“A first impression makes a huge impact on rational decisions,” says Soussan Djamashi, PhD, associate professor of management information systems in WPI’s School of Business. “You can’t just design something that is easy to use. You have to know what the user wants and how to provide it.”

If you’ve ever found yourself getting lost on one website while you navigate another effortlessly, you’ve experienced the all-too-frequent disconnect between web design and user needs. Until recently, website creators have relied on good design principles and a bit of luck to create a satisfying customer experience. But that is beginning to change, thanks to the emerging field of user experience research.

WPI’s User Experience and Decision Making (UXDM) Research Laboratory, which Djamashi founded and directs, is one of the leaders in this new discipline, which is built upon cutting-edge eye-tracking technology. Djamashi says user experience research can help companies be more successful, since more user-friendly websites and applications can lead to repeat customers and more business.

But the potential for the research goes far beyond those basic goals. The work Djamashi directs is aimed, fundamentally, at expanding our understanding of how people take in and process information displayed on screens, how our emotional reaction to what we see affects our experience, and how interaction with and emotional reaction to screen displays influences the decisions we make. This knowledge could impact how websites, mobile applications, and other screen-based information sources are built.

With funding and partnership from Dynamic Network Services Inc. (Dyn), a leader in Internet infrastructure as a service technology founded by Jeremy Hitchcock ’04, Djamashi has created a state-of-the-art laboratory with 15 eye-tracking stations — five for recording and 10 for analyzing data. In addition to using it for research, she will soon begin teaching a new user experience course in the lab. “I want to expose students to what research happens in industry and what is needed in industry,” she says.

The small camera-like eye-tracking unit emits an infrared beam that, once calibrated to the reflection from a particular user’s pupil, will detect where that user is directing his gaze, moment by moment, as he navigates a website or uses a mobile app. The results appear as colored zones overlaid on the website or app screen. Red indicates areas that attracted the most eye time, while yellow and green define areas that were viewed less. The more intense the color (for example, the darker the red), the more intense the user’s gaze.

“It is a clear indication of the user’s attention,” Djamashi says. “This literally allows us to peer through a user’s eyes and see what she is looking at.”

Dan McAuliffe, Dyn’s user experience manager, says WPI’s eye-tracking research opened his eyes. Dyn sponsored a project in which a team of undergraduates was asked to help the company optimize the checkout process on its website for display on mobile devices with a range of screen sizes. The students discovered that while users found the website well designed and intuitive, when the same content was adapted for the mobile screen the need for scrolling, panning, and zooming made the checkout process confusing and prone to error.

Within months of implementing the students’ recommendation to have pages dynamically adapt to a mobile device’s screen size, Dyn observed “a 10.4 percent increase in number of mobile transactions, with a 32 percent increase in the average value of these transactions,” McAuliffe says.

“Design used to be purely about the emotion you got from something, but we didn’t have too much data to back that up,” McAuliffe says. “You try to put your best foot forward and make an educated guess about what is the best design. Now we can put more science behind it.”
McAuliffe says conducting usability research at WPI helps his company’s designers be proactive, not reactive, by evaluating the user experience before a product launches, rather than waiting to make fixes based on user feedback after the product is already in the field.

Dyn’s initial award to Djamasi allowed her to establish a specialized lab and move her eye-tracking equipment from her office into dedicated space. The company recently facilitated a new award valued at over $170,000 (including a generous contribution from Tobii, a leader in manufacturing eye-tracking equipment) that made it possible for the lab to acquire new workstations and expand, creating separate spaces for the testing stations and the analysis stations.

Separating recording and analysis will augment the lab’s research and development capacity and, Djamasi notes, help “ensure WPI’s status as a thought leader in teaching and scholarship in the user experience area.” And she hopes the expansion will pave the way for greater collaboration with other researchers at WPI and research partnerships with an even greater number of companies.

Djamasi says she is also looking forward to using her equipment and expertise to expand into new domains, including fields where the usability research has yet to have a significant impact on the user experience such as video games, robotics, in-vehicle displays, computer-based learning, and mobile healthcare apps.

Djamasi’s students say they are excited by the far-reaching implications of their eye-tracking work. “It is so simple and so profound,” says Dhiren Mehta ’12, who helped Djamasi set up the lab as an MIS graduate student. “It has endless possibilities.”

“It tells you what people are drawn to without their having to tell you,” says Michelle Mulken ’15, a biotechnology major who has worked in the UXDM lab. “It’s inspiring to think that we might be able to help people with cognitive disabilities who could benefit from websites tailored to their needs.”

For the time being, Djamasi and her team are looking forward to the impact they can continue to have within the domain of commerce. “We can help people make better and more effective decisions based on how they use and process information,” she says. “This is huge for business. I think in a few years this will be a standard procedure in every company as the equipment becomes more accessible. There is a need for this and we can deliver it effectively.”

From left, Soussan Djamasi, associate professor of management information systems, and Xue “Anny” Luan and Jingmin “Pat” Qiu, MS candidates in marketing and technology innovation, use an eye-tracking system. The system can be used to explore what users focus on when looking at a web page (the top two images are from a 2007 study that showed that people noticed a simpler “bricklet” in the top right of the screen more than a colorful one). The system can also be used to determine how people take in information on mobile devices. The bottom two illustrations show a heat map (how long people look at different areas) and a gaze map (what they look at and in what order). (Photo by Patrick O’Connor)