals in robot form, a process called bio-mimicry. “Bats evolved at least fifty million years ago, and have continued to evolve,” says Kunz, who is one of the world’s foremost experts on bats. “We’re never going to be able to mimic those sensory systems and movements in the way that evolution has provided.”

The team’s more realistic goal is to learn something from the flight paths of bats and the ways they respond to objects and forces in their environment, such as trees and wind. That is where Betke comes in. It is her task to compile and make sense of the massive amount of data collected by the researchers’ advanced thermal cameras. She develops computer algorithms that describe the bats’ trajectories and movement strategies. The engineers on the team will then use these models to create successive robot prototypes.

It takes all night to download the data from the 70-pound computers that the team lugs across the hot, dusty Texas terrain to connect to their thermal cameras. “We are pushing our abilities to handle dense data sets,” says Betke. “We are exploring how far we can push it and how many bats we can track at the same time.”

BU.edu/BU Today/CAS/Fall 2011

When Robots Fly

Researchers study how bats and other flying creatures navigate, as a model for a new kind of robot. ▶ BY JEREMY SCHWAB

Pursing from the mouth of Frio Cave in southwest Texas, thousands of Brazilian free-tailed bats move in what appears to be a chaotic mass. On closer inspection, however—and with the aid of thermal imaging cameras placed strategically nearby—BU researchers can see that the bats’ movements are far from random. Performing a series of tight, twisting maneuvers and split-second adjustments, the aerial acrobats manage to avoid colliding with each other and the surrounding vegetation. The question the research team wants to answer is: How do they do it?

A five-year commitment and $7.5 million in United States Navy funding are riding on finding the answer. The goal of the multi-institutional grant project, which began in summer 2010, is to design small robots that fly more like bats, birds, or insects than like planes. Professor of Biology Thomas Kunz and Associate Chair of Computer Science Margrit Betke, along with College of Engineering faculty members John Baillieul, Ioannis PaskSachs, and Calin Belta and several graduate and undergraduate research assistants, are part of a national team working on the grant (the BU portion is $3.1 million). The team also includes researchers from the Universities of North Carolina, Maryland, and Washington. Though not part of the grant team, CAS Professor Alan Shaler and Research Professor Crystal Schaaf, both of the Department of Geography & Environment, provide mapping and imaging assistance using ground-based LiDAR (Light Imaging Detection and Ranging).

Dubbed AIRFOILS (for Animal-Inspired Flight with Outer and Inner Loop Strategies), the project’s aim is to create autonomous robots inspired by the movements of bats, birds, and insects. The BU team members are studying bats, while their colleagues at the other institutions study birds and insects. The robots will employ the strategies used by their living counterparts to avoid objects in their path and navigate toward their destination.

The robots will not be drones, flown remotely by human operators; rather, they would be self-guiding vehicles tasked with maneuvering toward pre-set destinations and then gathering intelligence via tiny video cameras and microphones. They could be used for a range of defense and non-defense purposes, from searching for enemy combatants to tracking deforestation.
Nicole Bhatia (CAS’13), a voracious scholar, assists a renowned Judaic scholar on a project that will help redefine the Holocaust’s role in history. Bhatia is as deeply immersed in scholarship as she can be, and that’s the ultimate thing you can do. “When you’re passionate about a subject, you have to have a really long-term view; you have to have knowledge for knowledge’s sake, so that it’ll come in very handy when you do need it,” Bhatia says.

Bhatia has spent her summer at the Elie Wiesel Center for Judaic Studies helping Professor Steven Katz, the Alvin J. and Shirley Slater Professor in Jewish and Holocaust studies and the center’s director, on the next volume of the Holocaust in Historical Context: The Holocaust and Mass Deaths before the Modern Age. From typing up Katz’s manuscript to cataloging the 9,000-plus books in his office library, Bhatia is as deeply immersed in scholarship as she can be, and that’s the ultimate thing you can do. “When you’re passionate about a subject, you have to have a really long-term view; you have to have knowledge for knowledge’s sake, so that it’ll come in very handy when you do need it,” Bhatia says.

Bhatia would have lengthy discussions with Professor Jenny White, over email and after class, about policy and conflict in the Middle East. Fascinated by politics at home and abroad, she reads everything she can get her hands on; her learning doesn’t stop at the classroom door.

She credits this all-encompassing quest for knowledge to her grandfather, whom she grew up watching read the newspaper in six different languages. (In addition to English, Bhatia herself speaks Hindi, Punjabi, and Urdu—she’s catching up.) “He would watch the news all day, and it used to annoy me when I was a kid,” she says with a laugh. “But now I do it too. And I call him and we discuss it.”

Bhatia doesn’t see herself leaving academia anytime soon. After graduation, she plans to continue studying political science and sees in Katz’s work a model for her future. “I want to make a substantial contribution to my field, something that’s going to mold ideas, to help generations to come. And see in his work a model for my future. I want to make a substantial contribution to my field, something that’s going to mold ideas, to help generations to come.”

What’s the CIA missing by concentrating on terrorism?

