

Curriculum Vitae  
**ELIZABETH VIERLING**

**EDUCATION**

- 2007-08 (Summers) Sabbatical Research, Max Planck Institute for Molecular Plant Physiology, Golm, Germany, Sponsor Dr. N. Mark Stitt. (Alexander Von Humboldt support)
- 2000-01 Sabbatical Research, Wageningen Univ., Wageningen, The Netherlands, Sponsor, Dr. M. Koornneef. (NSF and Guggenheim support)
- 1993-94 Sabbatical Research, Whitehead Institute for Biomedical Research, Sponsor, Dr. G. Fink.
- 1982-85 Postdoctoral Research Associate, Botany Department, Univ. of Georgia, Athens, GA, Dr. J.L. Key, advisor.
- 1982 Ph.D., Biology, The University of Chicago, Chicago, IL. Dissertation title: "Structure and Biosynthesis of the P700 Chlorophyll *a* Protein" Dr. R.S. Alberte, advisor.
- 1979 M.S., Biology, The University of Chicago, Chicago, IL.
- 1979 Physiology Course, Marine Biological Laboratory, Woods Hole, MA.
- 1975 B.S., Botany, University of Michigan, Ann Arbor, MI.
- 1973 Junior Year in Freiburg, Albert-Ludwigs Universität, Germany.

**EMPLOYMENT**

- 2013 Distinguished Professor, University of Massachusetts
- 2011 Professor, Department of Biochemistry & Molecular Biology, University of MA, Amherst, MA; Regents' Professor Emerita, University of Arizona, Tucson, AZ
- 2008 - 10 Program Director, BIO/MCB National Science Foundation, Arlington, VA
- 2008 Regents' Professor, Dept. Chemistry & Biochemistry, University of Arizona
- 1999 Joint Professor of Plant Sciences, University of Arizona
- 1996 Professor of Biochemistry & Molecular Biophysics, and of Molecular and Cellular Biology, University of Arizona, Tucson, AZ.
- 1991 Associate Professor of Biochemistry and of Molecular and Cellular Biology, University of Arizona, Tucson, AZ.
- 1986 Joint Faculty, Department of Molecular and Cellular Biology, Univ of AZ, Tucson, AZ.
- 1985 Assistant Professor of Biochemistry, Univ of AZ, Tucson, AZ.

**HONORS AND AWARDS**

- 2013 University of Massachusetts Spotlight Scholar
- 2012 Appointed Fellow of the American Society of Plant Biologists
- 2012 Distinguished Graduate of Riverdell High School, Oradell, NJ
- 2007 Alexander von Humboldt Senior Research Fellow
- 2002 Elected Fellow of the AAAS
- 2000 John Simon Guggenheim Memorial Fellow
- 1997 NSF/JSPS Short Term Invitation Fellowship for Research in Japan
- 1993-97 American Cancer Society Faculty Research Award.
- 1978-81 Trainee, NIH Cell & Molecular Biology Training Grant, University of Chicago.
- 1979 Junior Researcher, Physiology Course, MBL, Woods Hole, MA; Society of General Physiologists Grant (summer).
- 1976-78 Hutchinson Botany Fellow, University of Chicago.
- 1971-75 National Merit Scholar, University of Michigan.

## **SERVICE (1994 to present)**

### **Outreach:**

High School Science Fair Project Sponsor: 1995, 1999-2000

Sponsored two Salpointe High students who performed research in my lab.

Sponsored 3 students for 2000 Science Fair projects.

Sponsored High School Teachers for summer research, 2002 - 2007.

Science Teachers Colloquium Presentation: 1997

Biology Career Day: 1995, 1997, 1999, 2003 Organizing committee.

K-12 Outreach: Took the Manduca Project to my daughter's kindergarten and 1<sup>st</sup> grade classes.

Spoke to 5<sup>th</sup> grade class about DNA and cells, Spring 2003.

Speaker, Science Career Day for middle school girls, March, 2003.

