Big Data, Big Ambition for Behavioral & Social Science Research

Why do criminals do what they do? How do local community choices affect Earth’s environment? What moves people to protest for changes in the way they’re governed?

The questions that behavioral and social scientists tackle are as fascinating and complex as ever, but the tools at their disposal are undergoing a technological revolution, says Gregory F. Ball, who’s wrapping up his first year as dean of the College of Behavioral and Social Sciences (BSOS), one of the university’s largest academic divisions.

“We have age-old questions, and we need to be attacking them in novel ways,” says Ball, a prominent behavioral biologist who previously served as vice dean of the Krieger School of Arts and Sciences at Johns Hopkins University.

One of his key priorities for the college is helping his faculty fully exploit challenging yet promising new computational research methods.

An emerging methodology that’s already changing BSOS, he says, is big data analytics, which is giving researchers a handle on chaotic masses of information that would have been impossible to analyze in earlier eras.

“We can look at large aggregates of data in novel ways to try to understand social trends on a much bigger spectrum than was possible before,” Ball says. “Right now, big data techniques applied to the social sciences is considered cutting edge, but in less than one generation it’s going to be routine.”

Ball says he and Eric Denna, UMD’s vice president for information technology and chief information officer, have had productive strategy sessions about how to provide advanced computational support for BSOS researchers.

“He completely gets it, that big data analysis is going to be extremely important for my college,” Ball says.

Within BSOS, the Department of Geographical Sciences is helping lead the way in the analysis of large data sets with its groundbreaking work in geospatial-information science and remote sensing. Among other discoveries, researchers from the department recently demonstrated that contrary to widespread belief, tropical deforestation is picking up steam.

“They are taking images of the entire planet from space, taking geography to a whole new level of analysis,” Ball says.

And BSOS researchers in behavior and psychology are applying advanced methods to the study of human behavior by using brain imaging technology at the Maryland Neuroimaging Center, a multicollage facility led by BSOS.

“We have people looking at behavior and cognition, and imaging brain activity in relation to that to try and understand the relationship” as well as answer other questions facing BSOS social science researchers, he says.

All these points in the same direction—BSOS is becoming known as a critical player in key interdisciplinary research areas at UMD including cybersecurity, language sciences, neurosciences and national defense work. “Our links to other colleges at UMD are becoming stronger and stronger,” he says. “They’ll continue to strengthen as our faculty work collaboratively to tackle the most important problems facing society today.”

Augmentarium: Virtual Worlds for Researchers

A revolutionary way of viewing the world is taking root in the University of Maryland’s new Virtual and Augmented Reality Laboratory, and departments across the university are reaping benefits from the futuristic facility nicknamed the Augmentarium.

Here, researchers can step into a breathtakingly lifelike world using the latest 3-D virtual reality headset, quickly manipulate vast amounts of information in waltz-size images of complex molecules, or visually enhance the physical world by overlaying it with social media data. “It’s amazing how many people across campus we have talked with about how this can help them,” says Amitabh Varshney, director of the university’s Institute for Advanced Computer Studies (UMIACS). He’s principal investigator for a $600,000 Major Research Instrumentation Grant from the National Science Foundation that, along with funding from the College of Computer, Mathematical, and Natural Sciences, helped found the lab.

Developing collaborations include work with the Department of Kinesiology on a tool using virtual reality to test “occupational athletes” like pro football players for brain injury after an impact. Department of Electrical and Computer Engineering researchers will work with the lab on real-time data visualization for cybersecurity.

With virtual reality taking off for entertainment purposes, researchers can use the Augmentarium to explore the technology’s practical side, Varshney says. With the University of Maryland Medical Center’s Shock Trauma Center in Baltimore, researchers will look for ways augmented reality visualization can aid in surgery—perhaps giving surgeons the power to virtually see inside a patient without cutting tissue.