It’s missing whole areas of the world that are going to be important in the future. We’re very concerned about terrorism, but not enough about developments in a country’s politics, society, and so on. As an example, I’m not sure that we know a whole lot, or have known a whole lot, about the opposition elements in Egypt. Do we know a lot about the Muslim Brotherhood? Do we know a lot about the opposition in Jordan? I have a feeling that these are areas that are being neglected because you have to have a really long-term view; you have to have knowledge for knowledge’s sake, so that it’ll come in very handy when you do need it.

Are you surprised by President Obama’s increased use of covert lethal force, such as the CIA drone strikes in Yemen?

Not at all. The president is obviously a big proponent of this type of covert action. In the future, it—or the type of covert action that we saw in the assassination of Osama bin Laden—is increasingly going to take place in lieu of having 100,000 American troops running around Afghanistan or somewhere in the Middle East. The other thing that’s really interesting is that the role of the Central Intelligence Agency has become more and more covert action and less and less espionage.

Will that be damaging in the long run?

I’m fond of saying, “If we wanted to know about Iraq, we should’ve started 30 years ago, not when it became a problem.” I think in the American mentality, we like the idea of friends and enemies. Do you collect intelligence because someone is your enemy or because someone is important? My view is, you collect intelligence because someone or something is important, not necessarily because they’re hostile.

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But many candidates for elected office in the U.S. are taking a more insular view of the world. It’s ironic, I think, in a more globalized world that we, as a country, are becoming more isolated. If you ask me why that is the case, I’m not exactly sure. Is it because we are so enveloped in our own issues that we really don’t have much of an interest or feel for what’s going on in the rest of the world? You are certainly getting a lot of representatives who have not had any experience overseas. When I was in Berlin (during a CIA overseas assignment), the ambassador was Senator Dan Coats and he remarked that it’d be a good idea if every representa- tive started out by spending a couple of years in a U.S. embassy somewhere. It is a real problem.

Do the death of bin Laden and the troop drawdown in Afghanistan make the CIA a target for budget cuts? Many have argued that post-Cold War cuts prevented the agency from effectively tracking the rise of Islamic terrorist groups.

The budget has probably been doubled—if not more—in the last ten years. It was a mistake to cut the intelligence budgets pretty drastically after the Cold War during the Clinton administration. As you’re cutting military budgets, the one thing you don’t want to cut is your intelligence budget because that is your focus for the future. Intelligence is there to give an understanding of the world to the policy maker. We’re very concerned about terrorism, but not enough about developments in a country’s politics, society, and so on. As an example, I’m not sure that we know a whole lot, or have known a whole lot, about the opposition elements in Egypt. Do we know a lot about the Muslim Brotherhood? Do we know a lot about the opposition in Jordan? I have a feeling that these are areas that are being neglected because you have to have a really long-term view; you have to have knowledge for knowledge’s sake, so that it’ll come in very handy when you do need it.

MORE CLOAK, LESS DAGGER

A decade of chasing terrorists may have distracted the intelligence community from the bigger picture. CIA veteran Joseph Wippl suggests the nation’s spies need to take a longer-term view.

BY ANDREW THURSTON
Hormone Hunter

ANTHROPOLOGIST CHERYL KNOTT INVESTIGATES THE LINKS BETWEEN NUTRITION AND REPRODUCTION IN ORANGUTANS—AND IN THEIR HUMAN COUSINS

By Corinne Steinbrenner  |  Photographs by Tim Laman
C

rashing through undergrowth, splashing through creeks, Cheryl Knott races to keep up with the 100-pound ape adroitly clambering through the lush canopy overhead. She’s following the wild orangutan, whom she calls Beth, through the Indonesian rain forest, documenting the female’s daily search for fruit to feed herself and the newborn infant who clings to her reddish fur.

The scene typifies Knott’s many research expeditions to Gunung Palung National Park in an Indonesian province on the island of Borneo, where the associate professor of anthropology has been studying orangutans since 1992. In addition to observing and documenting the endangered species’ behavior, Knott and her field team of Western and Indonesian researchers gather samples of the orangutans’ food, which she’ll later analyze for calorie and nutrient content, and of their urine, which she’ll test to measure the animals’ hormone levels. Her not-so-glamorous role as an “orangutan pee collector” earned Knott a place in Popular Science’s 2005 list of the worst jobs in science. “Have I been pissed on? Yes,” she told the magazine.

Knott began studying orangutans as a graduate student at Harvard in the early 1990s. “I was interested in a general sense in reproduction because evolution operates through reproductive success,” she says. While her initial interest was in human reproduction, she explains, “I started to realize that we actually knew a lot more about humans than we did about our closest relatives, the great apes.” With plenty of other primatologists focused on chimpanzees and gorillas, humans’ nearest cousins, Knott found a niche studying our next closest kin, orangutans.

The long-limbed, big-bellied apes proved to be the ideal research subjects, as their reproductive behavior is unique in many ways. Female orangutans, for example, give birth only once every six to nine years, the longest birth interval of any mammal. In addition, there appear to be two different types of adult male orangutans—one type with large bodies and wide cheek flanges, and another type that, while also sexually mature, remains smaller and without the impressive flanges. The existence of two male morphologies is fairly common in insects and fish, but it’s practically unheard of in mammals.

