

Curriculum Vitae
DANIEL M. VERNON

Department of Biology & Program in Biochemistry, Biophysics, & Molecular Biology
Whitman College, Walla Walla, WA 99362 USA. e-mail: vernondm@whitman.edu

EDUCATION

- 1992 Ph.D., Molecular & Cellular Biology, University of Arizona, Tucson, AZ. Dissertation: "Molecular Biology of Salinity Tolerance in the Facultative Halophyte *M. crystallinum*" Advisor: Dr. Hans J. Bohnert
- 1986 B.A., Biology, Oberlin College, Oberlin, Ohio

FACULTY & RESEARCH POSITIONS

- 2014-15 Director, Program in Biochemistry, Biophysics & Molecular Biology, Whitman College
- 2013- Arthur G. Rempel Professor of Biology, Whitman College
- 2010-11 Director, Program in Biochemistry, Biophysics & Molecular Biology, Whitman College
- 2009-13 Professor of Biology, Biology Department, Whitman College
- 2005-06 Director, Program in Biochemistry, Biophysics & Molecular Biology, Whitman College
- 2002; 2004-07 Chair, Biology Department, Whitman College
- 2001-09 Associate Professor of Biology, Whitman College
- 1999-00 Visiting Faculty, Dept of Molecular & Cellular Biology, Univ of Arizona, Tucson
- 1997-01 Assistant Professor of Biology, Whitman College
- 1995-97 Visiting Assistant Professor of Biology, Whitman College, Walla Walla, WA
- 1992-95 NSF Post-Doctoral Fellow, Laboratory of Dr. David Meinke, Department of Botany, Oklahoma State University, Stillwater, OK
- 1992 Post-Doctoral Research Associate, Laboratory of Dr. Hans J. Bohnert, Department of Biochemistry, University of Arizona, Tucson, AZ (August-October, 1992)
- 1986-92 Graduate Research Associate, Laboratory of Dr. Hans J. Bohnert, Department of Molecular and Cellular Biology, University of Arizona, Tucson, AZ
- 1985-86 Undergraduate Research, Dr. Richard Levin, Department of Biology, Oberlin College

AWARDS

- 2013- Endowed Professor position: Arthur G. Rempel Professor of Biology, Whitman College
- 2005 G. Thomas Edwards Award for Excellence in Teaching and Scholarship, Whitman College.
- 1993-95 National Science Foundation Post-Doctoral Fellowship in Plant Biology
- 1987-88 University of Arizona Graduate Academic Scholarship
- 1986-87 Univ. of Arizona Graduate Fellowship in Molecular & Cellular Biology

GRANTS FOR RESEARCH & EDUCATION

- 2014 National Science Foundation, *Co-PI* "RUI: The role of gene duplication in parallel evolution: a molecular genetic analysis of repeated gain of a color patterning trait." [*PI*: A. Cooley]. *Subm 1/14*
- 2013;-14 Perry Awards (Whitman College) \$8000. Funding for undergraduate summer research projects
- 2013 ASPB Summer Undergraduate Research Fellowship Award. \$4700. The American Soc. of Plant Biologists [highly competitive; only 4 awarded to RUI laboratories in the U.S. in 2013]
- 2012 HHMI Summer Research grant (Whitman College) \$13,000. Funding for 2 undergraduate research projects. "Using RNA interference to reduce expression of Arabidopsis PIRL genes."
- 2011 National Science Foundation (NSF) \$41,700. Supplement for NSF grant "PIRL1 and PIRL9- novel plant intracellular LRR proteins required for pollen viability" [*PI*; research grant]
- 2006-11 NSF- Integrative Plant Biology program. \$360,525. "PIRL1 and PIRL9- novel plant intracellular LRR proteins required for pollen viability". [*PI*; research grant]

GRANTS FOR RESEARCH & EDUCATION (CONTINUED)

