

**54. PROTEIN IDENTIFICATION USING THE VIRTUAL MASS SPECTROMETRY LABORATORY. Mark Bier<sup>1</sup>, Chungang Yang<sup>1</sup>, Lan Yan<sup>1</sup>, Joseph Grabowski<sup>2</sup>; <sup>1</sup>Carnegie Mellon University, 4400 Fifth Ave, Pittsburgh, PA; <sup>2</sup>University of Pittsburgh, 219 Parkman Avenue, Pittsburgh, PA**

The Virtual Mass Spectrometry Laboratory (VMSL) is an interactive, Internet educational tool that is being developed to teach mass spectrometry to undergraduate students. The VMSL project addresses several major hurdles facing universities: the high cost of mass spectrometers, the difficulty in teaching "real-life" problem solving to a group of students and the shortage of mass spectrometrists. The VMSL allows schools that can not afford mass spectrometers, which can cost upwards of \$1 million dollars, to add mass spectrometry (MS) experiments to their Chemistry, Biological Sciences, Chemical Engineering, Pharmacology and Physics programs. The students can solve real problems from different disciplines without actually going to a MS laboratory. The software allows each student to operate several virtual mass spectrometers and to acquire real mass spectra that are delivered to the student's computer rapidly as GIF files from the VMSL server. We expect that hundreds of students will be able to operate their own virtual mass spectrometer simultaneously using the VMSL Internet program. A student can solve several case studies such as identifying an unknown protein from an animal competing in an athletic event, determining a proper polymer formulation for a bicycle tire, determining whether a hair sample contains cocaine, or identifying what anesthetic was used during the Civil War. The Protein Identification case study will be demonstrated starting from the analysis of the problem, to the protein digestion, to the acquisition of an optimized tryptic peptide mass spectrum and finally, to a protein match generated using a protein database search engine. Our goal for this case study is to teach many students about protein identification using the powerful tool of mass spectrometry. See <http://sVMSL.chem.cmu.edu>.