50. TEACHING RESEARCH-ORIENTED WRITING SKILLS TO UPPER DIVISION CHEMISTRY MAJORS. **Marin Robinson**[1], Fredricka Stoller[1], James Jones[1]; [1]Northern Arizona University, Box 5698, Flagstaff, AZ

With funding from the National Science Foundation (DUE 0230913), we are in the first year of a four-year project designed to promote research-inspired writing skills in upper-division chemistry majors. The materials, designed to culminate in a textbook and companion websites, focus on three writing modules: a scientific paper, a research proposal, and a poster presentation. In each module, students are taught to write for the appropriate audience through a series of reading, analyzing, and writing activities. The materials target students from diverse backgrounds, including language minority students, and are written for chemistry instructors with minimal training in teaching writing. Unique features of the materials include (a) the inclusion of "canned" research projects, making it possible for students without undergraduate research experience to complete data-driven papers; (b) the use of corpus linguistics, allowing for the development of instructional materials based on actual patterns of the language of chemistry; and (c) the accessibility of the materials to nonnative speakers. Assessment, linked to student learning and instructor/user objectives, is an integral part of the project. An overview of the course will be presented and samples of our materials will be shared.

51. UNDERGRADUATE RESEARCH: DEVELOPING CONNECTED, MOTIVATED, AND INSPIRED UNDERGRADUATE STUDENTS. **Nancy Levinger**[1]; [1]Colorado State University, Department of Chemistry, Fort Collins, CO

Many students choose a college major based on an idea that it will lead them to employment or because the subject matter interests them. For chemistry majors, completing course and teaching laboratory work can begin to allow students to learn about the field. However, the benefits of undergraduate research can be monumental to help students learn if they really want a career as a chemist, to help students to determine what they like about chemistry and what kind of career suits them. This presentation will discuss the benefits of undergraduate research for students, faculty and institutions alike.

52. THE THIRD DIMENSION IN VISUALIZATION. Kenneth Jordan[1], **Joseph Grabowski**[1]; [1]University of Pittsburgh, 219 Parkman Ave., Pittsburgh, PA

Realizing the limitations of the conventional approaches to 3D conceptualization, a group of Chemistry faculty at the University of Pittsburgh has joined forces to design and implement a 3D stereo projection system in a lecture hall accommodating 125 students. The system was designed to work with existing software. The hardware consists of a PC with a graphics and supporting 3D stereo, a Cyviz converter box, and two projectors with cross polarized filters. This talk will discuss a variety of issues which arose in implementing the system and its subsequent use in instruction.

53. PROTEIN STRUCTURE MODELING AND VISUALIZATION: A DISCOVERY PROCESS FOR UNDERGRADUATES. **Jonathan Southard**[1]; [1]Indiana University of Pennsylvania, Chemistry Department, 975 Oakland Ave., Indiana, PA

A learning module in `Structural Bioinformatics´ has been developed as part of a laboratory course for biochemistry majors. In this module, students gain experience in accessing complex linked databases, performing protein/nucleic acid sequence analysis, and generating and evaluating a theoretical model 3D structure for a macromolecule. Students are given a brief introduction to databases for biomedical research literature and for protein/nucleic acid sequence and 3D structure data as well as resources for 3D structure prediction and molecular visualization. Over the course of several weeks, with individual consultations as needed, each student chooses a protein/nucleic acid with known sequence but unknown 3D structure (the `target´) and generates a model structure based on one or more known structure with sequence similarity to the target. Students then use molecular visualization to compare overall and detailed features of the known and model structures. Ideally, they are able to make predictions regarding the functional properties of the target protein (or confirm previous studies of function) by comparison to the structural and functional properties of the protein with known 3D structure. Students describe their findings in short oral presentations to conclude the module. Although many students express considerable frustration in the early stages of the project, student feedback after the conclusion of the module has been overwhelmingly favorable.

54. PROTEIN IDENTIFICATION USING THE VIRTUAL MASS SPECTROMETRY LABORATORY. **Mark Bier**[1], Chungang Yang[1], Lan Yan[1], Joseph Grabowski[2]; [1]Carnegie Mellon University, 4400 Fifth Ave, Pittsburgh, PA; [2]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 with out 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.