Electrical & Computer ENGINEERING

SEMINAR

THURSDAY
MARCH 30, 2006

Scaife Hall Auditorium
Room 125

4:00 PM
Refreshments—3:30 PM

KARL BÖHRINGER

UNIVERSITY OF WASHINGTON

Karl Böhringer is an associate professor in Electrical Engineering with adjunct appointments in Computer Science & Engineering and in Mechanical Engineering at the University of Washington, Seattle. He received both his M.S. and Ph.D. degrees in Computer Science from Cornell University and his Diplom-Informatiker degree from the University of Karlsruhe, Germany. He was a visiting scholar at the Stanford Robotics Lab and Transducer Lab and a postdoctoral researcher at the University of California, Berkeley, before joining the faculty at the University of Washington.

His current interests include micromanipulation and microassembly, as well as biomedical implants and bioMEMS for single-cell genomics and proteomics. His Ph.D. thesis was nominated for the ACM doctoral dissertation award. He received an NSF postdoctoral associateship in 1997, an NSF CAREER award in 1999, and was an NSF New Century Scholar in 2000. His work was featured among the Top 100 Science Stories in Discover Magazine's 2002 "Year in Science". In 2004, he received the IEEE Robotics and Automation Society Academic Early Career Award and a sabbatical fellowship from the Japan Society for the Promotion of Science (JSPS).

PROGRAMMABLE SELF-ASSEMBLY AT THE MICRO AND NANO-SCALE

Massively parallel self-assembling systems present a promising alternative to conventional manufacturing. Recently, various successful instances of self-assembly have been demonstrated, including applications for commercial products such as RFID tags. However, the full impact of this approach will only be realized once these systems can be programmed or reconfigured on demand (i.e., attachment between components is activated by software).

In this talk, we review several projects that lead towards such self-assembling systems. A key concept to achieve this goal is the "programmable surface", an engineered surface whose characteristics (surface forces, hydrophobicity, friction, etc.) can be controlled with high spatial and temporal resolution. We present several projects that address various aspects ranging from real-time control of surface properties, to binding site designs that optimize attractive forces between components, to computational and algorithmic issues in the modeling of self-assembling systems.

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