



*Pritzker Distinguished Lecturer:*

## Rebecca Richards-Kortum, PhD

*Department of Bioengineering, Rice University*

THURSDAY, OCTOBER 7, 2010

8:00AM

BALLROOM D, CONVENTION CENTER

### From Cell Phones to Cell Biology: High Tech, Low Cost Solutions for Global Health

**A** **ADVANCES IN THE BIOSCIENCES** and public health are responsible for dramatic gains in life expectancy achieved over the last century. Yet, the majority of the world has not benefited from this progress. Sustainable and scalable innovations to prevent disease are needed. This talk will describe efforts of bioengineering faculty and students to develop new diagnostic and therapeutic tools which can be used at the point-of-care (POC) to improve health in low resource settings.

Advances in MEMS technologies, molecular recognition, and low power sensors now offer the ability to design low-cost, reusable platforms for POC diagnostics. Efforts to integrate molecular imaging together with miniature microscopes are now yielding new POC diagnostics for infectious and chronic diseases. Driven by advances in consumer electronics, high resolution imaging can be obtained with low cost devices; advances in digital signal processing provide the ability to automate analysis.

In parallel, multidisciplinary educational programs are engaging undergraduate students to address POC design problems in developing countries. In creating solutions to real world challenges, students are challenged to think beyond traditional disciplinary and geographic boundaries.

**REBECCA RICHARDS-KORTUM** is the Stanley C. Moore Professor of Bioengineering at Rice University. Previously, she held the Cockrell Family Chair in Engineering #10 and was a Professor of Biomedical Engineering at the University of Texas at Austin, where she was also a Distinguished Teaching Professor. After receiving a B.S. in Physics and Mathematics from the University of Nebraska-Lincoln in 1985, she continued her graduate work at the Massachusetts Institute of Technology, where she received a PhD in Medical Physics in 1990. She joined the faculty in Bioengineering at Rice University in 2005 and served as Chair of Bioengineering from 2005-2008.

She was named a Howard Hughes Medical Institute Professor in 2002 and 2006, and was elected to the US National Academy of Engineering (2008). She was elected fellow of AAAS and of BMES in 2008, and received the IEEE Educational Activities Board Vice-President Recognition Award (2008).

Dr. Richards-Kortum's research group is developing miniature imaging systems to enable better screening for oral, esophageal, and cervical cancer and their precursors at the point-of-care. In collaboration with faculty at the UT MD Anderson Cancer Center, her group has carried out clinical trials of this technique involving over 2,000 patients in the US, India and Nigeria. Her group is developing contrast agents for in vivo molecular imaging of changes associated with precancer including expression of epidermal growth factor receptors. More recently, her group has worked to integrate advances in nanotechnology and microfabrication to develop novel, low-cost sensors to detect infectious diseases at the point-of-care, including cryptosporidium, malaria, and Tuberculosis.

At Rice University, Dr. Richards-Kortum has worked to establish new educational programs in global health technologies, including a new undergraduate minor in global health technologies at Rice. Students in the minor engage in project based courses to solve problems contributed by partners in developing countries. Students in the program have designed over 28 new technologies which have been used by healthcare providers in 15 international healthcare settings and have impacted the lives of over 19,000 people.