- 2010 NSF \$549,446 *Co-PI* MRI: Acquisition of a Laser Scanning Confocal Microscope to Build an Integrative Life Sciences Imaging Programs at Whitman College [*PI*: G. Withers]
- 2009 NSF \$408,000. *Co-PI* MRI: Acquisition of an Environmental Scanning Electron Microscope for Multidisciplinary Research and Undergraduate Training at Whitman College. [*PI*: K. Nicolaysen]
- 2008 Whitman College Innovation in Teaching and Learning Grant (w/ G. Withers & C. Wallace)
- 2007 NSF \$464,934. *Co-PI* MRI: An X-Ray diffraction Instrument for interdisciplinary and collaborative research and education in an undergraduate setting [*PI*: D. Juers]
- 2005 NSF ROA supplement; \$19,700 [supplement to another lab's grant (NSF 0348028) for sabbatical travel and research; *May-June 2005*]
- 2003-05 WM Keck Foundation; Whitman College Integrative Biology Initiative; \$340,000 (Principle Author & Administrator; Institutional award for equipment and curriculum improvements)
- 2002-05 USDA Plant Growth & Development program; \$150,000; "Functional Investigation of Plant LRR Proteins Related to Components of the RAS Signaling Pathway" [*PI*; research grant]
- 2001-03 M.J. Murdock Charitable Trust, research grant; \$35,500; "Reverse-genetic Investigation of a Family of Novel Leucine-Rich Repeat Proteins in *Arabidopsis thaliana*". [*PI*; research grant]
- 1997-01 NSF Plant Devel. Mechanisms; \$206,758 (incl. REU & supplement); "Mechanisms of Embryogenesis in *Arabidopsis*: Characterization of the *tnw1* & *emb88* Mutants." [*PI*; research grant]
- 1995 NSF special faculty start-up award; \$3500

PROFESSIONAL SERVICE & SOCIETIES

Peer-reviewer of research proposals for research funding agencies:

- Federal Ministry of Education & Research (Germany): GABI-Future program
- National Science Foundation - Integrative Plant Biology & Plant Developmental Mechanisms programs
- U.S. Dept. of Agriculture - Plant Genetic Mechanisms; and Plant Growth & Development programs
- NSERC (Canada; the primary government research funding agency)
- Natural Environment Research Council, Directorate of Science and Technology (UK)
- American Society of Plant Biologists SURF program reviewer (grants supporting undergraduate research)
- Private Foundations: W.J.Murdock Trust; American Philosophical Society; Jeffress Memorial Trust.

Peer-reviewer for professional journals (all international): Trends in Plant Sciences; Genome; The Plant Cell; The Plant Journal; Developmental Biology; J. of Experimental Botany; Plant Physiology & Biochemistry; Planta; Plant Science; Physiologia Plantarum; Am. J. of Botany; Int. J. of Plant Sci; The Journal of Plant Research; Thai Journal of Agricultural Research; Annals of Botany; Devel. Dynamics

Conference Organization:

- 2007; **Invited Panel Member**, Laboratory Leadership Workshop, American Society of Plant Biologists meetings, Chicago, IL (ASPB's annual meeting is a major international plant biology conference)
- 2003; **Coordinator**, meeting for faculty from Primarily Undergraduate Institutions; ASPB meetings, Seattle, WA
- 2002; **Session Chair** (Development short talks session), ASBP conference, Denver, CO
- 2002; **Conference organizer**: Murdock Undergraduate Research Conference, Whitman College. [A large regional undergraduate conference with participants from 18 colleges and universities]

Professional Societies: American Society of Plant Biologists; American Assoc. for Advancement of Science.

PATENT

Transgenic Plants with Altered Polyol Content (*co-inventor*; United States Patent #5,563,324)

PUBLICATIONS

[*Asterisks denote undergraduate student co-authors. **Bold** designates peer-reviewed journals]

