PAMELA K. HANSON

Professor of Biology
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EDUCATION

Ph.D., Biochemistry, Cell and Developmental Biology Program, Spring 2001
Graduate Division of Biological and Biomedical Sciences, Emory University, Atlanta, GA

B.S., Biochemistry, *cum laude*, May 1996
Rhodes College, Memphis, TN

PROFESSIONAL EXPERIENCE

Birmingham-Southern College
Birmingham, AL. Professor (2015-present); Associate Professor (2007-2015); Assistant Professor (2001-2007)

University of Iowa
Iowa City, IA. Visiting Associate Professor (Spring 2008; Summer 2009; May 2010). Laboratory of Dr. W. Scott Moye-Rowley, Department of Molecular Physiology and Biophysics

RESEARCH INTERESTS

I use the budding yeast *Saccharomyces cerevisiae* as a model system to better understand mechanisms of resistance to anti-cancer ruthenium complexes. I am also interested in the impact that perturbation of sphingolipid homeostasis has on membrane physiology and transporter trafficking.

COURSES TAUGHT

- *BI 110:* Cell and Molecular Biology
- *BI 149:* Cancer Biology (for non-science majors)
- *BI 215*: Principles of Genetics
- *BI 301*: Molecular Genetics and Genomics
- *BI 402:* Advanced Cell Biology
- *BI 405:* Genetic Engineering and Biotechnology
- *HON 126*: Honors Cell and Molecular Biology
- Various Exploration Term courses, including:
  - Understanding the Human Genome Project
  - The Art and Science of Fermentation
  - Ecological Disasters and Human Health
  - The Yeast ORFan Gene Project

EXTRAMURAL FUNDING & GRANT INVOLVEMENT

Proposals Currently under Review:

National Science Foundation ($1.8 million)
Improving Undergraduate STEM Education (Role: Principal Investigator)
- "Establishment and Social Network Analysis of the Teaching Interdisciplinarity through Research (TItRe) Community of Transformation"

National Science Foundation ($1 million)
Molecular and Cellular Biology (Role: External Evaluator)
- "Consortium for WD40beta propeller Interactome"

HHMI Inclusive Excellence Program ($1 million)
- "Retooling our Vision to Improve STEM Education (ReVISE)" (Role: Co-Principal Investigator)

Current and Former Funded Projects:

National Science Foundation ($485,852; September 2016-August 2021)
Research Coordination Network – Undergraduate Biology Education (Role: Steering Committee Member)
- "Yeast Orphan Gene Project: Finding a place for ORFans to GO"
- Assist with network expansion and maintenance through workshops; contribute to development of assessment tools

National Science Foundation ($499,744; August 2014-August 2019)
Research Coordination Network – Undergraduate Biology Education (Role: Steering Committee Member)
- "Bridging the divide between research and education with authentic research experiences in introductory biology"
- Assist with network expansion and maintenance through workshops at scientific and pedagogical conferences

Associated Colleges of the South Blended Teaching and Learning ($3,050; March-December 2013)
Virtual Collaboration Workshop to Facilitate Blended Learning across ACS Campuses (Role: Co-Principal Investigator)
- Coordinated and hosted workshop on virtual collaboration

National Science Foundation ($32,297; December 2012-May 2015)
Widening Implementation and Demonstration of Evidence Based Reforms (WIDER), (Role: Principal Investigator)
- "Associated Colleges of the South Workshop on Integrating Research and Teaching via Interdisciplinary, Inter-institutional Partnerships"
- Supplement to TUES award
- Coordinated and hosted workshop on integrating cross-institutional research projects into courses

National Science Foundation ($86,553.00; October 2012-September 2015)
Major Research Instrumentation (MRI), (Role: Major User)
- "Acquisition of a BD Accuri C6 Flow Cytometer for Multidisciplinary Undergraduate Research"
- Adapted flow cytometry protocols for use in course-based and mentored research experiences

National Science Foundation ($175,932; May 2012-May 2015)
Transforming Undergraduate Education in Science, Type 1 Grant (Role: Principal Investigator)
- "Multi-Level Implementation of Interdisciplinary Inquiry- and Research-Based Labs"
- Collaborated with chemistry faculty members to integrate additional inquiry and research into lab courses