“Ultimately, this technology is all about gaining insight into the data and into the science,” Varshney says. “The goal is to create a one-of-a-kind cyber facility here that allows us to explore problems where a new kind of visualization could lead to solutions.”
PALS Program Pushes Smart Growth for College Park

Faculty expertise and student energy have combined in an effort to make the University of Maryland’s home city a world-class college town. In February, UMD’s National Center for Smart Growth and the city of College Park finalized an ongoing partnership making sustainable development part of the curriculum across campus.

In its inaugural semester, the College Park Partnership for Action Learning in Sustainability (PALS) program features four classes to improve College Park’s economic, social and environmental well-being: an architecture course to transform existing commercial space, a greenhouse gas analysis of College Park, a study of waste-management practices and a public art and design class.

Students of Ronit Eisenbach, associate professor of architecture, set up temporary “guerilla” art installations downtown as part of the “Making Place: Public Art and Design” course she’s teaching with sculpture Professor John Ruppert and urban planning Professor Gerrit Knaap. Longer-term installations will appear in early May.

Temporary installations have the power to spark discussion about better use of the city’s limited spaces, she said.

“This work helps people consider what it?” she said.

“What if we reimagined this parking lot or this alley as a garden or an outdoor performance yard?”

The PALS program in 2014 focused on Frederick, Md., and a new effort later this year will target Howard County, Md. PALS Director Uri Avin says he’s excited to roll out the program with College Park city officials.

“Besides the real-world learning experience PALS provides, it will no doubt be exciting for students to see their work create positive change in their own back yard,” he said.

Research @ Maryland

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New Augmentarium Pushes the Boundaries of Virtualization

Faculty awards & honors

Professor Emeritus Ralph Bennett and Clinical Professor Amy Gardner, both of the School of Architecture, Planning and Preservation, were elected to the American Institute of Architects College of Fellows in recognition of their contributions to the profession.

Sandor Boyson, research professor and co-director of the Supply Chain Management Center in the Robert H. Smith School of Business, was named Resilient Supply Chain Educator of the Year by the Global Supply Chain Resiliency Council. His work is “preparing the next generation of supply chain-risk-management superstars,” the council said.

Eitan Tadmor, distinguished university professor in mathematics and director of the Center for Scientific Computation and Mathematical Modeling, was awarded the 2015 Peter Henrici Prize by the Society for Industrial and Applied Mathematics. The society cited Tadmor’s “original, broad and fundamental contributions to the applied and numerical analysis of nonlinear differential equations.”

We introduce you to new faculty and research scientists in the Maryland research community.

La Marr Jorelle Bruce, assistant professor of American studies, teaches and researches black expressive culture, critical race theory, queer theory, performance studies and protest art.

Kelly Hamby is an assistant professor and extension specialist in the Department of Entomology. She researches sustainable pest management strategies, focusing on insect interaction with microorganisms such as yeast.

Yia Tausczik, an assistant professor in the School, studies how online communities, peer production and crowdsourcing enable distributed problem solving. Her work informs the design of social systems to support open science and the use of open data.

Rohan Tikekar is an assistant professor of food science. His research focuses on applications of novel ingredients and processes to improve food quality and safety.

Research news & announcements

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UPCOMING EVENTS & CONFERENCES

Translating Research Success to Financial Results
S. Gulu Gambhir, chief technology officer and senior vice president, Leidos, featured speaker in the Whiting-Turner Business & Entrepreneurship Lecture Series
Tuesday, May 5
4:30 p.m. reception; 5 p.m. lecture
1110 Jeong H. Kim Building
RSVP at http://go.umd.edu/wtgambhir

Human-Computer Interaction Laboratory (HCIL) Symposium
Thursday, May 28, 8:30 a.m.-6 p.m.
HCIL’s 32nd Annual Symposium will highlight cutting-edge research conducted in the Human-Computer Interaction Laboratory at the University of Maryland.
Computer Science Instructional Center
Register at http://www.cs.umd.edu/hcil/sohl/