brain+cognitive sciences news
Spring 2005

MESSAGE FROM THE DEPARTMENT HEAD

Mriganka Sur

The Department of Brain and Cognitive Sciences is in an historic phase. We expect our faculty size, currently at 32, to reach 42 by 2010, double the size relative to 1995 – a growth made possible by the McGovern Institute and the Picower Center. We are on the verge of moving to a new building that will house, for the first time in 20 years, the entire department – including neuroscience and cognitive science, and the Picower Center and McGovern Institute. Moreover, the Singleton Fellowships have substantially strengthened the department's graduate program. This is a time for us to envision a future that secures our place in our field, and even in society as a whole.

Our first task as we go forward is to bolster key areas of the department with strong faculty appointments. The department's core mission, of studying the brain and mind at multiple levels of analysis, remains unique in the field. By recruiting outstanding researchers and educators who anchor and bridge these levels through the questions they ask and the approaches they use, we should consolidate and expand our leadership position.

Discovering basic mechanisms is fundamental not only for increasing our knowledge of how the brain and mind work but also for a range of applications that stem from this knowledge. People have tremendous curiosity for the discoveries of our field; additionally, various kinds of applications that impact people's lives flow from our work. First, new products that are useful to society get created. Indeed, several of our researchers have contributed importantly to developing new products or machines that derive from principles of human brain function or performance. MIT, with its extraordinary resources in engineering and applied science, and encouragement of entrepreneurship, provides a particularly rich environment for such applications. Second, new findings about the brain and mind enable possible solutions to the huge problem of brain disorders and diseases. Our

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Massachusetts Institute of Technology

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BCS IN THE NEWS

PD Associate Russell Tedrake, Teresa Zhang, Ming-fai Fong, Derrick Tan, and Andrew Baines of Sebastian Seung's lab were members of a team that developed a robot that demonstrates a new learning system that allows it to continuously adapt to the terrain as it moves. Named Toddler because of the way it walks, Russ says it is "one of the first walking robots to use a learning program, and it is the first to learn to walk without any prior information built into the controller." Similar robots built at Cornell and Delft were simpler and focused on the control program, while Toddler uses a customized learning software that exploits the design. Toddler, which uses electric motors that directly move the ankle, can teach itself to walk in less than 20 minutes or 600 steps. Toddler was introduced at the Feb. 17 Annual Meeting of the American Association for the Advancement of Science, and its story will appear in Science, co-authored by Prof. Andy Ruina of Cornell, Steven Collins of the University of Michigan, and Martijn Wisse of the Delft University of Technology. Additional stories about the robot have appeared in print, radio and television, including features by the AP, Reuters, the *NY Times*, the *Tech Review*, and (soon) *Popular Mechanics*, BBC The World, NPR Day to Day, the Science Channel, and NECN. Shortly, the Special Edition Terminator 2 DVD will also feature Toddler.

Tomaso Poggio's group at CBCL has developed a quantitative model of the first few hundred milliseconds of primate visual perception to account for some of the basic properties of the physiology and the psychophysics of object recognition. Computer simulations have shown the plausibility of this scheme for visual recognition and its consistency – so far! – with several data from the labs of colleagues in physiology and psychophysics. The

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'Toddler' impresses passersby in the E25 atrium, as Russ Tedrake (far right) demonstrates his skills.

SPRING 2005 CALENDAR OF EVENTS

Mondays *Brain Lunch*
Tuesdays *Cog Lunch*
Wednesdays *Brains & Machines Lecture Series*
Alternate Thursdays *Plastic Lunch*
web.mit.edu/picowercenter/events
Fridays *BCS Colloquium followed by Reception*
web.mit.edu/bcs/newsevents/events

SPECIAL EVENTS

Friday, April 1, Bidwell Lecture,
4:00 PM, E25-111 Speaker: Bruce Yankner, Ph.D., Professor of Neurology and Neuroscience and Director of the Program in Neurodegeneration, Harvard Medical School, Children's Hospital. "DNA Damage and Gene Silencing in the Aging Brain"