Associated Colleges of the South Blended Teaching and Learning ($2,000; Nov 2011-June 2012)
General Education Cancer Biology Learning Module Development for ACS Institutions Grant (Role: Participant)
- Hosted summit for faculty members from Trinity University, Rhodes College, and Furman University
- Assisted in identifying key learning outcomes, teaching resources and assessment tools for cancer-themed courses

National Science Foundation ($49,990; Sept 2011-August 2012)
Research Coordination Network – Undergraduate Biology Education Incubator Grant (Role: Core Participant)
- "Authentic Research Experiences in Biology Labs"
- Contributed to construction of survey to assess current status of research in introductory biology labs
- Attended meetings and conferences exploring course-associated "authentic research" for undergraduates

Associated Colleges of the South Faculty Renewal Program ($6,500; May 2010-May 2011)
Professional Development Grant (Role: Co-Principal Investigator)
- "Revitalizing Genetics Courses Through Collaborative Research & Sharing Best Practices"
- Collaborated with Dr. Mary Miller from Rhodes College to integrate teaching and research
- Assisted Dr. Miller in integrating active-learning strategies in her Genetics course

Associated Colleges of the South Faculty Renewal Program ($8,000; Feb 2009-May 2010)
Leadership Development Grant (Role: Leadership Team Member)
- Collaborated with other leadership team members in selecting seminar and workshop topics
- ACS Faculty Program funded by the Andrew W. Mellon Foundation

National Science Foundation ($75,686; May 2006-May 2010)
Course, Curriculum, and Laboratory Improvement, Phase I Grant (Role: Principal Investigator)
- "Enhancing Multidisciplinarity through Molecular Modeling"
- Collaborated with biology and chemistry faculty to develop new lab modules
- Designed and implemented appropriate assessment of molecular modeling modules

Center for Educational Technology ($34,540; January 2006-May 2007)
Learning Objects in Support of an Interdisciplinary Approach to the Teaching of Cancer Biology to Non-science Majors (Role: Co-Principal Investigator)
- Collaborated with faculty from other institutions on design of learning objects
- Contributed to construction, assessment, and revision of learning objects

Associated Colleges of the South Science Reform Program ($8,000; May 2005-May 2007)
Review, Redesign, and Reimplementation Mini-Grant (Role: Principal Investigator)
- "A Textbook Prototype for Non-Science Majors Cancer Biology Courses"
- Developed course materials and lab exercises for teaching cancer biology to non-science majors
- ACS Science Reform Program was funded by W.M. Keck Foundation of Los Angeles

Mellon Foundation Grant (2004-2005)
"Beyond the Boundaries to Acculturation and Renewal" (Role: Supervisory Team Member)
- Assembled and supervised faculty teams working on projects related to Advising, Latin American Studies, and Interdisciplinarity
- Explored models of faculty development and wrote progress reports

LI-COR Biosciences ($28,500 Fall 2004)
Genomics Education Matching Funds Grant (Role: Principal Investigator)
- Worked with biology faculty to develop projects for grant; Implemented DNA sequencing course modules

Merck – American Association for the Advancement of Science ($60,000; 2003-2005)
Undergraduate Science Research Program 2003-2005 (Role: Co-Investigator)
- Worked with chemistry faculty to develop research projects
- Supervised students studying toxicity of ruthenium complexes in yeast

NIH training grant GM08367
Emory University, August 1997-August 1999 (Role: Trainee)

AWARDS AND HONORS:

AAAS Science and Technology Policy Fellow
National Science Foundation – Division of Engineering Education and Centers; September 2015-August 2016

Omicron Delta Kappa Excellence in Teaching Award (selected by ODK student honor society)
Birmingham-Southern College, May 2013

Who's Who Among America's Teachers
8th Edition, 2004; 9th Edition, 2005; 11th Edition, 2007

Bob Whetstone Faculty Development Award (outstanding teaching by non-tenured faculty member)
Birmingham-Southern College, 2002-2003 academic year

AAAS Mass Media Science and Engineering Fellowship
Chicago Tribune; Summer 2000

EXTRAMURAL PROFESSIONAL MEMBERSHIPS AND SERVICE

Council on Undergraduate Research
Member, 2004-present; Elected Councilor, Biology Division, 2009-2012, 2012-2015
Chair of Biology Division Post-Doc Working Group, 2011-2012
- Coordinated initiatives to improve outreach to post-doctoral fellows in biological and biomedical sciences

