



BSAC co-Director Leads Portable Biosensor Project

BSAC members might take note that Professor Bernhard Boser of EECS and co-Director of BSAC, is bringing MEMS and device technology to a highly interdisciplinary project within the UC Berkeley Center for Exposure Biology (CEB). The center, headed by Stephen Rappaport, adjunct professor of environmental health sciences, is focused on developing biomarkers and biosensors to allow cost-effective testing for blood cancer risks.

The UC Berkeley CEB advances the National Institutes of Health (NIH) ongoing Exposure Biology Program goal *to develop innovative technologies to better understand the interplay of environmental exposures to contaminants and genetic variations on human disease.*

The Center was Funded late last year (2007) by a \$ 4.7 million National Institute of Environmental Health Sciences (NIEHS) award to develop cutting edge methods for detecting diseases in humans exposed to environmental contaminants.

"The ability to characterize the health risks of environmental contaminants, and to understand the influence of genetic variability, is limited now because tests are cumbersome," said Rappaport. "To get conclusive information now would require careful collection and processing of blood samples from thousands of people over time, and that is prohibitively expensive. What we're trying to do is develop technology that will allow a large number of subjects to be tested and screened quickly and inexpensively."

The center hosts three interdisciplinary projects:

- **Portable biosensors** - A project to develop biosensors that can reduce immunoassays to a microscale level, making biomarker measurements practical for large epidemiology studies using single drops of blood from finger lancets, will be led by Bernhard Boser, professor of electrical engineering and computer sciences; Richard Mathies, professor of chemistry and Rappaport of environmental health sciences.
- **"Protein adductomics"** - This project will focus on the use of protein adducts, which are compounds formed by reactions between blood proteins and chemical carcinogens, to identify initiators of human lymphomas. It will be led by Rappaport; Evan Williams, professor of chemistry and biophysics; and Mark van der Laan, professor of biostatistics.
- **Lab-on-a-Chip Microsystems** - Technology will be developed for genetic analysis on single cells to identify biomarkers for early signs of leukemia and lymphoma. This project will be led by; Martyn Smith, professor of environmental health sciences; Mathies of chemistry; and Luoping Zhang, associate adjunct professor of environmental health sciences.

- source: Sarah Wang, Media Relations