Presenter, Science Career Day for middle schoolers, Swanson Middle school, Arlington, VA, Nov. 2008

Presenter, Thomas Jefferson Science Career Day, Arlington, VA, 2009

High School Science Fair Judge, Arlington, VA, Feb. 2009

Presenter: Girls Excited about Math and Science, 6<sup>th</sup> grade Daniels Run Elementary, Falls Church, VA  
Jan. 2010

Eureka Program: Developed two morning laboratory exercise for 15 year old girls from Holyoke Girls, Inc. program, UMass campus, Summer 2013; 2104.

Public Lectures: "GMOs: Science behind the Hype", Amherst Town Hall, April 2014 (video recorded, shown on local TV and posted on Amherst town website); New Canaan, NY church group, May 2014; "Is there an upside to genetically modified plants?", Amherst Town Hall, Nov 2014; "Science of meaningful GMO labeling" Speaker and panelist at forum sponsored by MA State Senator Brownsberger, Watertown, MA, October 2015; "The Science of Genetically Engineered Plants", sponsored by the CT Valley section of the ACS, Amherst, MA, Oct 2015; "Where GMOs Stand Today" New England Vegetable and Fruit Conference, Manchester, NH, Dec 15, 2015; An evening with an expert, Amherst Hillel, Amherst, MA, April 2016. "Transgenic Plants: From basic research to agricultural applications", Amherst Learning in Retirement, Hitchcock Center for the Environment. Dec 2017.

Organized "This is STEM in College" panel and campus shadowing day for Amherst Regional High school students (involved UMass undergrads); Spring 2014 to 2017, 2019 (12-20 student participants each time). Same event for Girl's Inc. of Holyoke for middle school girls (14 girls), Fall 2015, Spring 2017.

Sponsored a visiting student from the Czech Republic for a ten day visit for a collaboration on the function of the enzyme GSNOR (Dec 2014).

Sponsored a visiting postdoc from Australian National University in Canberra for one week to perform pilot experiments on heat stress in grasses (June 2015).

Sent a postdoc to Berlin, Germany for three weeks to learn new techniques and collaborate with an international partner (Feb 2015).

Met with Boston Globe Editorial Board members as expert on GMOs to discuss MA GMO labeling bill. (May 2016).

Sponsored middle school science/math teacher Elliot Kelly to perform research and develop middle school curricula with plants (July-Aug 2016, 2017, 2018, 2019), and Jodi Stevens (2018, 2019).

Teacher Workshop – Amherst Middle School, August 2017. Morning workshop on middle school science project with plants. Led by Elliott Kelly. Three teachers, one student teacher and one UMass graduate student.

Attended Elliott Kelly's Amherst Middle School 8<sup>th</sup> grade classroom for "radish races" exercise (2017);  
Attended Elliott Kelly's and Jodi Stevens Amherst Middle School 7<sup>th</sup> grade classroom to observe  
plant density lab (2018).

### **Departmental Committees**

#### U AZ

Undergraduate Advising 1991 - 1996; 2004 to 2008  
Graduate Studies Committee 1995 - 2000. Chair from 1996-1999  
Biochemistry Department Executive Committee 1995-1998, 2005-2007  
Seminar Committee - 1999  
Curriculum Committee - 2002, 2003 to 2008  
Research Program Committee, Chair – 2006 to 2008

#### U Mass

Departmental Personnel Committee: Fall 2011 – 14, 2019; Chair 2012-13, 2013-14; Chair 2019  
Undergraduate Advising – Class of 2015 (~25 students), Class of 2019 (~33 students)  
Nordin Lecturer Committee – For Spring 2012, 2014, 2016 lectures  
Research Resources Committee – Spring 2012 - 2017  
Academic Affairs Committee – Fall 2014 – 2017  
Head's Advisory Committee – Fall 2014 – 2017  
Faculty Search Committee, Chair – Fall 2014, Margaret Stratton hired.  
BMB Office Manager Search Committee – Chair – Fall 2015  
Faculty Search Committee, Chair – Summer 2016-2017, Sibongile Mafu hired.  
Honors Program Director – 2019 to present