Education Workshop Organizer (2008) and Co-Organizer (2010, 2016)
The Allied Genetics Conference; Orlando, FL; Summer 2016
Yeast Genetics and Molecular Biology Meeting; University of British Columbia; Summer 2010
Yeast Genetics and Molecular Biology Meeting; University of Toronto; Summer 2008

AAAS Science and Technology Policy Fellowship Affinity Groups (2015-2016)
MADTechEd Affinity Group Co-Chair; Big Data Affinity Group, member
Higher Education and Research Administration Affinity Group, member
Federal Innovation and Research Evaluation Affinity Group, member

Additional Professional Society Memberships
American Association for the Advancement of Science
American Society for Cell Biology
Genetics Society of America

SELECTED CAMPUS HONORS AND RESPONSIBILITIES:

Biology Assessment Coordinator
Assessment Coordinator, 2017-present
- Coordinate administration of assessment instruments; analyze data and craft annual assessment report
- Lead department in establishing learning outcomes and programmatic goals

Faculty Development Committee
Elected member, 2017-present
- Review applications for faculty travel and sabbatical
- Coordinated workshop on grant proposal writing

Health Professions Advisory Committee
Member, 2003-2007, 2016-2017
- Reviewed student applications to the committee; assisted in writing recommendation letters to professional schools

Promotion and Tenure Committee
Elected member, 2008-2011, 2014-2015
- Review applications for promotion and tenure; interview applicants for tenure-track positions

Strategic Planning Committee
Elected Member, 2012-2014
- Met with external consultants and committee members to discuss the future of the College

Biology Department Chair
Spring 2012-Summer 2014
- Led weekly meetings to discuss departmental issues including curriculum, schedule, and budget
- Managed departmental budgets and class schedules; evaluated adjunct and visiting faculty members
- Chaired search committee for tenure-track line in plant ecology
- Coordinated departmental assessment efforts and prepared annual reports for SACS

Enrollment Management Committee
Member, 2011-2013
- Explored areas of institutional need with respect to advising and retention
- Contributed to development of new guidelines for Fall advising meetings with first-year students

Honor Council
Faculty Adviser, 2008-2010
- Worked with Honor Council members on training and outreach; monitored Honor Council trials

BSC Institutional Review Board
Member, 2005-2007
- Reviewed proposals for research involving human subjects

Beta Beta Beta, Biology Honor Society
Faculty Adviser, 2002-2007
- Worked with student officers to organize membership drives, initiation, and service activities

Biology Discipline Coordinator
Discipline Coordinator, 2005-2006
- Led weekly meetings to discuss departmental issues including curriculum, schedule, and budget
- Worked with Division Chair to establish schedule and annual budget request
- Coordinated search for new biology faculty member

Intellectual Property Rights Policy Task Force
Member, 2003-2004
- Wrote initial draft of College policy regarding intellectual property rights

Admissions Committee
Member, 2002-2003
- Reviewed applications of prospective students

PUBLICATIONS: (Undergraduates are underlined)

Manuscripts in Preparation:

Stultz, L.K., Hunsucker, A., Grovenstein, E., O'Leary, J., Mobley, J. and **P.K. Hanson**. (in preparation) Proteomic analysis reveals that anticancer ruthenium complex KP1019 activates diverse stress responses in *Saccharomyces cerevisiae*. Target Journal: *Journal of Proteomics*

Daniel, H., Moye-Rowley, S.M. and **P.K. Hanson**. (in preparation) Loss of the complex sphingolipid mannosyl-diinositol-phosphorylceramide decreases membrane permeability of the budding yeast *Saccharomyces cerevisiae.* Target Journal: *Antimicrobial Agents and Chemotherapy*

Sharman, S., Rossi, A., Newcomb, A., Stultz, L.K. and **P.K. Hanson**. (in preparation) The pentose phosphate pathway modulates sensitivity to the anticancer ruthenium complex KP1019. Target Journal: *FEMS Yeast Research*

Hanson, P.K. and L. Pezzementi. (in preparation) Pairing molecular modeling and biochemical assays improves student understanding of enzymology. Target Journal: *CourseSource.*

Hanson, P. K. and L. Pezzementi. (in preparation) Student-centered, structured-inquiry exploration of optimum conditions for horse serum cholinesterase. Target Journal: *Biochem. Mol. Biol. Educ.*

Manuscripts in Press:

Hanson, P.K. (2018, in press) The model organism *Saccharomyces cerevisiae*. *Curr Protoc Essent Lab Tech*.

