SCIENTIFIC AMERICAN

Professor recognized as pioneer of future

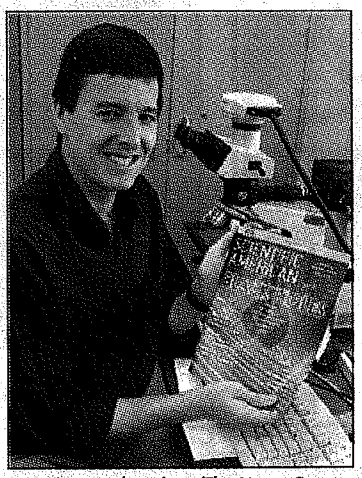
UI's John Rogers works on flexible electronics

By GREG KLINE
gkline@news-gazette.com

John Rogers thinks your walls, carpet, couch and clothing could compute some day, not to mention your newspaper.

Mind you, he's not talking about reading the news on a computer screen. He's talking about folding the screen and putting it in your pocket, much like the paper paper.

Sound farfetched? Scientific American doesn't think so. The magazine has recognized Rogers and his work on flexible electronics, using plastics and other soft materials, as among the 50 most influential efforts in science and technology for 2005.



John Dixon/The News-Gazette

Scientific American magazine says that University of Illinois Professor John Rogers' work on flexible electronics is one of the 50 biggest science and technology developments of 2005.

Past recipients of the "Scientific American 50" honor have included Nobel Prize-winning scientists and world and industry leaders, such as Apple chief Steve Jobs and Burt Rutan, designer of the first private aircraft, SpaceShipOne, to reach space. Google Inc. is among the other winners this year, highlighted in the December issue of Scientific American.

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For the first time, the goal was to identify "leaders in the context of the larger trends that made those advances so highly significant this year," Scientific American Editor-in-Chief John Rennie said in a press release.

Rogers noted in an interview that a lot of companies are working to bring flexible electronics, and flexible computing and display devices in particular, to market. Electronics giant Philips could be mass producing a roll-up display for handheld computers next year.

Many of the players' in the field are paying attention to breakthroughs by Rogers and his students, and Rogers has started a small company through Illinois Ventures, the UI's program for supporting new businesses based on campus-related developments, to promote the technology.

"I have a strong belief it's possible to have an impact on consumer electronics," said Rogers, a materials science and engineering, chemistry and electrical engineering professor whose specialty is the use of soft materials for high-tech purposes.

Ian Roberston, head of the UI Materials Science and Engineering Department, said its potential impact on our everyday lives is one reason Rogers' work has garnered attention in popular science and business publications, like Scientific American and Technology Review, as well as weighty academic journals.

"I think it's new and it's novel," Robertson said. "He's really sort of designing tools that we will see in the future. John does innovative and creative work."

But popular attention aside, Rogers also is a serious scientist and an excellent teacher, Robertson said.

In fact, Rogers emphasized that his lab's role is to understand the basic properties of the newly developed materials, a necessary prerequisite for their broad adoption. He also praised his students, post-doctoral researchers and the UI's interdisciplinary research culture.

"In terms of getting research done, I've never been at a better place," said Rogers, who's worked at Harvard and Bell Labs, among other places.

Rogers' lab has developed methods of using carbon-based organic materials with natural pliability and electric charge- and light-emitting properties to, in essence, print electronics on rubber and plastics. The method gets around the damaging heat, chemicals, pressure and other rigors of traditional chip processing on hard silicon.

The UI researchers also have developed a way of incorporating tiny silicon particles, while still retaining flexibility, to leverage silicon's speed advantage over organic materials for demanding uses, such as wireless communications.

Now, they're working with carbon nanotubes, cylindrical carbon molecules tougher than stainless steel, almost transparent and possessed of unique electrical properties, all of which could make them very useful in flexible high-tech devices, Rogers said.

He said the challenge is to get nanotubes to organize themselves in the desired fashion — they're too small to manipulate otherwise — when their natural tendency is to form kind of a rat's nest.

Besides its consumer uses, the Defense Department is interested in using the technology, for example, to make satellite communications dishes that a soldier could fold up and carry into the field in a backpack.

Another idea: something like "a living airframe" or a "nervous system" for aircraft that could sense flight conditions and damage and make adjustments accordingly.