### **University**

#### U AZ

Biochemistry Head Search Committee - 1996  
Graduate College Representative - 1995 -2003  
Faculty Senate - 2000 - 2005  
Biochemistry Dept Head 5-yr Review Committee - 2001  
Research Policy Committee - 2002-2003  
Honors College Scholarship Board - 2004 - 2007  
College of Science P & T Committee – 2006

#### U Mass

Campus Physical Planning Council: Fall 2011 to 2017  
Faculty Senate Outreach Council Subcommittee: 2011 to 2015  
Broader Impacts Working Group (grant development advisory function): Spring 2011, Spring 2012  
Facilitator: Workshop on Broader Impacts in Grant Applications: Spring 2011, 2012  
Scribe: Workshop on Outreach and Engagement: Fall 2013.  
Plant Biology Program Graduate Admissions Committee: 2012 – 2017, 2019  
IALS Models to Medicine Steering Committee: 2013 - 2016.  
Interdepartmental Graduate Program Review Committee: 2015 - 2016  
Plant Biology Graduate Program Director: 2015 to 2017; academic year 2018-2019  
Co-Organizer -13<sup>th</sup> Annual UMass Plant Biology Symposium – Oct 2015  
Chair, Dean's CNS Plant Visioning Committee: 2015-2016  
Life Sciences Steering Committee: 2015 - 2017

CNS Dean Search Committee: 2016  
IALS Core Facility Director Search Committee: 2016  
Graduate Education Innovation Working Group: 2019  
Commonwealth Honors College Council: 2019-2022  
Plant Biology Graduate Program Graduate Operations Committee: Chair 2019-2020

**Service to Profession:** (Selected)

International Service:

Advisory Board for the Gregor Mendel Institute of Plant Biology, Vienna, Austria. Appointed 2011-2106. Yearly board meetings.

Advisory Board for Marie Curie Initial Training Network SPOT-ITN, EU Project coordinated at Goethe University, Frankfurt, Germany. 2012-2015. Yearly consortium meetings.

Editorial Positions

Editor - Plant Physiology, 1992 - 1995

Editorial Board - Plant Molecular Biology, 2000 - 2004

Editorial Board - Journal of Biological Chemistry, 2003-2008

Editorial Board - Plant Journal, 2003-2008

Reviewing Editor – Frontiers in Molecular Biosciences, Protein Folding, misfolding & degradation

Elected Offices

American Society for Cell Biology, Publications Committee, 1992-1995.

American Society for Plant Physiologists, Executive Committee, 1995-1997.

Committee Service

American Society for Plant Biologists, Charles Albert Shull Award Committee, 2005-2008.

American Society for Plant Biologists, ASPB Pioneer Hi-Bred Graduate Student Fellowship Committee, 2009 to 2015

Grant and Program Review Panels

1994 USDA-NRICGP - Plant Responses to the Environment

1995 NIH Molecular Cytology Study Section, Ad Hoc reviewer

1996 American Cancer Society - Personnel grants

1999 USDA-NRICGP - Plant Development

2000 USDA-NRICGP - Plant Responses to the Environment

2002 DOE - Energy Biosciences

2004-5 USDA-NRICGP - Panel Manager, Plant Responses to the Environment

2005 DOE – MSU Plant Research Lab Site Review

2011 NSF – MCB Signal Transduction Panel

2012 NIH – MSFB Study Section, Ad Hoc

2014 VA Tech – Review of Department of Plant Pathology, Physiology and Weed Science

2014 NIFA – USDA - Plant Growth, Development, Composition and Stress Tolerance

2016 NSF – PhD Dissertation award panel

Membership in Professional Societies

American Society for Biochemistry and Molecular Biology - 1997 to present

American Association for the Advancement of Science - 1985 to present

American Society for Cell Biology - 1978 to 2004

American Society of Plant Biologists - 1977 to present

### Meeting organization/chair positions:

#### Keystone Conferences:

Chair, Plant Responses to Abiotic Stress. Copper Mountain CO, April 2006

Co-Chair, Plant Responses to Abiotic Stress. Santa Fe, NM, February, 2004.