Friday, April 22, Hans-Lukas Teuber Memorial Lecture
4:00 PM, E25-111 Speaker: Fernando Nottebohm, Ph.D., Professor, Laboratory of Animal Behavior, Rockefeller University, Field Research Center. "Vocal Learning and the Natural History of Adult Neurogenesis and Neuronal Replacement"

BCSP IS PROGRESSING RAPIDLY

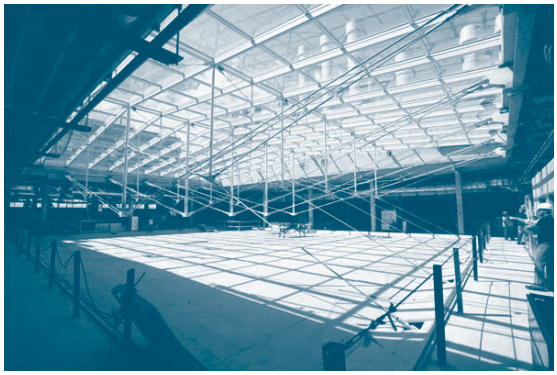

Photo coursesy of Andy Ryan

The atrium

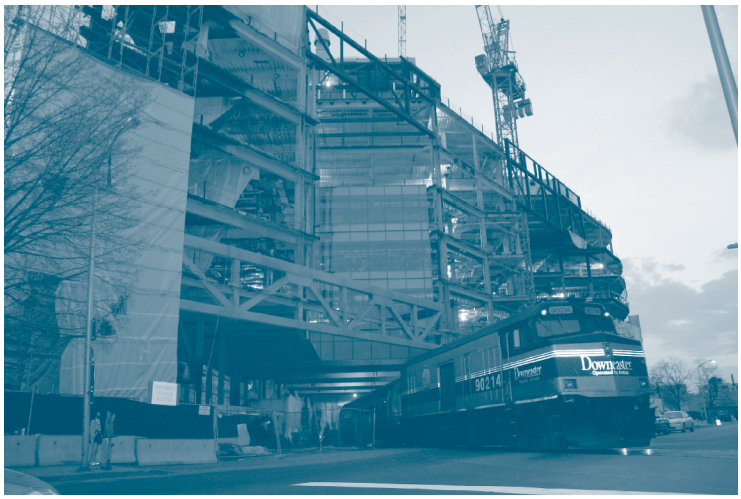

Photo courtesy of David Conlon

We have our own onsite transportation. Actually, the building has been constructed so that we won't feel the movement of the train.

ERRATUM

In the Fall issue, in the photo at the right, Prof. Ted Adelson (center) was erroneously identified as Arne Abramson, bcsp Project Manager. Mea culpa [ed.]

NEW BEGINNINGS

McGovern Institute Director Bob Desimone and his wife Chen Chen welcomed daughter An An ("peaceful") on December 27.

Postdoctoral Fellow Jill Crittenden and husband Kyle Copps welcomed son Oliver on November 8.

Graduate Student Ben Balas and Erin Conwell (BCS '03) were married on January 8 in Kansas City, Missouri.

Graduate Student Thomas Serre and Alison Tovar were married in Bogotá, Colombia on January 15, 2005.

BOB DESIMONE

Bob Desimone, the new director of the McGovern Institute for Brain Research and BCS Professor of Neuroscience, hails from an immigrant Italian community outside of Philadelphia. His father, who entered the family car business when he returned from his World War II service, was a great believer in education. Though he only briefly attended college himself, he and other family members encouraged Bob's education from the beginning and, by age 8 or 9, Bob was already an amateur astronomer. Every weekend, Bob would take a train to the Franklin Institute in Philadelphia, a science museum noted for its hands-on activities. It was there Bob built a telescope, first designing and polishing the mirror, then building the housing to hold the optics. An uncle who worked as a maintenance mechanic in a plastics factory provided him with the old machine parts he used to build it. The process of taking an ordinary piece of glass and shaping it into a precise instrument really appealed to Bob and was his introduction to science.