Published Manuscripts:

Bierle, L.A., Reich, K.L., Taylor, B.E., Blatt, E.B., Middleton, S.M., Burke, S.D., Stultz, L.K., **Hanson, P.K.**, Partridge, J.F. and M.E Miller. (2015) DNA damage response checkpoint activation drives KP1019 dependent pre-anaphase cell cycle delay in *S. cerevisiae*. *PLoS One*. **10:** e0138085.

Hanson, P.K. and L.K. Stultz (2015) Collaboration-focused workshop for interdisciplinary, inter-institutional teams of college science faculty. *J. Coll. Sci. Teach*.**44:** 30-37.

Stevens, S.K., Strehle, A.P., Miller, R.L, Gammons, S.H., McCarty, J.T., Miller, M.E., Stultz, L.K. and **P.K. Hanson**. (2013) The anticancer ruthenium complex KP1019 induces DNA damage, leading to cell cycle delay and cell death in *Saccharomyces cerevisiae*. *Mol Pharmacol.* **83:**225-34.

Johnson, S.S., **Hanson, P.K.**, Manoharlal, R., Brice, S.E., Cowart, L. A., and W.S. Moye-Rowley. (2010) Regulation of yeast nutrient permease endocytosis by ATP-binding cassette transporters and a seven transmembrane protein, RSB1. *J. Biol. Chem.* **285:** 35792-802.

Berger, A.C., **Hanson, P.K.**, Nichols, W.N. and A.H. Corbett. (2005) A yeast model system for functional analysis of the niemann-pick type C protein 1 homolog, Ncr1p. *Traffic.* **6**: 907-17.

Hanson, P.K., Malone, L., Birchmore, J.L. and J.W. Nichols. (2003) Lem3p is essential for the uptake and potency of alkylphosphocholine drugs, edelfosine and miltefosine. *J. Biol. Chem.* **278**: 36041-50.

Hanson, P.K., Grant, A.M. and J.W. Nichols. (2002) NBD-labeled phosphatidylcholine enters the yeast vacuole via the pre-vacuolar compartment. *J. Cell Sci.* **115**: 2725-33.

Hanson, P.K. and J. W. Nichols. (2001) Energy-dependent flip of fluorescence-labeled phospholipids is regulated by nutrient starvation and transcription factors, *PDR1* and *PDR3*. *J. Biol. Chem.* **276**: 9861-7.

Grant, A.M., **Hanson, P.K.**, Malone, L.M. and J. W. Nichols. (2001) NBD-labeled phosphatidylcholine and phosphatidylethanolamine are internalized by transbilayer transport across the yeast plasma membrane. *Traffic* **2**: 37-50.

ABSTRACTS: (Presenters marked with asterisks; undergraduates are underlined)

Invited Talks

Hanson, P.K.* (2011) Curing cancer with yeast? Establishment of *S. cerevisiae* as an effective model for studying the anticancer ruthenium complex KP1019. Rhodes College, Memphis, TN

Stevens, S., McCarty, J., and P.K. Hanson* (2008) Multiple pathways process DNA damage induced by the anti-cancer ruthenium complex KP1019. *UAB Genomics Seminar Series*; Birmingham, AL.

Oral Presentations at Conferences

Drace, K., Gibbs, V.K., Styers, M.L. and P.K. Hanson* (2017) Steel city blues: Leveraging a legacy of pollution for research and reflection in introductory and advanced undergraduate biology courses. American Society for Cell Biology Annual Meeting; Philadelphia, PA

Stultz, L.K., Hunsucker, A., Grovenstein, E., Middleton, S., O'Leary, J., Mobley, J. and P.K. Hanson* (2015) Proteomic profiling reveals effects of anticancer ruthenium complex KP1019 on protein folding and synthesis. *Southeastern Regional Yeast Meeting*; Little Rock, AR.