Gordon Research Conference: Chair, Plant Responses to Temperature: January, 2006

National Science Foundation: Cochair, Workshop on Innovation in Biological Research and Education in the Molecular and Cellular Biosciences, Arlington, VA, June 2010.

ASPB Annual Meeting: Minisymposium Chair, Minneapolis, MN, August 2011.

Minisymposium Chair, Providence, R.I. July 2013.

ASBMB Annual Meeting: Theme Session Organizer (12 speakers); Chair and Speaker, Indianapolis, IN, Apr 2021.

### **TEACHING**

#### U Mass

#### Formal Courses:

**BiochemHO1** - (Spr '11;13;14 Fall '12,13) – 1 credit, ~30 students, 1 lecture

**Biochem694A PB II** - Topics in Plant Biology Research (Spring 2011) – 2 credits, 2 students, 1 lecture

**Bio 891PB** -Topics in Plant Biology Research (Fall '11; 12) – 3 credits, ~15 students, 2 lectures

**Biochem 697A** – Protein Folding Journal Club, co-organizer (Fall '11, '12, Spr 13) – 2 credits, ~18;~18; 6 students

**Biochem694A PB II** - Topics in Plant Biology Research 2 credits (Spr 12 - 8 students; Spr 13- 9 students; Spr 14 – 3 students; Spr 15 – 8 students; Spr 16 - 3 students; Spr 17 – 9 students; Spr 2019 – 4 students)

**Biochem 491H** – Junior year writing (Fall 12, 13, 15, 16) – 2 credits (11, 13, 9, 13 students)

**Biochem 430H** - Biochemistry Writing seminar (Fall 18) – 3 credits, 12 students.

**NatSci 494I** - Global Issues/Applied Biology (Spr 2015 – 3 credits, 83 students; Spr 2016 – 3 credits, 59 students; cotaught 1/3 of course with Li-Jun Ma both years. (Spr 2017, 2019, 2020 – 3 credits, 65-90 students; taught 1/3 of course).