A National Merit Scholarship enabled him to enroll at Macalester College in St. Paul, Minn., where his ambition was to be a psychotherapist. During the college's equivalent of IAP, he spent a month living on a ward in a mental institution housing long-term schizophrenic patients, and he remained involved with activities of this nature throughout his college career. On another occasion, necessitated by his having taken all the money his parents had saved to cover his living expenses to invest in a Karman Ghia, he accepted a live-in job in a halfway house for mentally ill young adults, where he served as the night emergency person, calling an ambulance if a patient attempted suicide. The experience taught him to appreciate the problems of the mentally ill and clarified that he lacked the requisite skills to be a therapist. On the other hand, he had a talent for lab work so, after graduation, he left for Charlie Gross's lab at Princeton. While there, he volunteered at a local hot line for suicidal people in order to keep his involvement with the mental illness side of neuroscience.

In the Gross lab, he worked on primate neurophysiology, and was awarded an NIH/NRSA fellowship to continue this work with Peter Schiller at MIT. However, before starting at MIT, Mort Mishkin offered him an opportunity to establish his own neurophysiology lab at the NIH, and Peter advised him to accept the position because it could lead to a long-term research career there. As a result, Bob never really did get postdoctoral training – something unheard of today. Instead, he was able to establish his own research program and get tenure at an earlier age than most people, and this fast track to tenure gave him the freedom to take more risks in his research.

Bob's subsequent appointment as the head of the intramural program at the NIMH came at the behest of Steve Hyman (now provost at Harvard) who was the Institute Director for NIMH at the time. Bob felt that because of his indebtedness to the NIH for the opportunities it had provided him, he should accept the offer. He believed he could help rebuild the clinical research sector of the intramural program and link it to stronger basic science, thus contributing to the mental health research effort, even though his own research did not directly involve the mentally ill. In essence, he came full circle, having gone to college to do mental health work.

Bob has a 19 year old son who is working, but who, he hopes, will eventually enroll in college. He also has a new baby daughter who has awakened his competitive spirit, and he brags that he can change a diaper in a flash. His wife, Chen Chen, a pianist, will be an instructor in MIT's music department. She has written children's music books and, influenced by her Chinese background, she tries to combine eastern and western elements of music in original arrangements.

Recently, Bob acquired a 100 year old telescope that he hopes to set up on his deck in Brookline, once he and the family finally move up here. They have purchased an 1898 Queen Anne Victorian house, complete with stained glass windows, that is full of history. While the house is in great shape, Bob and Chen Chen are making lists of improvements they would like to add. In his spare time, he mainly reads novels and historical fiction, though currently, he is finishing a history of the early American republic. He is trying to learn Chinese by listening to CDs as he drives to work.

Administrative responsibilities at the NIH meant that he had to focus his research more, so his work on memory was dropped in favor of concentrating on neural mechanisms of attention. He is now expanding his human studies on attention, using magnetoencephalography and brain imaging. He would like to bridge research in animals and human subjects and is thinking more about projects that could have an impact on brain disorders.

At the McGovern Institute, a major thrust of his research will be based on the concept that selective attention depends on the synchronous activity of large numbers of neurons in distributed brain structures. He wants to understand how cells can cooperate with so many of their other neighbors in directing the path of important signals in the brain, so that an important stimulus in the environment can trigger the focused behavior of the organism. For example, when a student is trying to concentrate on a text, it requires that neurons in the brain enhance and synchronize their activity so the student can keep focused on the text and not be distracted by other activities that are going on around her in the classroom. His newest study on the neural mechanisms of attention was accepted for publication in Science.

There was nothing negative which drove him from the NIH, but rather the positive opportunities here which attracted him. In his first meeting with Pat and Lore McGovern, who established the McGovern Institute and remain active on its board, he was inspired by their dedication to improving human welfare and by their belief that research in neuroscience was important to achieve this. The McGovern Institute, with its own governing board, but also part of a university, has the best of all worlds for accomplishing this. He was also attracted to joining both the superb faculty who had been brought in by Phil Sharp, the former director, as well as his many friends and colleagues on the faculty of the Picower Center and BCS. One of Bob's first

continued from p. 3 Bob Desimone

postdocs at the NIH, Earl Miller, is now a Professor in BCS, and Earl was instrumental in encouraging Bob to move. Bob says that the NIH is a fabulous medical and research environment, but it does not have the technology and engineering and other physical sciences that MIT has. Bob's vision for the McGovern Institute is to facilitate the interaction of neuroscience with these disciplines, as well as with the talents of people in information sciences, computation, biology, and the Broad and Whitehead Institutes at MIT. The new brain and cognitive sciences project, to be completed next fall, will be the focal point of these interactions. He says that these are all ingredients needed to produce headway in neuroscience and brain disorders, and MIT is unique in having such a grouping, particularly a grouping of such caliber. Having a distinguished neuroscientist as the new President of MIT, is "icing on the cake."