After nearly two decades of tracking elusive orangutans through the forest, and positioning plastic sheets below their nightly nesting spots to catch falling urine, Knott is well on her way to solving both of these puzzles. In each case, the answers lie in the availability of food in the forest habitat to which orangutans have adapted.

“We tend to think of the rain forest as this cornucopia of food and fruit all the time,” says Knott, “but actually—even though the temperature doesn’t change like it does in the temperate zones—there are big fluctuations in fruit. And these Southeast Asian rain forests fluctuate much more than those in Africa or South America.” Every few years, the Bornean rain forest bursts... (continued on page 16)
Top left: High above the forest floor, one-year-old Betki grasps the hand of her mother, Beth. Bottom left: Cheryl Knott leads her daughter, Jessica, and son, Russell, through the rain forest. The children often accompany her to Borneo. “It’s a kids’ paradise,” she says. Top right: Cheryl occasionally climbs up for an orangutan’s-eye view of the forest. The world’s largest arboreal animals orangutans live almost entirely in the canopy.
into a “mast fruiting”—up to 80 percent of its trees produce fruit simultaneously—that provides a feast of exotic rain-forest fruits. The masts are followed by years of low fruit production, leaving orangutans with little else to eat than leaves and bark. As an adaptation to this boom-and-bust cycle, orangutans are very good at storing fat, which they live on during lean times. Knott’s analysis of orangutan hormones shows their unique reproductive characteristics also reflect the unstable food environment.

Her research has revealed a direct link, for example, between orangutans’ long birth intervals and the spotty availability of their food. Her lab analyses show female orangutans’ reproductive hormones increase when their nutritional status improves, so they’re most likely to become pregnant or three years away, to reach hormone levels at which she could ovulate. Once a juvenile orangutan is weaned, the mother for their babies—then carry and nurse their young for about six months, while they are still dependent. Then, when their food environment improves, the mother may wait for the next mast fruiting, which could be two to three years away, to reach hormone levels at which she could become pregnant again.

“So the pattern of the forest affects their hormone levels and whether they can get pregnant,” says Knott. “I think that makes sense.”

Inconsistent food availability may also be the key to solving the mystery of dimorphism in male orangutans. While humans and other mammals develop from adolescents to adults within an expected time frame, male orangutans reach their fully developed adult stage—characterized by wide cheek flanges, large throat patches, and the production of long bellowing calls—at unpredictable times. Some develop these traits at age 10, others at 15 or 20, and some may never develop them at all, retaining an adolescent-like morphology throughout their lifetime. Scientists have long observed this phenomenon but have been at a loss to explain it.

Knott’s recent studies reveal that sustaining the prime state requires massive energy resources, so males don’t stay big and flanged for long. Jari Manis, a male in peak condition when Knott encountered him in 1997, was a shadow of his former self—shriveled cheeks, wasted muscles, sunken eyes—when she saw him again nine months later. Jari Manis means “ring fingers,” and if she hadn’t spotted the damaged finger for which he was named, Knott says she may not have even recognized the once-magnificent male.

“In the zoo, where you don’t have problems with food, you can be a big male for 20 years or so,” she says. “In the wild, they only seem to be able to maintain that size for a fairly brief period.” Knott has shown that ovulating females prefer to mate with prime males. Thus, because females are fertile for so rarely, timing of the prime state is critical. “So it doesn’t make sense to have a fixed developmental period,” Knott says. “There’s no point in being a big male if you can’t use it to your advantage reproductively.”

Why some males never develop the prime morphology is an unanswered question, but Knott is finding clues in the hormone levels of male orangutans. Having high testosterone levels early in life appears to put males on a faster trajectory toward full prime development. Fascinating as these findings are in orangutans’ own right, orangutan behavior particularly interests Knott—who is not only a biologist but a biological anthropologist—for what it explains about human behavior. As she teaches students in her Anthropology 335 course, “The Ape Within,” comparing human traits with those of other primates helps us identify characteristics that are unique to humans and understand how those traits evolved.

The reproductive cycles of most mammals, for example, are synchronized with the seasons, timing conception so that offspring will be weaned when food is most abundant. In humans, however, female fertility corresponds to current, not future, food availability. Women’s reproductive hormones rise when they gain weight and drop when they lose weight. “We thought maybe humans were unique in that,” says Knott, but her research shows that humans share this trait with other long-lived primates. By contrast, watching Beth and other lone female orangutans raise their offspring one at a time underscores the uniqueness and importance—of human cooperation. With multiple family members helping to feed their children, human females can have overlapping dependent offspring—a newborn, a two-year-old, and a five-year-old for instance. “So we have short birth intervals, but we can still have a long period of development,” says Knott, “and how we do that is through a social structure that allows it.”

