

# Tumor detection, data encryption to benefit from UH research

April 29 2005

---

From detecting tumors to encrypting data better, one young engineering professor's nanotechnology work at the University of Houston holds enormous potential for medicine and electronics.

Pradeep Sharma, assistant professor of mechanical engineering at UH, received the Office of Naval Research's Young Investigator Program (YIP) Award for his proposal on the "Novel Size-Effects in the Coupled Mechanical Deformation and Opto-Electronic Behavior of Quantum Dots and Wires." The total award of \$262,471 for three years is intended to further propel Sharma's research.

"It's a proposal that will investigate new scaling laws for quantum dots due to mechanical strain," Sharma said. "Quantum dots are very small clusters of semiconductor material, and they exhibit some unusual and exciting opto-electronic properties. They have tremendous potential in future nanoelectronics."

Some examples of those nanoelectronics applications include next generation lasers and lighting devices, quantum cryptography, information storage and chemical sensors. On the medical side, this research may one day aid doctors in detecting and surgically removing cancerous cells in the body.

"Among many other applications, quantum dots can be used as biological labels," Sharma said. "For example, one can suitably tailor the size and bio-treatment of a dot so that it preferentially seeks and attaches to tumor cells. Then, simply by shining light on the body, one may optically

detect and pinpoint precise locations of tumors."

Though Sharma is well aware of the possible products of his research, he maintains his work is largely fundamental and provides the basis for these potential uses rather than the actual technology itself. He estimates that his current quantum dots work will be put to practice in the nanoelectronics and medical arenas in the next five to 10 years.

The YIP program is designed to support and encourage the teaching and research of outstanding new faculty members in higher education, who have received a graduate degree. Sharma, who began teaching at the Cullen College of Engineering in January 2004, received his doctorate from the University of Maryland-College Park in 2000. Also benefiting from this award are two UH doctoral students who will have the opportunity to work with Sharma on his research for the next three years.

"This award is supposed to be a jump start for young professors, and historically, that's what it's done," Sharma said.

Source: University of Houston

Citation: Tumor detection, data encryption to benefit from UH research (2005, April 29)  
retrieved 22 September 2024 from

<https://phys.org/news/2005-04-tumor-encryption-benefit-uh.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.