At the NIH, Bob also missed the interaction with students, and the quality of MIT students, both graduate and undergraduate, was a major attraction for him. He says that interacting with our faculty has already been great fun, and he's having a wonderful time.

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researchers have contributed here too, but I believe it is timely to initiate a dialogue on this topic.

There has been increasing discussion recently, led by the NIH, about the importance of translating basic research findings to clinical treatments. Brain disorders of either developmental or degenerative origin, including stroke, affect large numbers of people and are a major concern for societal health. Thus there is both a responsibility and an opportunity for us to have a significant impact, but only if combined astutely with our strengths.

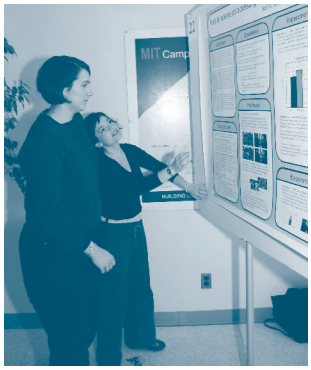
Because MIT does not have a medical school, we cannot be an end-stage provider of treatments or therapies. But given our outstanding basic research programs, we are in a unique position to advance a mechanistic understanding of brain disorders. In turn, research on disorders can complement and strengthen our basic research effort. Indeed, some of our recent faculty searches have recognized this potential synergy.

The ways in which a department such as ours can advance the study of brain disorders depends on the nature of the research. A focus by an individual laboratory on a molecular mechanism or cellular process can lead to findings that have important implications for a disorder or disease. In other instances, collaborations with investigators in medical schools are required, and particularly for cognitive or imaging approaches to be applied to patient populations or materials. Such work has sometimes merited caution: Does it meet the standards of controlled experiments, or does it dilute our mission?

Several of our faculty already study cognitive processes, brain systems or molecules in ways that relate directly or indirectly to brain disorders (based on a recent informal tally, over half of our faculty self-identify their work as having some relation to brain disorders). The vast majority of brain disorders and diseases have cognitive and functional manifestations with neuronal and molecular underpinnings – indeed, a sophisticated understanding of a disorder demands a diversity of approaches. Brain disorders also provide a unique window into the architecture of the brain and mind, roughly the way visual illusions provide a window to understanding how the visual system works. Thus, in addition to the various themes that link different analysis levels across the department – sensory and movement systems, learning and memory, neural and cognitive development – another theme could naturally be brain disorders and diseases.

It is important to affirm that our central mission remains to understand fundamental mechanisms of the brain and mind. Other entities at MIT, such as the Broad Institute, are also exploring the possible applications of basic science advances to human disorders. Indeed, as our field evolves, I believe that the complexity of brain disorders, together with the rapid growth of information and tools – particularly including molecular, genetic, electrophysiological and brain imaging approaches – demands new alliances and organizational structures that bring together basic scientists and physicians seamlessly.

INTERVIEW DAY 2005



Left to right: Mriganka Sur introducing prospective graduate students to the department; Jodi Davenport and Amy Pooler setting up posters; Earl Miller with Tim Buschman and Rahmat Muhammad at party. Below: current members of the department and prospective students were well fed.

BCS HOLIDAY PARTY

Chris Moore, Aude Oliva, and Mriganka Sur

Bob Desimone and Earl Miller sampling the wine.

The BCS family is expanding. L to R: Grad student Mara Breen & Adelaide, Prof. Elly Nedivi & Ness, Prin. Res. Sci. Ruth Rosenholtz & Sarah, Financial & Oper. Officer Sheila McCabe & Patrick, Lauren Armstrong (wife of A.O. John) & Hayden.