What else might orangutan behavior reveal about our own? Knott hopes the species will survive long enough for her and future researchers to find out. Wild orangutans currently live only in the forests of Borneo and nearby Sumatra, forests that are rapidly being destroyed by illegal logging. Like most of today’s primatologists, Knott devotes considerable time to conservation projects aimed at saving the forests in which she conducts her orangutan fieldwork because—as her own research has proved—the lives of these animals are intricately linked to the rhythms of their fragile forest home. If the trees are lost, so are the orangutans and the lessons they have yet to teach us.© 2011 Cheryl Knott

Watch video footage of Borneo’s wild orangutans and hear Cheryl Knott discuss her research and conservation efforts at bu.edu/cas/magazine/fall11.

FERTILE AT FORTY

While Cheryl Knott and her field team study orangutans in the wild, doctoral student Lara Durgavich is busy in the BU Biological Anthropology Laboratory, using urine samples from captive female orangutans to study lifelong changes in their hormone cycles. One branch of Durgavich’s research focuses on female orangutans’ late-life hormone levels in an attempt to determine if they experience something akin to human menopause. Scientists have long assumed that menopause is a uniquely human phenomenon (no other animals seem to live long past their fertile prime) and, therefore, that it’s a relatively recent evolutionary development—but there’s not much conclusive research on our ape relatives to prove it.

“What I’m seeing so far in the preliminary data suggests that, at least in orangutans, you don’t see the kind of hormonal decline that you would see in a menopausal or peri-menopausal human female,” says Durgavich.

She’s studying samples from orangutans that are around 40 years old, “which is pretty old for an orangutan,” she says, “so I would think that if they are going to have signs of reproductive decline, it would start happening by that point.”

Other branches of Durgavich’s research seek to determine the age at which female orangutans become reproductively mature and whether the sexual behavior of mature orangutans changes in correspondence with their monthly hormone cycles. Captive orangutans provide the best subjects for this type of research, she says. “It’s not hard to train the animals to pee in a cup, so if it becomes part of their routine, you can get samples from the same individual at the same time every day, which is practically impossible to do in the wild.”

PHOTO BY KALMAN ZABARSKY

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PHOTO BY TIM LAMAN

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PHOTO BY TIM LAMAN
assimiliano “Max” Versace sits in a conference room at Boston University’s Neuromorphics Lab headquarters. He holds one of the lab’s frequent visitors—his infant son, who is looking intently at his father. Versace, who is a senior research scientist and the lab’s director, says of his baby, “This is a great example of a general-purpose learning machine,” and he is only half joking.

We’ve just been discussing the lab’s primary goal: to build an artificial intelligence that is smarter than any robot yet created. As every proud parent knows, babies have astonishing brains; they take in a wealth of information from the senses and, over time, learn how to move around, communicate, and begin to make independent decisions, and adapt to their environments.

IN BU’S NEUROMORPHICS LAB, AN INTERDISCIPLINARY TEAM OF NEUROSCIENTISTS, BIOLOGISTS, ENGINEERS, COMPUTER SCIENTISTS, AND MATHEMATICIANS ARE DEVELOPING ROBOTS MODELED ON THE HUMAN BRAIN THAT CAN LEARN ON THEIR OWN, MAKE DECISIONS, AND ADAPT TO THEIR ENVIRONMENTS.

BRAINY, BUT SO ARTIFICIAL

By Courtney Humphries • Photographs by Cydney Scott
decisions. Compared to a baby—or even the simplest animal—
computers are sorely lacking in learning ability. Even sophisti-
cated robots and software programs can only accomplish tasks
that they're specifically programmed to do, and their ability to
learn is limited by their programming. Your Roomba® may man-
age to clean your house with random movements, but it doesn't
learn which rooms collect the most dirt or the least distracting
time of day to clean.

Versace (GRS’07) calls this limited capability “special-
purpose intelligence,” and his group is aiming for something
much more sophisticated. The Neuromorphics Lab, launched in
the summer of 2010 as part of the National Science Foundation-
funded Center of Excellence for Learning in Education, Science
& Technology (CELEST), is pushing the boundaries of artificial
intelligence by creating a new kind of computer that can sense,
learn, and adapt—all the behaviors that come naturally to a
living brain.

YOUR ROOMBA® MAY MANAGE TO CLEAN YOUR HOUSE WITH RANDOM MOVEMENTS, BUT IT DOESN'T LEARN WHICH ROOMS COLLECT THE MOST DIRT, OR THE LEAST DISTRACTING TIME OF DAY TO CLEAN.

SMART AND SOPHISTICATED

BU is renowned for its work in computational neuroscience—
creating computer algorithms that describe the complex behavior
of brains. The Neuromorphics Lab draws on that tradition, but is
focused on turning this fundamental knowledge into real-world
applications. The primary project is an ambitious program to
develop what Versace refers to as a “brain on a chip.” The project,
dubbed MoNETA (short for Modular Neural Exploring Traveling
Agent, and also the name for the Roman goddess of memory)
devoted to creating computer algorithms that describe the complex behavior of brains. The Neuromorphics Lab draws on that tradition, but is focused on turning this fundamental knowledge into real-world applications. The primary project is an ambitious program to develop what Versace refers to as a “brain on a chip.” The project, dubbed MoNETA (short for Modular Neural Exploring Traveling Agent, and also the name for the Roman goddess of memory) devoted to creating computer algorithms that describe the complex behavior of brains. The Neuromorphics Lab draws on that tradition, but is focused on turning this fundamental knowledge into real-world applications. The primary project is an ambitious program to develop what Versace refers to as a “brain on a chip.” The project, dubbed MoNETA (short for Modular Neural Exploring Traveling Agent, and also the name for the Roman goddess of memory) bestowed on the brain behind virtual and robotic agents that can learn on their own to interact with new environments, using the information they glean to make decisions and perform tasks.