- Forsthoefel NR, Klag KA*, Simeles BP*, Reiter R*, Brougham L*, Vernon DM (2013) The Arabidopsis PIRL family and the value of reverse genetic analysis for identifying genes that function in gametophyte development. **Plants**, 2: 507-520 [DOI: 10.3390/plants2030507]
- Forsthoefel NR & Vernon DM (2011) Effect of sporophytic *PIRL9* genotype on post-meiotic expression of the Arabidopsis *pir11;pir19* mutant pollen phenotype. **Planta**, 233:423-431 [DOI:10.1007/s00425-010-1324-5]
- Forsthoefel NR, Dao TP*, and Vernon DM (2010) PIRL1 and PIRL9, Encoding Members of a Novel Family of Plant Leucine-rich Repeat Proteins, Are Essential for Differentiation of Microspores into Pollen. **Planta**, 232(5):1101-1114. [DOI: 10.1007/s00425-010-1242-6]
- Chen T, Martin D, Nayak N, Majee S, Lowenson J, Schäfermeyer KR, Eliopoulos AC, Lloyd TD, Villa S, Dinkins R, Perry SE, Forsthoefel NR, Clarke SG, Vernon DM, Zhou Z, Rejtar T, and Downie AB. (2010) Substrates of the *Arabidopsis thaliana* PIMT1 identified using seed phage display cDNA libraries and biopanning with recombinant enzyme. **J. Biol. Chem.**, 285:37281-37292 [DOI:10.1074/jbc.M110.157008]
- Forsthoefel NR, Cutler K*, Port MD*, Yamamoto T*, & Vernon DM (2005) PIRLs: A novel class of plant intracellular leucine rich repeat proteins. **Plant & Cell Physiology**, 46: 913-922 [DOI: 10.1093/pcp/pci097]
- Cushing DA*, Forsthoefel NR, Gestaut DR*, Vernon DM (2005) *Arabidopsis emb175* and other *ppr* knockout mutants reveal essential roles for PPR proteins in plant embryogenesis. **Planta**, 222: 424-436.
- Vernon DM & Forsthoefel NR (2002) Leucine-rich repeat proteins in plants: diverse roles in signaling and development. Research Signpost: Recent Research Developments in Plant Biology. 2: 201-214.
- Tax FE & Vernon DM (2001) T-DNA associated duplication/ rearrangements in *Arabidopsis*: implications for reverse genetics and functional genomics. **Plant Physiology**, 126:1526-1537
- Vernon DM, Hannon MJ*, Le M-P*, Forsthoefel NR (2001) An expanded role for the *TWN1* gene in embryogenesis: defects in cotyledon pattern and morphology in the *twn1* mutant of *Arabidopsis*. **American Journal of Botany**, 88(4), 570-582.
- Schwartz B, Vernon DM, Meinke DW (1997) Development of the Suspensor: Differentiation, Communication, & Programmed Cell Death during Plant Embryogenesis. *Adv. in Cellular & Molecular Biol. of Plant Seed Development*, v 2 (BA Larkins & IK Vasil, eds) Kluwer Press, Dordrecht, The Netherlands, pp53-72
- Vernon DM and Meinke DW (1995) The Late *embryo-defective* Mutants of *Arabidopsis*, **Developmental Genetics**, 16, 311-320.
- Forsthoefel NR, Vernon DM, Cushman JC (1995) A Salinity-Induced Gene from the Halophyte *M. crystallinum* Encodes a Glycolytic Enzyme, Phosphoglyceromutase, **Plant Molecular Biol.**, 29, 213-226.
- Vernon DM and Meinke DW (1994) Embryogenic Transformation of the Suspensor in *twin*, a Polyembryonic Mutant of *Arabidopsis*, **Developmental Biology**, 165, 566-573.
- Vernon DM, Tarczynski MC, Jensen RG, Bohnert HJ (1993) Cyclitol Production in Transgenic Tobacco, **The Plant Journal**, 4(1), 199-205.
- Vernon DM, Ostrem JA, Bohnert HJ (1993) Stress Perception and Response in a Facultative Halophyte: The Regulation of Salinity-Induced Genes in *M. crystallinum*, **Plant, Cell & Environment**, 16, 437-444.



PUBLICATIONS (CONTINUED)