Cheryl Cheney, Sasha Rakhlin Jodi Davenport, and Jason Jacobson

AWARDS AND HONORS

FACULTY

Neville Hogan was awarded an Honorary Doctorate by the Dublin Institute of Technology, in December 2004.
Earl Miller was the Keynote speaker at both the 2005 Human Brain Mapping meeting and the 2005 Motivational Neural Networks meeting.
Tomaso Poggio was a featured speaker at the Crick Memorial at the Salk Institute in September
Morgan Sheng was elected Fellow of the American Association for the Advancement of Science (AAAS) in September 2004.

STAFF

HR Administrator and Newsletter Editor Judy Rauchwarger was presented with the BCS Department Service Award at the holiday party in December.
The BCS Financial Team, Financial and Operations Officer Sheila McCabe and Financial Assistant Toni Oliver, has been given a School of Science Infinite Mile Award.
Undergraduate Administrative Assistant Carla Ashton-Cohen is also the recipient of a School of Science Infinite Mile Award.

GRADUATE STUDENTS

Christopher Hirsch won best research poster award at the GALANA (Generative Approaches to Language Acquisition – North America) conference, December 2004 in Hawaii.
Special Award for Extraordinary Teaching Service: Tevye Rachelson
Angus MacDonald Awards for Excellence in Undergraduate Teaching: Beau Cronin, Amy Perfors, Monica Linden, Chris Hirsch
Walle Nauta Award for Excellence in Graduate Teaching: Daniel Casasanto, Simon Overduin, Charles Kemp
Walle Nauta Awards for Continuing Dedication to Teaching: Josh McDermott, Ben Balas
BCS Team Awards for Outstanding Teaching: Tim Buschman, Julie Goldberg, Boris Krupa, Marnie Phillips, Cansu Tunca, and Gene Yeo for 9.02; Julie Goldberg, Emily Hueske, Lena Khibnik, Show Ming (Sally) Kwok, and Neville Sanjana for 9.12

UNDERGRAD STUDENTS

Laura Yong-Hwa Lee, '05, a pre-med double major in BCS and biology has been awarded a Rhodes Scholarship to pursue a doctorate in clinical medicine at Oxford University. USA Today also honored her recently by naming her one of 20 students to the All-USA College Academic Team.
Shijun "Cindy" Xi, SB '05, has been awarded a Merage Fellowship. The foundation awards this to immigrants who have demonstrated leadership and academic achievement.

David Berry, SB '00 in BCS and currently an MD/PhD student in HST, received the $50,000 Lemelson-MIT Student Prize for his work with a new protein and a common coagulant that may help with both stroke and cancer patients.

Mark Histed, Theresa Feleday and Terra Barnes

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model, dubbed the standard model because it is a quantitative version of the simple feed-forward, hierarchical architecture originally proposed by Hubel & Wiesel, summarizes a set of basic facts about cortical mechanisms of recognition. BCS graduate student Thomas Serre, PD Fellow Lior Wolf, and Stan Bileschi have extended the model to take into account that the tuning of neurons early in the visual pathway is likely to depend, at least in part, on visual experience. When tested on real-world natural images the model seems to outperform some of the best computer vision systems on a recognition task, categorizing well many different types of objects in complex natural images.

Prof. Mriganka Sur, PD Fellows Jorge Marino, James Schummers, and David Lyons, in collaboration with a group led by Klaus Obermayer at Berlin University of Technology have discovered an important new way the brain performs complex functions such as pattern recognition. They have examined how processing networks in the brain transform visual stimuli to create outputs that can be used for perception and action. This forms the beginning of an important new way to understand how the brain creates new functions.

Meanwhile, former graduate student Serkan Oray and PD Fellow Ania Majewska of the Sur lab measured the structure of single dendritic spines using two-photon microscopy. Their results, appearing in the Dec. 16 issue of *Neuron*, examined how the structure of single dendritic spines, the location of single synapses, changes when inputs to the visual cortex change during a critical window of development. They discovered that the twitching or change in size during the period connections are forming is increased by the addition of tPA, a brain chemical used to dissolve blood clots in the brain after a stroke which can hasten the structural remodeling of synapses.