“We want to eliminate, as much as possible, human interven-
tion in deciding what the robot does,” Versace says. This is a tall
order, which is why the lab is breaking down aspects of behavior,
tackling them one at a time.

To demonstrate this idea, Anatoli Gorchetchnikov (GRS’05),
a research assistant professor who is leading the MoNETA project,
points to a projected screen in the conference room that shows a
classic psychological experiment called the Morris water maze. A
cartoon depicts the position of a rat that is dropped in a round pool
of water. Rats can swim but they don’t like to—the animal explores
the pool until it finds a partially submerged platform that it can
stand on. On subsequent trials, it remembers the location of the
platform and finds it much more quickly.

In this case, however, there is no real rat: instead, it’s a com-
puter program designed to mimic a rat’s behavior. But rather than
being programmed with the explicit task of finding the platform,
this program has a series of motivations: a lack of comfort when in
water motivates it to find solid ground, for instance, while a “curi-
osity drive” compels it to search nearby places it hasn’t been before.
The idea is to create algorithms that produce lifelike behavior with-
out explicitly telling the program what to do.

Other lab members are addressing different aspects of brain
function. Gennady Livitz (GRS’11), who recently earned his PhD
in Cognitive & Neural Systems, is working with postdoc Jaemin
Léveillé (GRS’10) on the visual systems of MoNETA—how it will
interpret what it sees—and implementing those systems in simple
robots. Others are working on how it will sense sounds in its envi-
ronment, and how it will make decisions.

WIRED FOR BRAIN POWER

Modeling the complexities of the brain is only the first task.
Versace and his colleagues believe that a lifelike artificial brain
would require innovations in both the software and the hardware
that houses it. While some lab members are creating computer
models of the brain, the group is also working in partnership with
Hewlett-Packard to develop the operating system for such a brain
called Cog Ex Machina, or Cog. This software will run on an inno-

ative type of electrical component just a few atoms wide, called a
memristor, created by HP.

Ben Chandler, a PhD candidate in Cognitive & Neural
Systems, explains that a new kind of hardware is necessary to
overcome fundamental physical limits in what current computer
chips can accomplish. A key difference between the way brains are
wired and the way computers are wired is that computers store
information in a separate place from where they process it: when

“We WANT TO ELIMINATE, AS MUCH AS POSSIBLE, HUMAN INTERVENTION IN DECIDING WHAT THE ROBOT DOES.” — MAX VERSACE
In the laboratory's work, they perform a calculation, retrieve the necessary information from memory, perform the processing task, and then store the result in another location. Brain cells, however, manage to do all of this at the same time and location, making transfer of information from cell to cell much faster and more efficient.

Another key difference is power. For all its tremendous activity, the human brain runs on the equivalent of a 20-watt lightbulb. If the goal is to create a free-moving machine with an intelligence on par with even a small mammal, it can't involve large, power-guzzling supercomputers. Such a machine must have a “brain” that is dense, compact, and requires little power. Memristors, Versace says, allow hardware designers to build chips with unprecedented density that operate at very low power.

NEW CONNECTIONS
Because the lab’s work requires applying a deep understanding of the brain to the practical problems of software development, and then integrating that software into computer chips and eventually robotic vehicles and devices, it is highly interdisciplinary. “We are a bridge between neuroscience and engineering,” Versace says. “We are fluent in both languages. We can talk neurotransmitters and molecules with biologists, and electronics and transistors with engineers.” Lab members come from a wide range of backgrounds, some bringing knowledge in neuroscience, psychology, and biology, and others in computer science, engineering, and math. To thrive here, however, they need to feel comfortable working at both ends of the bridge.

The laboratory’s staff composition signals a focus on the future: newer faculty members and graduate students spearhead projects, without the traditional hierarchies of an academic lab. “It’s a brand-new field and it’s wide open,” says Chandler. “For anyone who has the interest and the talent, there’s an opportunity to move in.” Chandler personifies this point; one of the lab’s cofounders, he has taken a leading role in the partnership between the lab and HP, while still managing to make progress on his graduate thesis.

Usually academic labs make theoretical advances and publish scientific papers, but transferring this work to the real world requires a different approach. Heather Ames (GRS’09), a postdoctoral fellow in Cognitive & Neural Systems and one of the Neuromorphics Lab’s founding members, is leading an outreach effort to engage industry in the lab’s work. She and her colleagues believe that such partnerships with industry are crucial to keep these ideas from languishing in a lab. Versace says that the ultimate goal is to “take neuroscience out of the lab” and turn theory into reality.

