Active Transport of Nanomaterials Using Motor Proteins

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Submitted to:
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U.S. Department of Energy

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PRINCIPAL INVESTIGATORS: Prof. Henry Hess and Viola Vogel

SUMMARY

During the two year period of funding we have focused on the following topics: Guiding of microtubule movement on kinesin-coated, structured surfaces, directed assembly of oriented microtubule networks, and the interaction between synthetic materials and biological components in hybrid devices based on microtubules and kinesin motors. Additional efforts have been made and are still on-going in controlling the motor activity, and loading and unloading of cargo.

In all aspects, the collaboration with the team at Sandia has been critical. A constant intellectual and material connection has been maintained by frequent visits, videoconferences, and exchanges of parts and supplies, such as microfabricated structures and motor proteins. The scientific advances made through this collaboration have been documented in seven publications in high-impact journals and an encyclopedia, discussed in invited talks at the annual meetings of MRS and ACS, and publicized by journalists in “The Scientist” and “Nature Materials Nanozone”. One double Ph.D. degree in Bioengineering and Nanotechnology has been completed (John Clemmens).

List of accomplishments:

Peer-reviewed journals - published:


**Book chapters:**


**Other:**


**Press Resonance:**


**Invited Lectures (Henry Hess):**

IEEE Conference on Nanodevices and Systems Integration, Miami, FL (2004)


2004 Fall Meeting of the MRS, Boston, MA (2004)

**Supported Students (1 Ph.D. graduated), Postdocs, and Faculty:**

Professor Viola Vogel (until 4/2004) – now at the Institute for Biologically Oriented Materials, Department of Materials, Swiss Federal Institute of Technology (ETH), Zurich, Switzerland

Henry Hess (Research Assistant Professor)

Dr. John Clemmens (graduate student and postdoctoral researcher) – now at Micronics Inc. (Redmond, WA)

Robert Doot (graduate Student)

Dr. Karl-Heinz Ernst (visiting scientist) – staff scientist at Molecular Surface Technologies Group, Swiss Federal Laboratories for Materials Testing and Research (EMPA), Dübendorf, Switzerland

Christian Brunner (visiting student) – graduate student at the Department of Materials, Swiss Federal Institute of Technology (ETH), Zurich, Switzerland