- Vernon DM and Bohnert HJ (1992) A Novel Methyl Transferase Induced by Osmotic Stress in the Facultative Halophyte *M. crystallinum*, **EMBO Journal**, 11(6), 2077-2085.
- Vernon DM and Bohnert HJ (1992) Increased Expression of an Inositol Methyl Transferase in *M. crystallinum* is Part of a Stress Response Distinct from CAM Induction, **Plant Physiology**, 99, 1695-1698.
- Cushman JC, Vernon DM, Bohnert HJ (1992) ABA and the Transcriptional Control of CAM Induction during Salt Stress in the Common Ice Plant. In: *Control of Plant Gene Expression*, (D.P. Verma, ed). CRC Press, Boca Raton, FL, pp287-300.
- Adams P, Thomas JC, Vernon DM, Bohnert HJ, Jensen RG (1992) Distinct Cellular and Organismic Responses to Salt Stress, **Plant & Cell Physiol.**, 33(8), 1215-1223.
- Bohnert HJ, Vernon DM, DeRocher EJ, Michalowski CB, Cushman JC (1992) Biochemistry & Molecular Biology of CAM. In: *Inducible Plant Proteins: Biochemistry & Molecular Biology* (JL Wray, ed) Cambridge Univ Press, Cambridge, UK, pp113-137.
- Vernon DM (1992) Molecular Biology of Salinity Tolerance in the Facultative Halophyte *M. crystallinum*, Ph.D. dissertation, University of Arizona
- Ostrem JA, Vernon DM, Bohnert HJ (1990) Increased Expression of a Gene Coding for NAD-GAPdH during the Transition from C3 Photosynthesis to Crassulacean Acid Metabolism in *M. crystallinum*. **Journal of Biological Chemistry**, 265(6), 3497-3502.
- Bohnert HJ, Ostrem JA, Cushman JC, Michalowski CB, Rickers J, Meryer G, DeRocher EJ, Vernon DM, Vasquez-Moreno L, Hoefner R, Schmitt JM (1988) *M. crystallinum*, a Higher Plant Model for the Study of Environmentally Induced Changes in Gene Expression. *Plant Molec. Biol. Reporter* 6, 10-28.
- Vernon DM, Ostrem JA, Schmitt JM, Bohnert HJ (1988) PEPCase Transcript Levels in *M. crystallinum* Decline Rapidly upon Relief from Salt Stress. **Plant Physiology**, 86, 1002-1004.

RESEARCH PRESENTATIONS & SEMINARS

[**Bold** = invited talk; * designates undergraduate co-authors]

- Vernon DM, Reiter R*, Reinhart C*, Forsthoefel N (2013) The Arabidopsis *PIRL2*, *PIRL3*, and *PIRL9* genes function in the formation and organization of the male germ unit in developing pollen. *Plant Biology* 2013 (American Society of Plant Biologists meetings), Providence, RI, 7/13 [**Invited minisymposium talk**]
- Forsthoefel NR, Klag KA*, Vernon DM (2013) Alternative splicing, RNA expression, & knockout analysis suggest an essential function for *PIRL6* in Arabidopsis gametophytes. *Plant Biology* 2013, Providence, RI
- Vernon DM, Brougham L*, Reinhart C*, Forsthoefel N (2012) Arabidopsis *PIRL2* & *PIRL3* function in pollen differentiation and nuclear organization and interact with the pollen-essential gene *PIRL9*, 23rd International Conference on Arabidopsis Research (ICAR), Vienna, Austria
- Forsthoefel N & Vernon DM (2012) The Arabidopsis *PIRL9* gene functions in both the flowering transition and pollen differentiation, 23rd Intl. Conference on Arabidopsis Research (ICAR), Vienna, Austria

SELECTED RESEARCH SEMINARS AND PRESENTATIONS (continued)

