Mark B. Jensen

Mark Jensen came to Concordia College in 1997. He received a B.A. in chemistry and mathematics from Northwestern College (IA) in 1989 and a Ph.D. in analytical chemistry in 1994 from Iowa State University. His dissertation research, for which he received an ISU Research Excellence Award, involved the use of surface-sensitive spectroscopies in the investigation of fluorocarbon reactions on metal surfaces under ultra-high vacuum conditions. Following graduation he remained at ISU to perform post-doctoral research in the areas of electrochemistry and liquid chromatography.

Research Interests: My research centers around the use of electrochemical detection in high-performance liquid chromatography (HPLC). More specifically, I'm interested in applications of pulsed electrochemical detection (PED) toward compounds of biological interest. Many of these compounds do not efficiently absorb UV light, so they are insensitive toward traditional UV detection following their separation by HPLC. In many of these cases electrochemical detection can be an effective substitute. Often times, however, the potential of the electrode in the detection cell must be pulsed in order to maintain its activity. This is the foundation for liquid chromatography with pulsed electrochemical detection (LC-PED). Recent projects related to LC-PED have included:

- the effect of dissolved oxygen on the chromatographic baseline
- fast PED waveforms for use with microbore LC and capillary electrophoresis

I am also interested in a new project, to be carried out in collaboration with Dr. Ulness, involving electrochemical studies of alkane thiol self-assembled monolayers (SAMS) on metal surfaces. SAMS are commonly utilized for a variety of purposes, from chemical sensors to models of biological interfaces. Recent studies have shown that SAMS can be formed quickly and inexpensively on gold electrodes prepared from commercial recordable compact disks (CD-Rs). We hope to learn more about electrochemistry on SAMS, with the intent of utilizing them for analytical purposes.

Finally, I am interested in applications of LabVIEW in analytical chemistry. LabVIEW is a graphical computer programming environment designed specifically to facilitate the interfacing of personal computers to scientific instruments. The graphical environment is extremely intuitive relative to more traditional text-based languages. Students and I have been working on writing LabVIEW programs to be used in either the research laboratory, the teaching laboratory, or the classroom.

Selected Publications:

- M.B. Jensen "Integrating HPLC and Electrochemistry: A LabVIEW-based Pulsed Amperometric Detection System" *Journal of Chemical Education* **79**, 345 (2002).
- M.B. Jensen and D.C. Johnson, "Fast Waveforms for Pulsed Electrochemical Detection of Carbohydrates by Incorporation of Reductive Desorption of Oxidation Products" *Analytical Chemistry,* **69***,* 1776 (1997).
- M.B. Jensen and P.A. Thiel, "Thermally-Induced and Electron-Induced Chemistry of CF_3I on Ni(100)" *Journal of the American Chemical Society,* **117**, 438 (1995).