Hanson, P.K.* and L.K. Stultz (2014) Incorporation of linked research experiences into biology and chemistry courses promotes student confidence and interdisciplinarity. *American Society for Cell Biology Annual Meeting*; Philadelphia, PA

Hanson, P.K.* and L.K. Stultz (2014) CURE-ing cancer with yeast: Course-based undergraduate research experiences use *S. cerevisiae* as a model to study anticancer ruthenium complexes. *Yeast Genetics and Molecular Biology Meeting*; Seattle, WA

Middleton, S.*, Stultz, L.K. and P.K. Hanson (2014) The anticancer ruthenium complex KP1019 causes oxidative stress and activates the DNA damage response in *S. cerevisiae. 21st Annual Southeastern Regional Yeast Meeting*; Nashville, TN

Stultz, L.K..* and P.K. Hanson* (2012) Linking biology and chemistry courses through research on anticancer ruthenium complexes. *Conference on Integrative STEM Learning: Pedagogy and Partners*; San Antonio, TX.

Hanson, P.K..* and M.E. Miller (2012) Integration of research into undergraduate genetics laboratories positively impacts student attitudes and self-reported learning gains. *Yeast Genetics and Molecular Biology Meeting*; Princeton, NJ.

Temple, G.*, Fink, A.D.*, Hanson, P.K.*, Harriger, D.* and T. Lyden* (2010) Update on *BIO2010*: Progress, barriers, and next steps. *Council on Undergraduate Research 13th National Conference*; Ogden, UT.

Hanson, P.K.* and J. King* (2010) Active-learning in cancer biology courses for non-science majors. *Council on Undergraduate Research 13th National Conference*; Ogden, UT.

Johnson, S., Hanson, P.K.*, and W.S. Moye-Rowley (2009) ABC transporter deletion increases phytosphingosine tolerance and tryptophan uptake in *S. cerevisiae*. *Southeastern Regional Lipid Conference*; Cashiers, NC.

Hanson, P.K.* (2008) Linking biology and chemistry courses through molecular modeling. *Interdisciplinarity in Science and Mathematics Conference*; San Antonio, TX.

Hanson, P.K.* (2006) Enhancing multidisciplinarity through molecular modeling. *Interdisciplinarity in Science and Mathematics Conference*; San Antonio, TX.

Preston, T. C. and P.K. Hanson* (2006) ABC transporters contribute to miltefosine resistance in *PDR* strains. *Yeast Genetics and Molecular Biology Meeting*; Princeton, NJ.

Hanson, P.K.* (2005) Cancer biology textbook for non-science majors. *Associated Colleges of the South Science Reform Workshop*; Greenville, SC.

Representative Posters

Palmer, B.,* Mancuso, H., Groark, S.C., and P.K. Hanson. (2018) Effect of polyamine homeostasis on resistance to the anticancer ruthenium complex KP1019 in yeast. *UWA Undergraduate Research Symposium*, Livingston, AL

Hanson, P.K.,* Strome, E., Aiello, D., Miller, M., and J. Keeney (2018) The yeast ORFan gene project: Finding a place for ORFans to GO. *AAC&U Transforming STEM Higher Education Conference*, San Francisco, CA

Hanson, P.K.* (2016) Science policy applications for social network analysis. *AAAS Science and Technology Policy Fellowship Year End Summit*; Washington, DC

Hanson, P.K.,* Stultz, L.K., Sharman, S., Newcomb, A., and J. Mobley (2016) Anticancer ruthenium complex KP1019 induces metabolic retooling in *Saccharomyces cerevisiae*. *The Allied Genetics Conference*; Orlando, FL

Hanson, P.K.* and L.K. Stultz (2015) Promoting cross-disciplinarity via a shared research project in undergraduate biology and chemistry courses. *American Society for Cell Biology Annual Meeting*; San Diego, CA

Mancuso, H.,* Miller, M., Stultz, L.K., and Hanson, P.K. (2015) Polyamine transporter Tpo1 is induced by and modulates resistance to the anticancer ruthenium complex KP1019. Southeastern Regional Yeast Meeting; Little Rock, AR

Hanson, P.K.* and L.K. Stultz (2014) Incorporation of linked research experiences into biology and chemistry courses promotes student confidence and interdisciplinarity. *American Society for Cell Biology Annual Meeting*; Philadelphia, PA

Stultz, L.K., Hunsucker, A., Grovenstein, E., Middleton, S., O'Leary, J., Mobley, J. and P.K. Hanson* (2014) Anticancer ruthenium complex KP1019 induces the heat shock response in yeast. *Yeast Genetics and Molecular Biology Meeting*; Seattle, WA

Hanson, P.K.* and L.K. Stultz (2014) Interdisciplinary research on anticancer ruthenium complexes links undergraduate courses and improves student learning and confidence. *Yeast Genetics and Molecular Biology Meeting*; Seattle, WA

Stultz, L.K..* and P.K. Hanson* (2014) Establishing and Expanding Interdisciplinary, Inter-institutional Teaching-research Networks Through Virtual Collaboration. *Council on Undergraduate Research 15th National Conference*, Washington, D.C.

