Prof. Hans Arwin at Linköping University is a world leader in spectroscopic ellipsometry (SE) research, especially in applying SE to biological materials. Prof. Arwin's arsenal of ellipsometric capabilities include dynamic (in-situ), spectroscopic, generalized (anisotropic), imaging, and total internal reflection. His research group utilizes many SE systems; including two VASE, an in-situ M-88, an IR-VASE, along with other "home-made" systems. Overall, this allows him to measure from the deep UV to the far IR (0.193 mm to 33 mm). Woollam ellipsometers have been the key tool in **70** published papers!
Some of his research interests include:

- **Physical Modeling of Protein Adsorption**

The focus of this project is physical modeling of interactions between proteins and surfaces. His group is developing a more complete description of the dynamic adsorption and desorption processes. Models are tested through extensive simulations and comparison to in-situ ellipsometric data collected during adsorption-desorption experiments.

- **Optical Noses and Tongues-SE in Sensor Systems**

The vision of this work is to develop a compact and sensitive optical sensor based on imaging ellipsometry. They have coined the system an *optical nose* or an *optical tongue* depending on its use. Potential applications include mapping protein adsorption on gradient surfaces, screening tests for bi-molecular reactions (i.e. antigen-antibody reactions), and multi-sensor arrays for gas sensors.

- **Porous Silicon for Biological Applications**

This work is striving to solve interfacial problems between man-made surfaces and biological systems. Applications for this project are expected in areas like biosensors, drug delivery, and biomaterials. Currently, studies are using porous silicon (man-made material) and human serum albumin (biomaterial). Ellipsometry characterizes the porous silicon (thickness and amount of porosity) and the loading of the porous silicon with macromolecules to study how proteins are adsorbed into porous structures.

- **Polymer Modifications of Porous Silicon for Gas Sensing**

This work studies polymer films on porous silicon layers to increase sensitivity and make detection of gas concentrations down to parts-per-million (ppm) possible. Also, the polymer layers increase gas selectivity. Prof. Arwin's group uses ellipsometry to study and characterize the porous and polymer layers.

Prof. Arwin continues to forge new research areas where SE plays an important part.

Selected Publications:

1. R. Bjorklund, S. Zangooie, and H. Arwin, "Adsorption of surfactants in porous silicon films", Langmuir, Vol. 13, No. 6, (1997) pp.1440-1445.

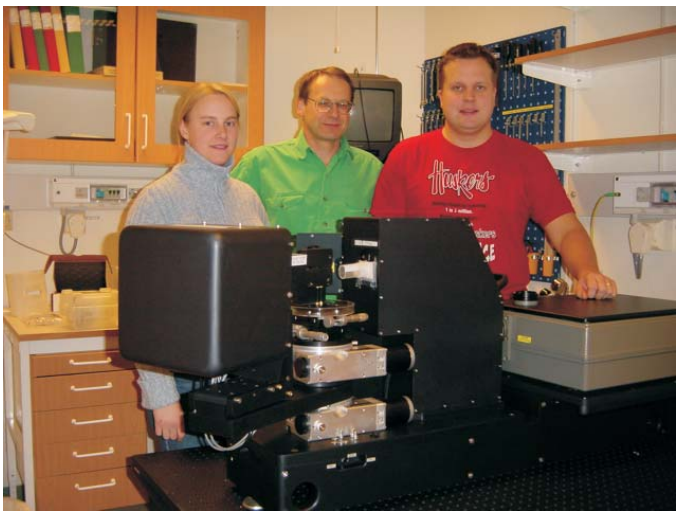
2. S. Zangooie, R. Jansson, and H. Arwin, "Electrochemical tailoring and optical investigation of advanced refractive index profiles in porous silicon", Mat. Res. Soc. Symp. Proc., Vol 557, (1999) pp.195-200.

3. H. Arwin, "Spectroscopic ellipsometry and biology: recent developments and challenges," Thin Solid Films, Vol. 313-314, (1998) pp. 764-774.

4. C. Wongmanerod, S. Zangooie and H. Arwin, "Determination of pore size distribution and surface area of thin porous silicon layers by spectroscopic ellipsometry", Appl. Surf. Sci. 172 (2001) pp.117-125.

5. S. Zangooie, H. Arwin, "Surface, pore morphology, and optical properties of porous 4H-SiC," J. Electrochem. Soc., Vol. 148, No. 6, (2001) pp. G297-302.

6. H. Arwin, "Ellipsometry on thin organic layers of biological interest: characterization and applications," Thin Solid Films, Vol. 377-378, (2000) pp. 48-56.



From left to right: Linda Karlsson, Prof. Hans Arwin, and Alexander Lindquist. Linda and Alexander have spent time in John Woollam's lab at the University of Nebraska. We appreciate them using Woollam ellipsometers and supporting the University of Nebraska "Huskers" (Alexander's T-shirt)!