

# Knowledge is power

## Biomedical informatics offers powerful new tools

by Eric F. Frazier

Smartphones and tablets, using applications like Facebook, Twitter and Google, are rapidly changing daily life by keeping people connected and informed wherever they go. The Translational Science Institute's Biomedical Informatics Program (BMIP) is similarly leveraging technology at the Medical Center.

"The program's mission is to use those same concepts and tools to help us meet our strategic goal of changing data not only into information and knowledge, but into improved health," said Jeffrey Carr, MD, professor, Radiology and BMIP director. "Just as we cannot run the Medical Center without water, electricity, or heating and ventilation, we cannot efficiently run a modern academic medical center without broad, sophisticated biomedical informatics."

Biomedical informatics is the comprehensive application of information science to medicine. "Biomedical informatics touches every aspect of science that is occurring at the Medical Center," Carr explained, "from laboratory-based science to clinical studies of new therapies to population-based studies focused on national or global issues."

### Broad scope of BMIP

As BMIP director, Carr leads an eight-person team working across research, service and education components. "In our strategic plan, developed under Dr. McConnell's leadership, we identified biomedical informatics as one of five key enabling platforms," Carr noted. "We've been working very hard to put together the tools to make that a reality."

The BMIP is working with clinical, research and academic departments in the following ways:

- On the clinical side, BMIP has supported the development of databases that work with mobile devices to automatically alert physicians when a patient's condition warrants immediate attention, such as the onset of infection.
- On the research side, BMIP is developing tools to help investigators find collaborators and to capture research and survey data electronically.



Jeffrey Carr, MD

- In education, Peter Santago, PhD, BMIP's deputy director, and Terri Yates, PhD, associate director of the program, have been working to develop master's level and doctoral degree programs in biomedical informatics.

BMIP is also developing strategic relationships with Virginia Tech and the University of North Carolina at Charlotte that bring together engineers and computer scientists to improve the interfaces between medical devices, information systems and handheld devices.

### Protecting patient privacy

Yaorong Ge, PhD, associate professor, Biomedical Engineering and BMIP's technical director, leads development of the Clinical Research Data Warehouse. The secure, searchable database allows researchers to evaluate potential study populations without

## PIN protection keeps data secure

A four-character PIN is required when using any smartphone, tablet or other mobile device connected to the Wake Forest Baptist Medical Center network to protect personal health information and other sensitive information entrusted to our Medical Center. It's the best defense against potential misuse of data—for you and for the Medical Center. For more information, contact the IT Service Desk at 336-716-4357.

accessing private patient information. Ge's team, through a consortium with Harvard Medical School and Partners HealthCare System in Boston, implemented a platform called i2b2 (Informatics for Integrating Biology and the Bedside). This enabled removal of patient names and medical record numbers from 15 years of clinical data.

### Robust, Web-based tools

In roughly one year since implementing REDCap (Research Electronic Data Capture), a secure, Web-based application, 225 researchers have adopted it for more than 300 projects. REDCap supports research databases and clinical surveys, and because it is Web-based, fosters multi-institution collaboration. "For example, one study is using it to collaborate with six institutions to examine the medical effects of police stun guns," Yates noted.

Lindsay Marion, a project coordinator, said several departments are using REDCap with iPads to administer surveys. "Rather than ask questions, they hand patients an iPad to fill out themselves," she said. "The departments feel like they get more honest answers from the patients." Responses upload to the database without the labor and possible errors of retyping.

"We're at just the beginning in terms of what we can accomplish with biomedical informatics," Carr noted. "We are giving clinicians and researchers access to powerful tools that will help all of us lead healthier lives."



Lindsay Marion, project coordinator, assists Mario Rojas, MD, MPH, Pediatrics, with using REDCap on an iPad to administer a patient survey.

## Search tool connects like-minded researchers

TSI Profiles is a new networking software tool that identifies faculty experts using simple search terms. "The idea behind this tool is that it allows our large organization of faculty, clinical physicians and researchers to rapidly find people with similar interests that they may want to talk to or collaborate with to develop new science," said Jeffrey Carr, MD, professor, Radiology and director of the TSI's Biomedical Informatics Program.

Users can enter a first or last name, department or faculty type, or search keywords, such as "fat cells" or "lupus." The search tool displays a list of faculty ranked from highest to lowest by relevance, based on the volume of published articles pertaining to the search terms. A "network view" reveals how Medical Center faculty members are related by their scientific publications. "I believe new faculty will find this feature particularly helpful when trying to identify individuals in a particular area or with a particular technique," said Carr.

Profiles search will initially be available only to Medical Center faculty and staff, but Carr said the tool will allow connections with scientists working in the Piedmont Triad Research Park and eventually allow faculty to rapidly connect with others world-wide to develop new collaborations.