Hanson, P.K..,* Stultz, L.K.. and M.E. Miller. (2012) Anticancer ruthenium complex KP1019 induces DNA damage response. *Yeast Genetics and Molecular Meeting*, Princeton, NJ

Banks, A.E..* and P.K. Hanson. (2012) Folate levels affect *S. cerevisiae* growth inhibition by the anticancer ruthenium complex KP1019. *Southeastern Regional Yeast Meeting*, Atlanta, GA

Zhao, C.* and P.K. Hanson. (2011) Deletion of MMS22 increases sensitivity to the anticancer ruthenium complex KP1019. *Southeastern Regional Yeast Meeting*, Mississippi State, MS

Farrell, A.,* Rodgers, J., Hartman, J., Stultz, L.K. and P.K. Hanson. (2010) A phenomic screen for modulators of the anticancer ruthenium complex KP1019. *Yeast Genetics and Molecular Biology Meeting*, Vancouver, BC

Strehle, A., Stultz, L.K. and P.K. Hanson*. (2010) Establishment of *S. cerevisiae* as a model organism for studying the anticancer ruthenium complex KP1019. *Model Organisms to Human Biology*, Boston, MA

Chiou, L.,* Stultz, L.K. and P.K. Hanson. (2010) Saccharomyces cerevisiae as a model to determine whether $[Ru(phen)_2(qdppz)]^{2+}$ perturbs topoisomerase function. *Association of Southeastern Biologists*, Asheville, NC

Hussey-Tomich, K.,* and P.K. Hanson. (2009) Analysis of the importance of *ELM1* in activation of the *PDR* network by hexadecylphosphocholine. *Southeastern Regional Yeast Meeting*, Nashville, TN

Speake, L.,* Moye-Rowley, W.S., and P.K. Hanson. (2009) Deletion of the inositol phosphotransferase gene *IPT1* increases expression of the multidrug transporter Pdr5p. *Southeastern Regional Yeast Meeting*, Nashville, TN

Crump, J.E.* and P.K. Hanson. (2005) Identification and characterization of mutations that suppress the miltefosine-resistant phenotype of *Δlem3* strains of *Saccharomyces cerevisiae. Southeastern Regional Yeast Meeting*, Atlanta, GA

Gandy, J.C.* and P.K. Hanson. (2004) Pdr1p regulates *LEM3* expression in *Saccharomyces cerevisiae*. *Southeastern Regional Yeast Meeting*, Memphis, TN.

Noureddini, W.C., Schedler, D.J.A., and P.K. Hanson*. (2003) Molecular modeling study of the interactions between phosphatidylinositol-specific phospholipase C and the alkylphosphocholine drug ET-18-O-CH_3. *Gordon Conference on Lipid Metabolism,* Meriden, NH.

Deason, K.L.* and P.K. Hanson. (2002) Analysis of the effects of CTP: Phosphocholine cytidylyltransferase overexpression in *Saccharomyces cerevisiae*. *Southeastern Regional Lipid Conference*, Cashiers, NC.

REPRESENTATIVE INTRAMURAL GRANTS AND FUNDING:

Summer 2015 Course Development Stipend ($2,750)
- Developed place-based authentic research project for BI 405 Genetic Engineering and Biotechnology

Summer 2009 Research Stipend ($3,000)
- Studied genetic interactions between sphingolipid metabolism and drug resistance

Summer 2003 Course Development Stipend ($2,750)
- Developed non-majors course "Understanding the Human Genome Project"

Summer 2003 Course Development Stipend ($2,000 – split with chemistry professor)
- Development of interdisciplinary lab module "Plasticizers in Vegetable Oil"

Summer 2002 Course Development Stipend ($2,750)
- Developed non-majors course "Cancer—Biology and Beyond"