We are a bridge between neuroscience and engineering. We are fluent in both languages. We can talk neurotransmitters and molecules with biologists, and electronics and transistors with engineers.” — MAX VERSACE
The wavy, melodic strains of “Blue Monk” fill Eric Jackson’s studio while he talks with arts&sciences. It’s deftly performed by contemporary pianist Eric Reed, in tribute to jazz giant Thelonious Monk. Jackson follows this up with a CD of Monk’s band paying homage to another legendary composer and piano player, Duke Ellington.

Speaking into his mic, Jackson gives listeners his signature greeting in a familiar mellow baritone: “My name is Eric. Let’s take a listen.”

For 30 years now, as host of Jazz with Eric in the Evening (recently renamed Jazz on WGBH with Eric Jackson), the “Dean of Boston Jazz Radio,” as Jackson is widely regarded, has presented listeners with a seamless mix of the well-established with the newest jazz talent. He has aired some 3,000 interviews with most of the biggest names in jazz, from Dizzy Gillespie to the Marsalis family.

He thinks ahead about only the first recording he’ll play on any given night, Jackson says. He then works with “the flow,” putting his show together as it’s happening “by sound.” He chooses a series of tunes based on “moods, feelings, colors, emotions, rhythms—more than style labels.” With the spontaneity of a jazz soloist, he improvises his set list.

“I hope I’ve learned from the musicians I play; I hope there’s a flow to the sets and the whole program.”

“Music permeates his life. When he’s not on the air eight to midnight, Monday through Thursday, he’s listening to music ‘pretty much all the time,’ he acknowledges. “I’m always reading and learning something that turns me to the CD player. All day long, I listen to music; it’s a physical process—some people would go nuts! But it’s part of me—I grow with it.”

“Take a Listen with Eric” celebrates 30 years as WGBH radio host. 

BY JEAN HENNELLY KEETh

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“A teacher of “The African-American Experience Through Music” at Northeastern University and a frequent lecturer and author, he also has developed exhibits for the American Jazz Museum in Kansas City.

Raised in a music-loving family (his father, Samuel, was a “huge jazz fan” and became the first African American radio announcer in New England), Jackson segued from the popular Motown music of his teens to the innovative jazz of “Miles and ‘Trane” (Jackson calls Miles Davis and John Coltrane “the pillars of their time”) as a college student. In his freshman year at the College of Liberal Arts (as the College of Arts & Sciences was then called), he applied to the student radio station WTBU—“no experience necessary” the ad read—and got his start as an announcer in 1969.

His first show was R&B, which he soon expanded to three shows, adding jazz and mixed music. When he asked his program director why he was on the air more than anyone else, Jackson found the reply significant: “Because when you’re on the radio, I get quality radio.”

Although Jackson came to BU planning to go to medical school to become a psychiatrist, he “fell more and more in love with the music and just decided to do something around the music.” During his next two years at the University, he took on more radio gigs, including a jazz program at WGBH. He left BU and worked at Harvard’s WHRB for the academic year 1971–1972, then ventured into commercial radio, hosting a Sunday afternoon jazz program at WILD, “sunup to sundown,” Jackson recalls. The next five years announcing at WBCN were key in exposing Jackson to a wide variety of music—“a ton of it,” he says.

Jackson joined WGBH in 1977 where, in addition to playing mixed music, he took over hosting a weekly chronology of African American musical history, Essays in Black Music. In 1981, when an evening shift announcer went on the road to play bass for a couple of weeks, Jackson filled in. When the host didn’t return, WGBH offered Jackson a spot and he began what has become the jazz radio program in Boston, for thirty years and counting.

Early last May, Boston’s jazz community, including BU alums impresario Fred Taylor (CAS’51) and radio personality Ron Della Chiesa (CGS’57, COM’59), along with musicians and many enthusiastic fans, gathered for “Eric in Two Evenings,” hosted by JazzBoston to honor their esteemed jazz dean, Eric Jackson.
The College and Graduate School of Arts & Sciences gratefully acknowledges the following donors who made a gift of $1,000 or more to the College or Graduate School in Fiscal Year 2011 (July 1, 2010 – June 30, 2011).
Nothing Wrong with Wooliness  Having found commercial success, a playwright returns to what he does best.

BY PATRICK L. KENNEDY

In any career, there’s a narrative trajectory, says Ronan Noone (GRS’01). The award-winning playwright made his name with works that explored conflict in his native Irish society, through characters that spoke with his native Irish volubility—“woolliness,” he calls it. After more than a decade in his adopted USA, he began experimenting with American settings and characters. At times, he fears, “my prose became leaden. Now,” he says, “I’ve come through to the other end of the cycle.”

Raised in rural Connemara, Noone attended University College, Galway, then worked for a month as a reporter at a weekly newspaper in Mayo, and later, in Prague, for two days.

Noone soon realized he was no journalist, but he enjoyed writing. “I started working in dialogue, and I became anxious to succeed commercially as I began raising two daughters,” he says. “Overthinking” the market and the American idiom, Noone says, he feels he “lost some of the spontaneity” of his earlier work.

Not that his career has suffered. His prizewinning plays, for example The Alcestis, starring Campbell Scott, were rather well received. And Noone has picked up some television work, adapting the true stories of Maltese-tuned-informers for the small screen.