#### Independent Studies:

**Biochem 396** (Fall 2011) Brett Higgins, BMB Sophomore, 2 credits

**Biochem 396** (Spring 2012) Brett Higgins, BMB Sophomore, 3 credits

**Biochem 496** (Spring 2012) Jonathan Barricelli, BMB Senior, 3 credits

**Honors Capstone** (Spring 2012) Joshua Coomey, PSIS Senior, 3 credits, Co-Advisor

**Biochem 396H** (Fall 2012) Michelle Rousseau, BMB Junior, 3 credits

**Biochem 499Y** (Spring 2013) Umaru Barrie, BMB Senior, 3 credits

**Biochem 296** (Spr 2013) Olena Gross, BMB, 3 credits

**Biochem 499T** (Fall 2013) Umaru Barrie, Honors thesis, 3 credits.

**Biochem 396** (Fall 2014) Mary Fowler, 4 credits

**Biochem 496** (Fall 2014) Olena Gross, 3 credits

**Biochem 396** (Spring 2015) Chirag Mehta, 2 credits

**Biochem 396H** (Spring 2015) Mary Fowler, 4 credits

**Biochem 496** (Spring 2015) Olena Gross, 3 credits

**Biochem 499Y** (Fall 2015) Mary Fowler, 3 credits

**Chem 496** (Fall 2015) Ian Truebridge, 3 credits

**Biochem 396H** (Spring 2016) Chirag Mehta, 3 credits

**Chem 496** (Spring 2016) Ian Truebridge, 2 credits

**Biochem 496** (Spring 2016) Sam Del'Olio, 4 credits

**Biochem 499T** (Spring 2016) Mary Fowler, 6 credits  
**Biochem499Y** (Fall 2016) Chirag Mehta, 3 credits  
**Biochem 499Y** (Fall 2016) Chirag Mehta, 3 credits  
**Biochem499T** (Spring 2017) Alyssa McQuillan, 3 credits  
**Biochem 499T** (Spring 2017) Chirag Mehta, 3 credits  
**Biochem 396H** (Spring 2017) Thi Bui, 3 credits  
**Biochem 396H** (Spring 2017) Jesse Arsenault, 3 credits  
**Biochem 396** (Spring 2017) Corey Isgur, 3 credits  
**Biochem 499Y** (Fall 2017) Thi Bui, 3 credits  
**Biochem 499Y** (Fall 2017) Jesse Arsenault, 3 credits  
**Biochem 496** (Fall 2017) Corey Isgur, 3 credits  
**Biochem 499T** (Spring 2018) Jesse Arsenault, 3 credits  
**Biochem 396H** (Spring 2018) Sam Zelman. 3 credits  
**Biochem 396H** (Spring 2018) Esther Oh, 4 credits  
**Biochem 496** (Spring 2018) Corey Isgur. 3 credits  
**Biochem 499Y** (Fall 2018) Esther Oh, 4 credits  
**Biochem 496H** (Fall 2018) Sam Zelman, 3 credits  
**Biochem 296H** (Fall 2018) Lilly Voke, 3 credits  
**Biochem 499T** (Spring 2019) Parth Patel, 3 credits  
**Biochem 499T** (Spring 2019) Esther Oh, 3 credits  
**Biochem 396H** (Fall 2019) Astha Parmar, 4 credits  
**Biochem 296** (Fall 2019) Philipp Guettler, 4 credits  
**Biochem 496** (Fall 2019) Eli Gordon, 4 credits

Graduate Program Participation:

Molecular and Cellular Biology (MCB) Program (weekly colloquia, weekly seminars)

ICE IGERT (2011-2015)

Plant Biology (PB) program (weekly seminars)

Chemistry Biology Interface (CBI) Program (monthly seminars); Training grant faculty – 2012-2019

CBI/BMB/BMP Joint Retreat, Worcester MA, June 2011, 2015; Amherst, MA June 2012, 2013, 2016, 2017, 2019

Informal Presentations to Graduate Programs:

MCB Colloquium - Spring 2011

ICE: Coffee and Connections - Spring 2011

CBI Chalk Talk-Spring 2011, 2015, 2017, Fall 2019

PB Graduate Student Program – Fall 2011, 2012

MCB Graduate Student Program – Fall 2011, 2012, 2015

BioTechTALES – BTP Training grant debate – Fall 2019

U Arizona (1995-2010)

**Biochemistry 462a** – Macromolecular structure/function for upper division Biochem majors (~110 students)

**Biochemistry 462b** - Metabolism for upper division Biochem majors (~100 students).

**Biochemistry 462bH** - Honors section of above.

**Biochemistry 461** - Nucleic acid biochemistry (for pharmacy, nursing, micro majors) (~140 students)

**Plant Sciences 561** - Biochemistry of photosynthesis & carbon metabolism (10-20 graduate students)

**Biochemistry 595c** - Current topics in biochem. & mol biol (8-15 MCB & Biochem graduate students).

## **GRADUATE STUDENTS**

### U Mass

#### PhD Advisor:

Keith Ballard – MCB PhD 2018

#### Visiting PhD Student:

Tianxiang Liu – NW Ag & Forestry University, Yangling, China – 2018-2020

#### PhD Student Committees:

Alba Tannous – PhD Student of Daniel Hebert, MCB Program, degree 2015

Peter van Gisbergen – PhD student of Magdalena Bezanilla, degree 2016

Jing Lui – PhD student of Peter Chien, degree 2016

Greg Delulio – PhD Student of Li-Jun Ma, PB Program, Degree 2017

Onur Oznas – PhD student of Dong Wang, MCB program, degree 2016

Patrick Hill – PhD student of Kevin Griffith, MCB program

Ryan Shepard – PhD student of Om Parkash, PB program; left with terminal MS 2016

Joseph Tilitsky – PhD student of Lila Geirasch, Chemistry; Left with terminal MS 2017