- Forsthoefel NR, Reinhart CS*, and Vernon DM (2010) *PIRLs* & Pollen: The *PIRL2* and *PIRL3* genes function in pollen development and have complex genetic interactions with *PIRL1* & *PIRL9*. Plant Biology 2010 meetings (American Society of Plant Biologists), Montreal, Canada
- Forsthoefel N, Reinhart C*, Dao TP*, Simeles BP*, & Vernon DM (2009) The Arabidopsis *PIRL1* & *PIRL9* genes are essential for microspore mitosis, growth, and differentiation into pollen, and have limited functional overlap with related *PIRLs*. Plant Biology 2009 (ASPB conference), Honolulu, HI.
- Vernon DM, Shafer M, and Forsthoefel NR (2009) An adaptable undergraduate molecular biology lab module that integrates use of genomic resources with bench experiments to pursue original research questions. Plant Biology 2009 (ASPB conference), Honolulu, HI.
- Vernon DM, Davis NA*, Forsthoefel NR (2008) Diverse impacts of *PPR* knockout mutations on *Arabidopsis* embryo morphology, cell organization, and plastid development. Plant Biology 2008 (ASPB conference), Merida, Mexico. [**Invited minisymposium talk**]
- Forsthoefel NR, Simeles BP*, Dao TP*, & Vernon DM (2008) The Arabidopsis *PIRL1* & *PIRL9* genes are essential for differentiation of microspores into pollen. Plant Biology 2008, Merida, Mexico, June, 2008
- Forsthoefel N, Dao TP*, Geiser HA, and Vernon DM (2006) The novel intracellular LRR proteins *PIRL1* and *PIRL9* are required for Arabidopsis pollen development and viability. Plant Biology 2006 (ASPB conference), Boston, MA [**Invited minisymposium talk**]
- Forsthoefel N, Geiser HA, & Vernon DM (2005) *PIRL1* and *PIRL9*, novel intracellular LRR proteins, are required for pollen development in Arabidopsis. Plant Biology 2005 (Meeting of the American Society of Plant Biologists), Seattle, WA, July 2005.
- Vernon DM (2005) Developmental functions and genomic evolution of plant *PPR* proteins: insights from Arabidopsis knockout mutants. Molecular Biology and Bioengineering Department, University of Hawaii, Honolulu, HI, June 2005. [invited seminar]
- Russo JE, Vernon DM (2005) Biochemistry, biophysics, and molecular biology (BBMB): An interdisciplinary major program in the Molecular Life Sciences at Whitman College; FASEB Journal 19 (5): A1394-A1394 Part 2 Suppl. [presented by J.R.; San Diego, 4/2005]
- Anderson TM*, Hutchison D, Vernon DM (2004) A possible role for RNA-mediated gene duplication in the evolution of a huge plant superfamily. Plant Biology 2004 (meetings of American Society of Plant Biology), Orlando, FL, July 2004 [**Invited minisymposium talk**]
- Cushing DA*, Gestaut DR*, Forsthoefel N, & Vernon DM (2003) Essential roles for *PPR* proteins in plant development revealed by Arabidopsis knock-out mutants. Plant Biology 2003, Honolulu, HI, July, 2003 [**Invited minisymposium talk**]
- Forsthoefel N, Cutler K*, & Vernon DM (2003) Overlapping genes and aberrant splicing at the Arabidopsis *PIRL6* mRNA, Plant Biology 2003, Honolulu, HI, July, 2003 [presented by N.F.]
- Cushing DA, Gestaut DR & Vernon DM (2002) Disruption of a *PPR* protein in the Arabidopsis *emb175* mutant. Plant Biology 2002, Denver, CO, August 2002 [**Invited minisymposium talk**]
- Forsthoefel N, Yamamoto TN*, & Vernon DM (2001) Structural and reverse genetic analysis of the *SLATs*. 12th International Conference on Arabidopsis Research. Madison, WI, June, 2001.

SELECTED RESEARCH SEMINARS AND PRESENTATIONS (continued)

- Vernon DM, Brinck MD*, Brady MA*, Eastberg JH*, & Forsthoefel N (2000) SLATs: a family of *Arabidopsis* proteins resembling components of the RAS signaling pathway, Plant Biology 2000 conference (meeting of the ASPB), San Diego, CA, July, 2000
- Vernon DM & Tax FE (2000) Jumbled genes: T-DNA associated chromosomal rearrangements, & implications for genomics & reverse genetics, 11th Intl Conf. on Arabidopsis Res., Madison, WI, 6/2000.
- Mackie SM*, Brinck MD*, Hamilton BG*, Forsthoefel NR, & Vernon DM (1998) A Novel Arabidopsis Leucine-Rich Repeat Protein, Meeting of the American Soc of Plant Physiol., Madison, WI, June, 1998
- Hannon MJ*, Le MT*, & Vernon DM (1998) Embryo-Specific Defects in Pattern and Morphogenesis in the Arabidopsis *twin1* Mutant, 9th Intl Conference on Arabidopsis Research, Madison, WI June, 1999
- Hamilton BG*, Keenan S*, Meinke D, & Vernon DM (1997) The Arabidopsis *EMB88* Gene Encodes a Leucine-Rich Repeat Protein Similar to Mammalian RSU-1/RSP-1, 8th International Conference on Arabidopsis Research, Madison, WI, June, 1997 [poster and **invited workshop talk**]
- Vernon DM (1997) Using Developmental Mutants to Identify Genes Essential for Plant Embryogenesis, Walla Walla College Department of Biology, April, 1997 [invited seminar]
- Vernon DM (1996) Discovering Genes Involved in Plant Embryogenesis Using Mutants of *Arabidopsis*. Murdock Research Conference, Pacific Lutheran University, Tacoma, WA, Nov., 1996 [invited talk]
- Vernon DM & Meinke DW (1995) Molecular and Phenotypic Characterization of *round embryo* Mutants of *Arabidopsis*, 6th International Conference on Arabidopsis Research, Madison, WI, June, 1995
- Vernon DM & Meinke DW (1994) The *twin* Mutant of *Arabidopsis*: Development of Viable Embryos from Cells of the Suspensor, Intl Soc. for Plant Molec Biol, 4th Intl. Congr.ess, Amsterdam, The Netherlands, June, 1994
- Vernon DM & Meinke DW (1993) *Twin*: an *Arabidopsis* Mutant Displaying Frequent Polyembryony, 5th International Conference on Arabidopsis Research, Columbus, OH, August, 1993
- Vernon DM (1992) Osmoprotection in a Facultative Halophyte: Transcriptional Activation of an Inositol O-Methyl Transferase in Adaptation to Salt Stress, Am. Soc. of Plant Physiol., Pittsburgh, PA, July, 1992 [**Invited minisymposium talk**]
- Vernon DM (1991) A Methyl Transferase Induced by Salt Stress and ABA in the Facultative Halophyte *M. crystallinum*, International Society for Plant Molecular Biology, Third International Congress, Tucson, AZ, October, 1991 [**invited talk**]
- Vernon DM (1991) The Regulation of Genes Involved in Salt Tolerance and CAM Induction in *M. crystallinum*: A Complex Web of Molecular Responses to Environmental Stimuli, American Society of Plant Physiologists, Albuquerque, NM, July, 1991. [**Invited minisymposium talk**]
- Vernon DM, Ostrem JA, Bohnert HJ (1988) PEPCase Transcript levels in *Mesembryanthemum crystallinum* Decline Rapidly upon Relief from Salt Stress. Plant Physiol. s86(4): 14