Nevertheless, he has decided to re-embrace his natural lyricism and to focus on the theme of immigration that he knows well. That decision has “reignited my passion for the subject and that wooly playwriting natural lyricism and to focus on the theme of immigration that he knows well. That decision has “reignited my passion for the subject and that wooly playwriting communication means. The second half is a friendly state-by-state guide to already-accessible astronomy destinations, such as observatories and planetariums. For more information, visit www.youcanasses-tronomy.com.

Bruce Dettore (CAS ’85) of Grand Haven, Mich., is an associate professor of biology at Grand Valley State University. He teaches introductory biology, genetics, cell and molecular biology, and research animal developmental biology. He recently received OVOS’s annual Pew Teaching Excellence Award. He lives near Lake Michigan with his wife, Georgette, and two teenage children, Quinn and Olivia.

Philip Chang (CAS’98) of Boulder, Colo., graduated with a PhD in music therapy from the University of Cincinnati School of Music in May 2011. He has taught music therapy at the University of Nevada in Boulder since 2006.

Ronan Noone


Beatrice Green (CAS’69, GRS’64) is a new graduate student in theater at the University of North Dakota and serving as the managing director of the University of North Dakota’s Dramatic and Musical Theatre.

Karl Dennis Chambers (GRS’69) of Newburyport, Mass., has recently published two books, both with Greenwood Publishing—Toys & Costumes That Changed the World and The Entrepreneur’s Guide to Writing Business Plans and Proposals.

Sofia Birke (CAS’72) released the documentary film Breviary, a poignant yet humorous film about her parents who survived the Holocaust, their perseverance, and their success in the quirky land-market clothes store they ran for 50 years in Lowell, Mass. For more information, visit www.BreviaryThroughBirkes.com.

Ellen LaFleche (CAS’79) of Northampton, Mass., recently was awarded a Public Policy and Community Leadership Fellowship for her manuscript, Workers’ Rites. The manuscript will soon be published, and a second of poems, Donum, is also forthcoming. Email Ellen at elhalafleche@gmail.com.

Arthur Lazarus (CAS’73) of Chadd’s Ford, Pa., the senior nonsurgical research physician at AstraZeneca Pharmaceuticals in Wilmington, Del., was appointed to the Board of Directors of the American College of Physician Executives for a three-year term. He was also an honorable mention in the 2011 Medical Economics Doctors’ Writing Contest. Lazarus can be reached at arlazarus@cvnet.com.

Melody T. McClain (CAS’77, MED’87) recently published a new book, Living Well, Despite Cancer: How the Black Women’s Guide to Health, Sex and Happiness. She is an Atlanta-based obstetrician-gynecologist, media consultant, and workshop facilitator. Her book can be found on Amazon.com. (See p. 30)
Shaken & Stirred: The Feminism of James Bond

She’s a cultural icon, the bearer of some almost unprintable names, and she’s the subject of a new study on the history of feminism.

With Shaken & Stirred, author Robert A. Caplen (CAS’01, GRS’01) chronicles the cinematic Bond Girl, from 1962’s “Honey Ryder” to 1979’s “Holly Goodhead,” against the backdrop of feminism’s second wave.

Caplen argues that the first Bond movies moved up an archetype—an Amazonian assistant for the male lead—that stood in contrast to the women’s liberation movement. It wasn’t until the 1970s, says Caplen, that the Bond Girl began, belatedly, to catch up with society, taking on more substance and independence. Almost, movie fans might note, with a big proviso: scientist, astronaut, and CIA agent make an impressive come-up, but they’re never named “Goodhead” is something of an albatross.—ARTHUR THURSTON

Health and Happiness, Despite the “Hell”


Hostile song lyrics, disparaging media images, and other psychosocial stressors lead to the release of stress hormones in black women, writes McClusky (CAS’77, MED’81), contributing to high rates of diabetes, hypertension, and other killer diseases. Her book offers comprehensive and down-to-earth advice to help black women overcome barriers to achieve both physical health and inner peace.—CORINNE STEINBRENNER

Bakery ignores $28,000 lawsuit

A bakery in Freehold, N.J., welcomed their first child, Connor Reidinger, on April 30, 2011. Dawn Quinlan (COM’03, Stoneham, Mass., married Jonathon Towles of East Boston, Mass., and her husband, Brian, welcomed their first child, Connor James, on January 14, 2010. Email them at shado3@verizon.net.

Rachel Simon (CAS’01) published a new book of poetry, The Towler of spires’/o lipants, with Cyphers, out of Multnomah, Idaho. She can be reached at rachelspires@yahoo.com.

2011: The HOARDING HANDBOOK: A GUIDE FOR HUMAN SERVICE PROFESSIONALS

Excessive, safety-threatening accumulation of clutter—old newspapers, pizza boxes, bicycle parts, broken chairs, even rabbits—has been more widely recognized recently as a social problem. But until now, there has been no comprehensive reference guide to assist housing officials, first responders, animal control officers, primary care providers, and elder protective service workers.