Joshua Coomey – PhD student of Sam Hazen, PB program

Nana Zhang – PhD Student at University of Pittsburgh, Stephen Tonsor advisor; degree 2016

Liyuan Zhang – PhD student at Beijing Agricultural University, Huiru Peng advisor; degree 2016

Lingling Zhu – PhD student at Australian National University, Owen Atkin advisor; degree 2017

Kathryn Vescio – PhD student of Li-Jun Ma, PB program

Jarrett Man – PhD student of Madelaine Bartlett, PB program

#### Masters Students:

##### MS Advisor:

Yichen Zhang – MCB MS 2014; MS in statistics, bioinformatics at Rutgers, 2016; employed in industry

Nathen Bopp – Biochem, MS 2015 – Currently PhD student at UT Galveston

Sally Chu – Applied Biotech, MS 2014; employed in industry

William Scholl - Applied Biotech, MS

Mary Fowler – Applied Biotech, MS 2017; employed in industry

Ian Truebridge – Biochem MS 2018 ; employed in academic research lab

Sam Zelman – Biochem MS

Parth Patel – Biochem MS

#### MS Student committees

Sarah Tarullo - MS 2014 (Scott Garman, Advisor)

Dennis DePaulo – MS 2014 (Sam Hazen, Advisor)

#### Rotations:

Keith Ballard – MCB, Summer 2011

Tieyang Liu – MCB, Spring 2012

Yichen Zhang – MCB, Spring 2012

Thomas Sawyer – MCB, Fall 2014

Jarrett Man – PB, Spring 2016

Ahmet Bakirbas – PB, Spring 2018

Nishadi Gamage – PB, Spring 2019

### Undergraduate Thesis Committees:

#### Chair:

Umaru Barrie – BMB Honors Thesis, Dec 2013  
Mary Fowler – BMB Honors Thesis, May 2016  
Chirag Mehta – BMB Honors Thesis, May 2017  
Alyssa McQuillan – BMB Honors Thesis, May 2017  
Jesse Arsenaault – BMB Honors Thesis, May 2018  
Esther Oh – BMB Honors Thesis, May 2019  
Parth Patel – BMB Honors Thesis, May 2019

#### Member:

Joshua Coomey – PSIS Honors Thesis, May 2012  
Christopher Waters - BMB Honors Thesis, Wang Lab, May 2014  
Samantha Williams – BMB Honors Thesis, Gierasch Lab, May 2014  
Swarna Veeramani – BMB Honors Thesis, Mager Lab (VASCI), May 2015  
Laura Carlucci – Biology Honors Thesis, Baskin Lab, May 2016  
Thi Bui – BMB Honors Thesis, Katz Lab, Dec 2018

### U AZ

Qiang Chen, PhD 1992. Professor, Dept of Applied Biological Sciences. AZ State University.  
Amy DeRocher, PhD 1993. Senior Staff Scientist, Seattle Biomedical Research Institute, Seattle, WA.  
Teri Suzuki, PhD 1998. Senior Research Scientist, Aventis Pharmaceuticals, Tucson, AZ  
Nadja (Wehmeyer) Anderson, PhD 1999. K-12 Biotech Outreach Coordinator, U of AZ, Tucson, AZ.  
Dee Willet, MS in Biology Teaching. 1999. Middle School Teacher, Tucson, AZ  
David Kim, M.S. 1999. Dean of Students, Albuquerque Academy High School, NM  
Kenny Friedrich, PhD 2003, Associate Professor, Portland Community College, OR.  
Guilong (Charles) Cheng, PhD 2007, (joint with Dr. Vicki Wysocki) Research Scientist, Amgen, MA.  
Nomalie Jaya, PhD 2009. Senior Scientist, Seattle Genetics, Bothell, WA  
Christina Jahr, MS 2010. High school teacher, CA.  
Minsoo Kim, PhD 2011. Returned as postdoc in Nov 2014