TEACHING EXPERIENCE

WHITMAN COLLEGE, WALLA WALLA, WA, 1995-PRESENT:

GENE DISCOVERY AND GENOMICS (BIOLOGY 342): Strategies of gene identification and functional analysis, from classic developmental genetics through genomics. Emphasis on primary research literature, plus lab component.

MOLECULAR BIOLOGY 326: Advanced class covering molecular biology and genomics; emphasis on gene regulatory mechanisms. A core requirement for Whitman BBMB (biochemistry) majors.

MOLECULAR BIOLOGY LABORATORY 336: Lab course in molecular techniques such as gene cloning, PCR, RT-PCR and genome database use. Required for BBMB majors.

BIOCHEMISTRY, BIOPHYSICS, & MOLECULAR BIOLOGY SEMINAR 400: Capstone seminar for the BBMB major; presentation & discussion of primary literature and student thesis research

GENETICS 205: Biology majors' required genetics class; includes both classical and molecular genetics, and an introduction to genomics.

GENETICS LABORATORY 206: Required for Biology majors; includes both Mendelian and molecular genetic projects, and use of genome sequence databases.

DEVELOPMENTAL BIOLOGY 329: Upper-level elective emphasizing developmental mechanisms in animal systems at the cellular and genetic levels. Included lecture and laboratory. [1996-1999]

GENES & GENETIC ENGINEERING 125: A non-majors' course on genetics, biotechnology, and societal implications

BIOLOGICAL PRINCIPLES 111 LAB: Laboratory of introductory biology course, covering principles of molecular, cellular, and organismal biology [1996]

STUDENT RESEARCH 489-490: Supervision of independent student research projects, senior thesis preparation, and seminar presentation, for my own lab students and others who do research off-campus. Since 1996: ~60 undergraduate students have worked in my lab; many as full-time summer research interns supported by external research grants.

OTHER LECTURES AND COURSES:

2 invited lectures, graduate Plant Development course, Plant Sciences Dept, Univ. of Arizona, Nov. 1999

Invited Lecture/Seminar, "Arabidopsis as a Model System for the Study of Plant Development", Undergraduate Genetics class (Bio 306), Biology Department, University of Michigan at Dearborn, 1994

Invited Lecture in graduate course, "Molecular Biology of Plant Environmental Stress", Department of Biochemistry, Oklahoma State University, 1993

Graduate Teaching Assistant, undergraduate introductory biology (Bio 181), Department of Molecular and Cellular Biology, University of Arizona, 1987.

Teaching Assistant, non-majors Human Biology, & majors' Introductory Biology Laboratories, Biology Dept, Oberlin College, 1985, 1986. Labs included detailed fetal pig dissection, plus microscopy.

Oberlin College Experimental College class: "Introduction to Freshwater Fishing". I designed, organized, and co-taught this 1-credit course offered for credit through Oberlin's "EXCO" program. Spring, 1986