Neurologist and Sr. Lecturer Thomas Byrne is currently offering a new BCS course, A Clinical Approach to the Human Brain, which focuses on how the human brain works in health and disease. Dr. Byrne uses clinical cases and will demonstrate how imaging is able to highlight differences between the normal and the diseased brain. In the Fall, he will be teaching a course entitled Diseases of the Nervous System.

Prof. Nancy Kanwisher, PD Associate Chris Baker, and Professor Eli Peli of the Schepens Eye Research Institute at Harvard Medical School published an article in the January 19 issue of the *Journal of Neuroscience* on their research showing that brain reorganization occurs in people suffering from macular degeneration, a progressive visual disorder in which the center of the retina is damaged and sight is limited to peripheral vision. Chris noted that "Our major finding is that the part of the brain that processes only central retinal visual information in people with normal sight reorganizes itself in people with macular degeneration to help process peripheral visual information." This suggests the possibility of developing new rehabilitative strategies to use these changes to compensate for loss of retinal function.

In the December 2 issue of *Neuron*, Visiting Associate Professor Guosong Liu and PD Associate Ina Slutsky describe how magnesium appears to help maintain memory in middle age and beyond by regulating a key brain receptor important for learning and memory. Prof. Liu states that "Our study shows … maintaining proper magnesium in the cerebrospinal fluid is essential for maintaining the plasticity of synapses." Plasticity is the ability to change and the key to the brain's ability to learn and remember. Loss of plasticity, particularly in the hippocampus, site of short-term memory, may explain, at least in part, increased forgetfulness.

Earl Miller, Picower Professor of Neuroscience, and PD Associate Anitha Pasupathy found that the striatum, the input structure of the basal ganglia (the large forebrain area beneath the cortex), showed more rapid change in the learning process than the more highly evolved prefrontal cortex. Their results suggest that the basal ganglia first identify the rule, and then "train" the prefrontal cortex, which absorbs the lesson more slowly. "In other words, primitive brain structures might be the engine driving even our most advanced high-level, intelligent learning abilities," Miller said. "We found that as monkeys learn new, simple rules, associations analogous to 'stop at red, go at green,' the striatum of the basal ganglia shows evidence of learning much sooner and faster than the prefrontal cortex. But, an interesting wrinkle is that the monkeys' behavior improved at a slow rate, similar to that of the slower changes in prefrontal cortex." This suggests that while the basal ganglia "learn" first, their output forces the prefrontal cortex to change, albeit at a slower rate.

Elly Nedivi, Fred and Carol Middleton Assistant Professor, together with PD Associate Ulrich Putz and grad student Corey Harwell, found that a plasticity gene and its growth-promoting protein, CPG15, could potentially be used to develop therapies for renewing damaged or diseased tissue. The three identified a form of CPG15 that protects cortical neurons from apoptosis, or programmed cell death. Apoptosis is a normal and essential part of early development, when brain cells proliferate rapidly and some are killed off, but little is known about how apoptosis of growing neurons is regulated. The molecule is key to the survival of neural stem cells in early development. Their findings were reported in the March issue of *Nature Neuroscience.*

Cognitive scientists have discovered that tamarin monkeys have no taste for the consonant tones that mostly make up music, suggesting that musicality may be restricted to humans alone. Josh McDermott of MIT and Marc Hauser of Harvard conducted a series of musical experiments on cotton-top tamarins, a species of squirrel-sized primates. The animals were placed in a chamber in which consonant sounds were played on one side, and dissonant sounds were played on the other. The monkeys spent equal amounts of time on the both sides of the chamber. In contrast, the humans tested by McDermott and Hauser showed a distinct liking for consonant sounds. The results of their study are reported online in *Cognition*. "This is the first time that a lack of preference for consonance has been shown in primates," says Isabelle Peretz, a psychologist from the University of Montreal, Canada, who studies music perception.

Aude Oliva goes canyoning.
(See story on p. 7)

AUDE OLIVA

Rock climbing at Via Ferrata in the Alps.

Since childhood, Aude has wanted to be a scientist. From a very early stage, she was fascinated by cosmology (the origins of the universe) and spent her high school years studying math and physics to assure a place in an engineering school studying astrophysics. For her, studying was a great pleasure and she was never intimidated by these subjects, so she received a baccalaureate in math. Perhaps her fearlessness can be attributed to her parents: her father, an engineer and a math virtuoso, saw math as a numerical game, and her mother is a professor of physics.