Based on her dissertation research, Christiana Bristiosis (GRS’09), a postdoctoral fellow in the School of Social Work, has coauthored the Handbook with 55W Dean Gail Steteket and psychotherapist Cristina Sorrentino Schmalis. The book includes case studies, decision trees, and other resources for professionals.

Mamie in the spotlight

Debra Ochoa (CAS’96, COM’96) of Seattle, Wash., is currently vice president, development and senior counsel, of the American Constitution Society as director of development and senior counsel. Learn more at www.acslaw.org. She can be reached at lorhayes@acslaw.org.

Christine (Knoblauch) Hall (CAS’01) of Glendale, Calif., married Christopher Hall on April 11, 2010, at Unitarian Universalist Church of Glendale, Calif. She can be reached at christinaehall@gmail.com.

2001

Shaken & Stirred: The Feminism of James Bond

1977

1999

2009

2010

Health and Happiness, Despite the “Hell”


Hostile song lyrics, disparaging media images, and other psychosocial stressors lead to the release of stress hormones in black women, writes McClusky (CAS’77, MED’81), contributing to high rates of diabetes, hypertension, and other killer diseases. Her book offers comprehensive and down-to-earth advice to help black women overcome barriers to achieve both physical health and inner peace.—CORINNE STEINBRENNER

Life Publishing, 2010) opens with an enthusiastic foreword by Paulletta Washington, wife of director Denzel Washington. Hostile song lyrics, disparaging media images, and other psychosocial stressors lead to the release of stress hormones in black women, writes McClusky (CAS’77, MED’81), contributing to high rates of diabetes, hypertension, and other killer diseases. Her book offers comprehensive and down-to-earth advice to help black women overcome barriers to achieve both physical health and inner peace.—CORINNE STEINBRENNER
Christopher Sayers (CAS’99, CA’02) was in the wedding party. Also in attendance was Miranda Banaus (CAS’09). Jesellette can be reached at jesellette@yahoo.com.

Elif S. Arnbrester (GRS’05) of Arlington, Mass., has just published a new book on the private writing lives of four American realist authors. The book, Domestic Biographies: Private Writing Lives of Four American Realists (Rutgers University Press, 2010), explores the overlap between the authors’ real lives and their literary realism. The book is available on Amazon.com, as well as other venues. Elif received her PhD in American studies in 2005 and joined the full-time faculty of Suffolk University’s English Department in 2006, where she is currently assistant professor of English. For more information on her book or to contact the author, please email earmbruster@suffolk.edu.

The luminous “skyscapes” of Roy Perkinson
BY JEAN HENNELLY KEITH

Layers of plum, coral, and dusky blues capture twilight settling over downtown rooftops. Tangerine streaks spread upward into a sweep of ultramarine, vividly heralding daybreak along a lonely stretch of highway. Big moody skies fill Roy Perkinson’s city scenes and expansive vistas—what his wife calls his “skyscapes.”

Growing up in a tiny town on the edge of Texas hill country, Perkinson (GRS’70) says he has a dual affinity for “uninhabited open spaces” as well as urban settings. Rendered variously in oil, pastel, and watercolor, his images, from the craggy coastline of Maine’s Monhegan Island to the broad wheat fields of Charente, France, all share a quiet solitude that invite the viewer to contemplate.

Perkinson’s paintings appear infused with light—washed iridescently over Tuscan foothills or concentrated in a bright flash of reflected neon outside his studio building. “A sense of light, and I don’t mean just illumination, is really important,” he says. “I’ve come to realize over the years that it’s almost Zen. For me the key is the opposition of cool and warm colors…that can bring a scene to life and give it that ineffable sense of light.”

The son of an artist father—the smell of oil paint was a regular feature in their house,” says Perkinson—has drawn and painted throughout his life. With an education in physics from MIT and a life-changing hiatus at art school in Texas, he earned a master’s degree in art history from BU, where, Perkinson says, Professor Samuel Edgerton “fired me up.” In 1967, while still in grad school, Perkinson began working as an apprentice in the paper conservation laboratory at Boston’s Museum of Fine Arts, where he eventually spent most of his career, becoming director of the lab and restoration program. The artist/physicist/art historian says he daily “reached right into that bag” of knowledge of aesthetics, conservation, and scientific-technological and historic context to select appropriate treatments for damaged artwork.

After 36 years at the MFA, he retired in 2006 but remains closely connected to the museum: his work is part of its collection and he occasionally narrates its exhibitions. Perkinson now paints at the Fountain Street Studios, an artist community in Framingham, Massachusetts, where he delights in having “just one job.” He says, “What I’ve learned, and now have, is the opportunity to truly see the benefits of full-time engagement with the materials. I think about it even when I’m not here; wrestling with problems, looking for solutions, trying to work out ideas and designs. There’s so much to do.”

Above, Dust, in Duxbury, oil on canvas, 2010. This painting is a revision of the original, shown at right in the background with artist Roy Perkinson. He changed the sky to reveal the graduated color he first witnessed in the semidarkness.

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I just …

☐ went back to school
☐ found my calling
☐ saw the world
☐ got married
☐ had a baby
☐ published a book
☐ started my first job
☐ finished my last job

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