Curriculum Vitae

DANIEL M. VERNON

Department of Biology
Program in Biochemistry, Biophysics, & Molecular Biology
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EDUCATION

1992 Ph.D., Molecular and Cellular Biology, University of Arizona, Tucson, Arizona. 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

2009- Professor of Biology, Biology Department, Whitman College, Walla Walla, WA

2005-06 Interim Chair, Program in Biochemistry, Biophysics & Molecular Biology, Whitman College

2004-07 Chair, Biology Department, Whitman College (and Interim Chair, 2002)

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 & Cellular Biology, University of Arizona, Tucson, AZ

1985-86 Undergraduate Research, Dr. Richard Levin, Department of Biology, Oberlin College

AWARDS

2008 Teaching Innovation Award, Whitman College

2005 G. Thomas Edwards Award for Excellence in Teaching & 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

2010 National Science Foundation (NSF) $376,327 "RUI: Functions of the novel PIRL1 & PIRL9 LRR genes in the Arabidopsis sporophyte" [*PI;* research grant] *proposal in review*

2009 NSF-Major Research Instrumentation grant: $408,000. "Acquisition of an Environmental Scanning Electron Microscope for Multidisciplinary Research and Undergraduate Research Training at Whitman College." [*Co-PI;* multi-department equipment grant]

2007 NSF- Major Research Instrumentation grant. $464,934. "An X-Ray diffraction Instrument for interdisciplinary and collaborative research and education in an undergraduate setting" [*Co-PI;* multi-department equipment grant]

2006-10 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)

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 NRI-Plant Growth and Development program; $150,000; "Functional Investigation of a Novel Class 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 A. thaliana". [PI; research grant]

1997-01 NSF Plant Developmental Mechanisms program; $206,758 (incl. REU and sabbatical supplements); "Mechanisms of Embryogenesis in Arabidopsis: Characterization of the *twn*1 & *emb*88 Mutants." [PI; research grant]

1997-98 Rall Research Awards (2); $4700 [internal funding for undergraduate research]

1996 Murdock Research Grant; $12,000 [internal funding for undergraduate research]

1995 NSF special start-up award; $3500 [awarded in conjunction with NSF post-doctoral fellowship]

PROFESSIONAL SERVICE & SOCIETIES

Peer-reviewer of research proposals for research funding agencies:

-Federal Ministry of Education & Research (Germany): GABI-Future program
-National Science Foundation (U.S.): Integrative Plant Biology; Plant Devel. Mechanisms
-U.S. Dept. of Agriculture: Plant Genetic Mechanisms; Plant Growth & Development
-NSERC (Canada; the primary government research funding agency)
-W.J.Murdock Charitable Trust
-American Philosophical Society
-Jeffress Memorial Trust (Virginia): Jeffress Research Grant Program
-Natural Environment Research Council, Directorate of Science and Technology (UK)

Peer-reviewer for professional journals (all international):

Genome; The **P**lant Cell; The Plant **J**ournal; Developmental Biology; Plant Physiology & Biochemistry; Planta; Plant Science; Physiologia Plantarum; American Journal of Botany; International Journal of Plant Sciences; The Journal of Plant Research; Thai Journal of Agricultural Research; Annals of Botany

Conference Organization:

- 2007; ***Invited Panel Member***, Laboratory Leadership Workshop, American Society of Plant Biologists meetings, Chicago, IL
- 2003; ***Coordinator***, meeting for faculty from Primarily Undergraduate Institutions; ASPB meetings, Seattle, WA
- 2002; ***Session Chair*** (Development session), ASPB 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 (formerly Am. Soc. Plant Physiologists); American Association for the 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 N, Dao TP*, and Vernon DM (2010) The Arabidopsis Leucine-Rich Repeat proteins PIRL1 and PIRL9 are essential for differentiation of microspores into pollen. *Submitted*

Forsthoefel N, 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 [Published online 4/05: http://www.pcp.oupjournals.org]

Cushing DA*, Forsthoefel NR, Gestaut DR*, Vernon DM (2005) *Arabidopsis emb*175 and other *ppr* knockout mutants reveal essential roles for PPR proteins in plant embryogenesis. **Planta**, 222: 424-436. [*Published online*, 1/05: http://dx.doi.org/10.1007/s00425-004-1452-x.]

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 N (2001) An expanded role for the *TWN*1 gene in embryogenesis: defects in cotyledon pattern and morphology in the *twn*1 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, in *Advances in Cellular& Molecular Biology of Plant Seed Development, Vol. 2*, (BA Larkins and IK Vasil, eds) Kluwer Press, Dordrecht, The Netherlands, p.53-72

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.

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.

PUBLICATIONS (CONTINUED)

Vernon DM and Bohnert HJ (1992) Increased Expression of an Inositol Methyl Transferase in *M. cryst-allinum* 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, OstremJA, 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.

MANUSCRIPTS IN PREPARATION

Forsthoefel NR & Vernon DM Forsthoefel N, Dao TP*, Reinhart CR*, Vernon DM. Assymetric functional redundancy between *PIRL*1 and *PIRL*9 during Arabidopsis pollen development: residual affect of sporophytic genotype on pollen phenotype. *In preparation.*

Forsthoefel N, Reinhart C*, Vernon DM Complex functional relationships between members of the Arabidopsis *PIRL* gene family during in pollen development. *In preparation; see 2009 conference presentation, below.*

Vernon DM, Cushing DA*, Davis NA*, Forsthoefel N Diverse Impacts of *PPR* knockout mutations on plastid biogenesis, embryo morphogenesis, and gene expression in the Arabidopsis *emb*1270 and *emb*2261 mutants, *In preparation*; *see 2008 conference presentation, below*.

Forsthoefel N, & Vernon DM. Overlapping genes and organ-specific aberrant mRNA splicing of the Arabidopsis PIRL6 gene. *In preparation*.

Anderson TM*, Hutchison D, Vernon DM Evolution of the PPR gene superfamily in Arabidopsis: probable expansion via an RNA-mediated mechanism. *In preparation*

SELECTED SEMINARS AND PRESENTATIONS (since 2000)

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 (American Society of Plant Biologists 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 (American Society of Plant Biologists 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 (American Society of Plant Biologists Conference), Merida, Mexico, June, 2008.

Dao TP*, Forsthoefel N, Vernon DM, Juers D (2007) Expression, purification & biophysical characterization of Arabidopsis LRR protein PIRL1. Meeting of the Biophysical Society, Baltimore, MD, March, 2007

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. [presentation by J.R. at FASEB conference, 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 locus, 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 *emb*175 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 *SLAT*s. 12th International Conference on Arabidopsis Research. Madison, WI, June, 2001.

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.

TEACHING EXPERIENCE

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

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 (biochemistry) majors.

BIOCHEMISTRY, BIOPHYSICS, & MOLECULAR BIOLOGY SEMINAR 400: Capstone seminar for the interdisciplinary BBMB (biochemistry) major; presentation & discussion of primary literature.

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

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

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

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 [taught in 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: **~40** undergraduate students have worked in my lab; many as full-time 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