A book by Hubert Reeves, a cosmologist, however, was her most significant influence. Reeves wrote that the challenge of the next century is to understand how the brain works. Inspired by his words, Aude could have chosen to study the brain via psychology or medicine, but the latter was not an option given her propensity for fainting at the sight of blood. Thus, she enrolled at the Universite de Savoie in the Alps, near her home, where she pursued a bachelor's degree in psychology and philosophy, ultimately receiving a degree in experimental psychology.

Since then, her research has focused on visual understanding by humans and machines. "I am fascinated by the mysterious ability of the human brain to understand so quickly facts and situations amidst the complexity of the visual world. My research journey is to discover the factors and the algorithms that gave rise to these solutions in the domain of scene understanding," she said. Aude approaches the scene understanding problem from a computational stance (e.g., what are the statistics in natural images that are relevant for perception and categorization? How can we model efficient scene and space recognition?); a cognitive neuroscience approach (e.g., what are the neural correlates of scene perception?); and a behavioral viewpoint (e.g., characterizing human performances in a variety of tasks).

Aude also holds two Master's degrees from Grenoble: one in Cognitive Science with a minor in image processing and another in Cognitive Psychology. Her Ph.D., at the Institut National Polytechnique de Grenoble (INPG), in France, was in Cognitive Science, and was followed by a "seven year journey of post-doctoral studies" around the world, with a goal of acquiring multiple approaches to the study of visual perception and cognition. She went to Glasgow in the UK, followed by a period in Kyoto, Japan, working in a company developing methods for automated face recognition systems. She then returned to the UK before accepting a two year research position at the INPG. In 2000, she came to the Harvard Medical School to work with Jeremy Wolfe who, in her own words, taught her everything she knows about visual attention. After one-and-a-half years at Michigan State University as an Assistant Professor, she came to MIT in July 2004, where she rejoined her partner, Antonio Torrralba, whom she had met in 1998 at the INPG. Antonio had done postdoctoral work with Pawan Sinha and is now a researcher in CSAIL. The two have collaborated on several articles.

Aude and Antonio were not only drawn together by their common research objectives, but by their mutual passion for science fiction, and they see every movie in that genre. Aude cannot think of any science fiction film she has not seen multiple times, and the two are consistently first in line for any new movie. She has also read all of Isaac Asimov and is hoping for a movie saga to be made of his works.

Though she does not have the time at this point to indulge in her more athletic passions, she hopes to return to some of them. For 10 years in her youth and adolescence, she rode horses, and was a skier by age 4, not surprising given her upbringing in the Alps. Later, she engaged in rock climbing, which she enjoyed because of the preciseness of the movements it requires. "You need to focus constantly on your next move and lose a notion of time. First there is a goal you can see, you plan how to attain it, and then slowly act on the plan in a quiet and patient way (so you don't fall)," she says. She had been terrified of heights, but she used climbing as a way to control and overcome it.

For Aude, climbing was not a risky venture because all aspects of it were clear, but the canyoning she did for 3 years was inherently dangerous. In this sport, you jump from one waterfall level to the next or you use a rope to climb down. You are exploring something unknown, because when you are climbing down through the falls, you don't see what is at the bottom, so there's a mystery and it's risky. You have to evaluate the risk without actually knowing what is there. This is what she likes about science: exploring an unknown avenue. "The mode you use to express a concept doesn't matter. The important thing is not being afraid of what could lay beyond." Aude equates her passion for research with both hobbies; i.e., at times she sees goals and climbs slowly and knows where she is going. Other times, there are probabilities, an interesting avenue, but the goal is somewhat obfuscated.

A less arduous and dangerous hobby is cooking. Though she does not cook often, when she does she prefers ethnic cooking for large groups, but chocolate mousse is her specialty. As a grad student, she would prepare it for the 40 members of the lab. She also loves to coordinate wines with the various courses of a meal, an interest she acquired from her father, an amateur wine connoisseur.

