

# Closer Connections for People, Places and Computers

Robert is a graduate student at NJIT, pursuing an MS in computer science. He is taking a course in Linux programming and has been given an assignment to code. But his code doesn't seem to work properly. To solve his problem, he accesses CampusMesh via his "smart" cell phone to signal that he would appreciate help with the assignment. Later, Robert is in the library when his phone vibrates. There is an "affinity match" nearby, an individual with a common interest in Linux. NJIT's SmartCampus system has automatically offered each the possibility of personal interaction based on shared interests. Robert learns that this person has completed the same course and is offering to help. They meet and eventually learn that they have many mutual interests in addition to Linux.

One afternoon, Ayala is relaxing in the Campus Center when her phone vibrates with a message. She sees that it has detected another female student with a high affinity match in the vicinity, someone she might wish to meet. Though the system does not reveal the stranger's identity, it does inform Ayala that they have several friends in common and a mutual interest in classic science-fiction films. As Ayala is hoping to organize a science-fiction film festival on campus, and despite her wariness about meeting strangers, she sends a message to find out more. After further information is exchanged through progressive identity revelation controlled by each user, she decides that a meeting is appropriate.

These scenarios are just two of the numerous ways that the SmartCampus project underway at NJIT can enhance interpersonal communication and access to information about campus events and facilities. The project has made the university's entire campus a laboratory for evaluating pioneering technologies that allow students, faculty and staff to better connect with each other via special cell phones and other compact wireless communications devices.

Through SmartCampus, individuals can instantly locate friends at the school, identify other people who share their interests, and be automatically notified of events compatible with their academic and social interests. It's even possible to obtain real-time information about the number of people in the library, the cafeteria, the computer labs and other places on campus.

## A lot of pieces

"We're putting a lot of pieces together in SmartCampus to create a ubiquitous social-computing cyberinfrastructure, pieces like CyberMesh," says Quentin Jones, assistant professor of information systems. "SmartCampus is a unique social-computing research project that uses technology to unite an urban environment — in this case the NJIT campus — into a community. This has been a dream of social and computer scientists for decades, and it's incredibly exciting because we now have the technological ability to do it."

A project of this magnitude requires a skilled team of experts to achieve its goals. Constantine Manikopoulos, associate professor of electrical and computer engineering, along with Jones, has assembled a team of NJIT faculty and students drawn from electrical engineering, computer science, human-computer interaction,

information systems and management. Their vision is to integrate resources from all of these disciplines to build a greater sense of place and personal interaction on campus, an effort that could ultimately change and improve the way people in urban environments throughout the world interact with each other.

“SmartCampus is a cutting-edge investigation of location-aware technology and social dynamics,” says Manikopoulos, one of the nation’s leading experts in network security. The SmartCampus initiative features the development of software that, among other uses, permits access to a database of interests and daily routines for all participants to facilitate social interaction. Constructing this database of participant profiles involves collecting geotemporal data from mobile communications devices on a scale never before attempted. These profiles will be leveraged in real time to support activities that will make campus life richer for all.



Student participation is a key aspect of the SmartCampus project. Not only are hundreds of student volunteers testing the SmartCampus concept at NJIT — the project also involves the hands-on educational experience of creating much of the software required. For example, undergraduate Nate Laws, who is working on a BS in information systems with a minor in management, is helping to lead the development effort. “The opportunity to be so involved as an undergraduate in creating something like SmartCampus is great,” says Laws. “It’s really why I chose to come to NJIT.”

The significance of the SmartCampus project is emphasized by the funding it has attracted: the National Science Foundation (NSF) is contributing \$1.7 million over the next three years. Part of the money will be used to provide participating volunteers with cell phones, laptop computers and other wireless devices that have the software and communications capabilities needed for the project.

### Preserving privacy

As the NJIT researchers acknowledge, gathering and storing such information raises the critical issue of protecting an individual’s privacy, and even physical safety. “Preserving privacy while enabling valuable services is a very challenging problem that we intend to investigate,” says Manikopoulos.



(Above) NJIT students Richard Schuler (background) and Nate Laws are on the SmartCampus research team. Their work ranges from developing SmartCampus software to investigating the possible use of “wearable” computing and communications devices.

(Left) PhD student Nkechi Nnadi with one of the wireless devices that could be used for tapping the capabilities of SmartCampus.

As a basic precaution, all those volunteering for the project will be required to specify which personal information they are willing to share with other users. Participants will also have the option of restricting the availability of their location information to certain times and places. In addition, through progressive identity revelation, users can gradually and selectively share specific information about who they are and where they are located when communicating via SmartCampus.

As with the Internet, Jones admits that there is both “danger and wonder” in the technologies that are further transforming the way people communicate and interact. But these technologies are fast becoming a part of daily life, he says, and with the appropriate safeguards, their potential for enhancing personal interaction and building community makes them an exciting new social asset. ■

For more information: <http://smartcampus.njit.edu>

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