### **POSTDOCTORAL RESEARCH ASSOCIATES**

#### Former:

Dr. Ricardo Azpiroz, Instructor, Richland College, Dallas, TX  
Dr. Kim Giese – RN, Princeton, NJ  
Dr. Damian Guerra – April 2013 to July 2016; Postdoc U. Denver.  
Dr. Andrew Hausrath – Scientist, UCLA  
Dr. Kenneth Helm, Professor, Siena College, NY  
Dr. Suk-Whan Hong- Associate Professor, Chonnam University, Korea  
Dr. Surekha Katiyar-Agarwal – Associate Professor, University of New Delhi, New Delhi, India  
Dr. Jane Larkindale – Director of Translational Research, Muscular Dystrophy Association, Tucson, AZ  
Dr. Gary J. Lee – Former Monsanto Scientist; Luthier, Wayne, NJ  
Dr. Ung Lee – Humanitarian Farm Advisor  
Dr. Fionn McLoughlin – April 2012-Dec 2015; Postdoc, Washington University, St. Louis, MO  
Dr. Heather O'Neill – Scientist, Caris Life Sciences, Phoenix, Arizona  
Dr. Katherine Osteryoung - Professor, Michigan State University  
Dr. Kerstin Petersen – Scientist, Max Planck Institute for Molecular Plant Physiology, Golm, Germany  
Dr. Indu Santhanagopalan – March 2011 to Nov 2016; Postdoc, Cambridge UK



Dr. Elizabeth Waters, Professor, San Diego State University  
Dr. Colin Watson, Neuroscience Regional Specialist, Pfizer, Tucson AZ  
Dr. Shengbao Xu – Associate Professor, Northwest Ag & Forestry University, Yangling, China

Current:

Dr. Minsoo Kim – Nov 2014 to present  
Dr. Patrick Treffon – August 2016 to present

### VISITING SCIENTISTS

Former (Since 2004 – two prior):

Dr. Eman Basha – 2004 to 2012, from Tanta University, Tanta, Egypt  
Dr. Kishor Gaikwad – 2009-2010, from National Research Centre on Plant Biotechnology, Indian Agricultural Research Institute, New Delhi, India  
Dr. Joel Stafstrom – Fall 2011, Professor, Department of Biological Sciences, Northern Illinois University.  
Dr. Huiru Peng – Sept 2011- Sept 2012, Associate Professor, China Agricultural University, Beijing. Return visit planned – delayed by coronavirus, 2020  
Dr. Alejandra Covarrubias – March 2014 – Sept 2014, Professor, UNAM, Cuernavaca, Mexico

### PUBLICATIONS (Complete list) (126 total)

**Peer Reviewed:** (100 total) (\* undergraduate authors)

All: H-Index – 70, i10 – 109; Citations: 20936 (Feb 2020 – Google Scholar)  
Since 2015: H-Index – 45, i10 index 81; Citations: 6366 (Feb 2020 – Google Scholar)

104) Kim, M., K. Kuehn, E. Vierling. Mitochondrial DNA in *Arabidopsis thaliana* requires mTERF18/SHOT1 and ATAD3 proteins for proper nucleoid organization. *In preparation*.

103) Wang, J., X. Guo, T. Liu, S. Javed, S. Xu, E. Vierling. GSNOR plays a maternal dominant role in regulating female gametophyte development by maintaining sporophytic nitric oxide homeostasis in *Arabidopsis*. *In preparation*.

102) Wang, J., X. Guo, J. Zhu, Q. Xiao, A. Cheung, R. Palanivelu, L. Yuan, E. Vierling, S. Xu. Auxin efflux controls orderly nucellar degeneration in *Arabidopsis*. *Submitted*.

101) Waters, E., E. Vierling. Plant Small Heat Shock Proteins - Evolutionary and Functional Diversity. *New Phytologist – Tansley Review* (2020). *Revision submitted*.

