



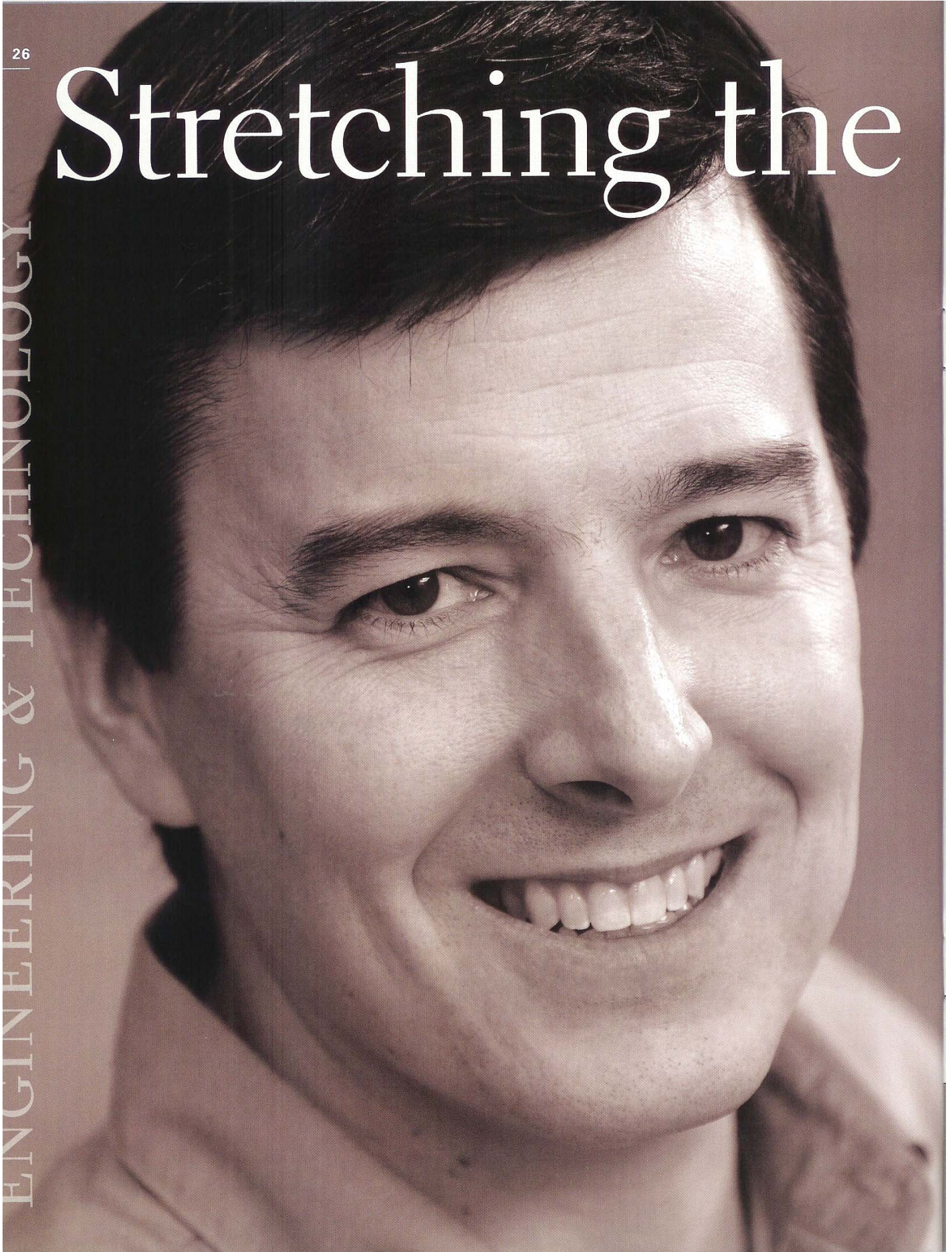
UNIVERSITY OF ILLINOIS  
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# Brilliance at Illinois

*Annual Report 2005-06*

# Stretching the

ENGINEERING & TECHNOLOGY



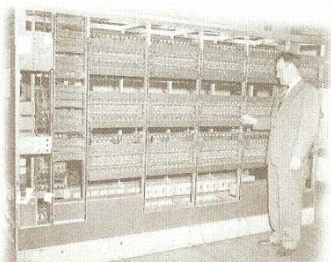
# Cutting Edge

## Re-inventing Silicon Provides Breakthrough Technology

**Kiss your hard-sided computer good bye.** John Rogers has figured out how to make one of its key components — silicon, normally brittle and stiff—become both flexible and stretchable. In this and other projects, Rogers' work is aimed at transforming society.

“We like to select interesting scientific problems whose solutions have the potential to lead to technologies with very broad impact on society,” says the professor of materials science and engineering at Urbana-Champaign.

One field of electronics is turning away from the “small is beautiful” to the “bigger is better” approach. Examples: computer monitors and television screens. The questions Rogers seeks to answer are: How do you handle a large area? How do you print circuits in a large and distributed area? And how do you create lightweight and flexible bases that bond with silicon? One answer Rogers supplied is to print circuits the way you'd print a newspaper, with stamping-based patterning techniques and ink-based electronic material rather than the conventional techniques that are well developed for wafer-scale size but not for bigger uses. This method is also less expensive. Besides displays that can be folded or rolled when not in use, stretchable silicon could be used in sensors and electronics for artificial muscles or biological tissues, structural monitors wrapped around aircraft wings or stretchy skins for integrated robotic sensors. These widespread applications led “Technology Review” magazine to tap Rogers' discovery as one of the top 10 emerging technologies.



### MAKING HISTORY

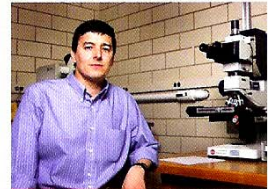
The U of I produced a pioneering computer called ILLIAC I in 1952. At that time, only Princeton and the U of I had the necessary federal approval to build computers. With the computing power of today's handheld calculator, ILLIAC had 2,800 vacuum tubes and weighed 10,000 pounds. Four years later, University engineers and scientists unveiled the next generation of ILLIAC, which had more computing power than all of Bell Lab's systems. This success paved the way for the Urbana-Champaign campus to be named one of the nation's five supercomputing sites in 1985.

“There are all kinds of opportunities here,” says Rogers, who was selected as one of the 2005 Scientific American 50 because of his research into the structure and behavior of organic semiconductors. Rogers, who came to Illinois in 2003 by way of MIT, Harvard University and Bell Labs, credits the intellectual climate at the University of Illinois for his productivity.

“The culture of collaboration and interest in technology outputs were things that really attracted me to Illinois,” says Rogers. “Illinois has a size and a scope and a scale that really exceeds anything at a place like Harvard or even MIT.”

The interdisciplinary nature of both the Materials Research Lab and the Beckman Institute — where Rogers also works — appeals to Rogers, who now has appointments in four departments: materials science and engineering, chemistry, electrical and computer engineering and mechanical and industrial engineering.

“I do a lot of collaborative work and the University, besides being the best in science and engineering, has a diverse faculty and is configured in a way that encourages collaboration.”



### John A. Rogers

#### Education

B.A., B.S. University of Texas at Austin

S.M., Ph.D. MIT

#### Honors

Top 10 Technology Award, MIT “Technology Review” magazine (2005, 2004, 2000)

Scientific American 50

R&D 100 Innovation Award (2002, 2001)

Joined the U of I 2003

#### Other Pursuits

Playing basketball

Hiking

Keeping up with his 3-year-old son