Aude is very happy to be here where she has the privilege of working with students and scientists who share her passion for scientific research. She is doing what she is "wired" to do. Though the object of her focus changed from outer space, the concept of space remains. Using behavioral, modeling and brain imaging approaches, her lab is currently investigating the psychological, computational and neural substrates of the representation of 3-D scenes, the representation of visual complexity and its modeling for machine vision applications, and the mechanisms of attentional deployment in complex scenes. These research topics bring together disciplines such as perceptual science, visual cognition, cognitive neuroscience, architecture, computational modeling and image processing, a multidisciplinary approach that will thrive in the intellectual richness of the MIT community.

ALUMNI NEWS

John Magee SB '92 recently became the VP and Director of Integrated Analytics at a marketing agency called Mullen in Wenham, MA, where he analyzes the effects of advertising campaigns for companies like XM Satellite Radio, LendingTree, and Turner Broadcasting. He is often called upon to develop hypotheses about how longer, more complex ads might affect consumers, and about the differential effects of media. It all comes back to cognitive processing. In addition, a study he worked on while a UROP was featured in the popular new Malcom Gladwell book *Blink.*

Ivan Gevirtz SB '95 was employed as a software engineer after graduation, but after being laid off, he took time to travel and reflect and then to work as a volunteer English teacher in Ecuador. Upon returning, he founded a consulting company, and then became part of a wireless company that was quickly sold to Amazon.com. Eventually he left to found and grow more companies. He would now like to combine his BCS studies with computers. He expects to be on campus in June for his 10th reunion.

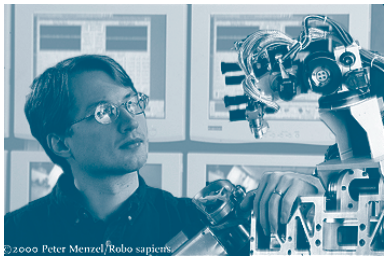
Grant W. Su SB '97 earned an M.D. after graduation and is now a Resident in Ophthalmology at the Cullen Eye Institute, Baylor College of Medicine. He will soon become a Fellow in Oculofacial Plastic and Reconstructive Surgery at the Medical College of Wisconsin through 2007.

Susan E. Rushing SB '99 currently a JD/MD Candidate 2005 at Stanford Law School/Yale School of Medicine, received word that she will be completing her training in Child Neurology at Boston Children's Hospital (from 2007-2010).

Jason M. Satterfield SB '90 is an Associate Professor and Director of Behavioral Medicine in the Division of General Internal Medicine at UC San Francisco. He is the Co-Director of the Behavioral Sciences curriculum for UCSF medical students and primary care residents including training in cultural competence, behavioral medicine, and psychiatric services in primary care settings. His current research interests include evaluation of cultural competency programs, cognitive therapy for fibromyalgia, and emotional intelligence in medical care.

Donald Hoffman Ph.D. '83 in computational psychology accepted a position at UC Irvine upon graduation and has been there ever since. He has joint appointments in the Depts. of Cognitive Science, Philosophy, and Information and Computer Science, and spent 8 months as a Visiting Prof. at the University of Blielefeld, Germany. In 1989, he received the Distinguished Scientific Award of the APA for an early career contribution to psychology in the area of perception and, in 1994, he was the recipient of the Troland Research Award from the US National Academy of Sciences. His research is on visual perception, focusing on object recognition, motion perception, color perception, and visual deficits in Alzheimer's.

Brian Scassellati SB '94 in BCS and Computer Science, Ph.D. '01 in Computer Science (under Rodney Brooks), is currently an Assistant Professor at Yale, where he focuses on the construction of humanoid robots that use normal social cues to interact with people. He is interested in using robots as a tool for investigating models of child development, human cognition, and social deficits in autism. He believes that one of the best ways to understand human intelligence is to attempt to build a similar intelligence in a machine. He also works closely with members of the Psychology Dept. and the Child Study Center in the School of Medicine. At Yale, he is constructing two humanoid robots. The first is being based on the body structure of a two-year-old child and will be used to study the development of object concepts and basic hand-eye coordination skills. The second robot will be used in a clinical setting to assist in the diagnosis and treatment of autism and related pervasive developmental disorders. He and wife Kristi Hayes have a daughter.



Brian with one of his robots.

brain+cognitive sciences

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