100) McLoughlin, F., M. Kim, R. S. Marshall, R. D. Vierstra, and E. Vierling. HSP101 interacts with the proteasome and promotes the clearance of ubiquitylated protein aggregates. *Plant Physiol.* 180:1829-1847 (2019). DOI:10.1104/pp.19.00263. Highlighted in *Plnt Physiol. News and Views*: 180:1777-1778. DOI: <https://doi.org/10.1104/pp.19.00711>.

99) Santhanagopalan, I., M.T. Degiacomi, D.A. Shepard, G.K.A. Hochberg, J.L.P. Benesch, E. Vierling. It takes a dimer to tango: Oligomeric small heat shock proteins dissociate to capture substrate. *J. Biol. Chem.* 293: 19511–19521 (2018). Cover article.

- 98) Wang, X., L. Hou, Y. Lu, B. Wu, X. Gong, M. Liu, J. Wang, Q. Sun, E. Vierling, S. Xu. Metabolic adaptation of wheat grain contributes to stable filling rate under heat stress. *J. Exp. Bot.* 69: 5531-5545 (2018). <https://doi.org/10.1093/jxb/ery303>
- 97) Marklund, E. G., Y. Zhang, E. Basha, J. L.P. Benesch, E. Vierling. Structural and functional aspects of the interaction partners of the small heat-shock protein in *Synechocystis*. *Cell Stress & Chaperones* <https://doi.org/10.1007/s12192-018-0884-3> (2018). PMID: PMC6045555
- 96) Hochberg, G. K.A., D. A. Shepherd, E.G. Marklund, I. Santhanagoplan, M. Degiacomi, A. Laganowksy, T. M. Allison, E. Basha, M. T. Marty, M. R. Galpin, W. B. Struwe, A. J. Baldwin, E. Vierling, J. L.P. Benesch. Structural principles that enable oligomeric small heat-shock protein paralogs to evolve distinct functions. *Science* 359: 930-935 (2018). PMID:29472485
- 95) Guerra, D., S. Eyles, I. Truebridge, P. Treffon, E. Vierling. Direct detection of in vitro protein nitrosation by mass spectrometry: S-Nitrosoglutathione Reductase as a Model Protein. In: Mengel A., Lindermayr C. (eds) Nitric Oxide. *Methods in Molecular Biology*, vol 1747, pp 143-160. Humana Press, New York, NY (2018). PMID:29600457
- 94) Zhang, L. X. Liu, K. Gaikwad, X. Kou, F. Wang, X. Tian, M. Xin, Z. Ni, Q. Sun, H. Peng, E. Vierling. Mutations in eIF5B confer thermosensitive and pleiotropic phenotypes via translation defects in *Arabidopsis thaliana*. *Plant Cell* 29:1952-1969 (2017). PMID: 28808135
- 93) Kim, M., F. McLoughlin, E. Basha, E. Vierling. Assessing tolerance to acute heat stress. *Bio-protocol* 7(14): e2405. DOI: 10.21769/BioProtoc.2405 (2017).
- 92) McLoughlin, F., E. Basha, M. E. Fowler\*, M. Kim, J. Bordowitz\*, S. Katiyar-Agarwal, E. Vierling. Class I and II small heat shock proteins together with HSP101 protect eukaryotic protein translation factors during heat stress. *Plant Physiol.* 172:1221-1236 (2016). PMID:27474115
- 91) Guerra, D., K. Ballard, I. Truebridge\*, E. Vierling. S-nitrosation of conserved cysteines modulates activity and stability of S-nitrosoglutathione reductase (GSNOR). *Biochemistry* 55:2452-64 (2016). PMID:27064847
- 90) Haslbeck, M., E. Vierling. A first line of defense: Small heat shock proteins and their function in protein homeostasis. *J. Mol. Biol.* 427:1537-48 (2015). PMID:25681016
- 89) Patel, S., E. Vierling, F. Tama. Replica exchange molecular dynamics simulations provide insight into substrate recognition by small heat shock proteins. *Biophys. J.* 106:2644-2655 (2014). PMID:24940782
- 88) Xu, S., D. Guerra, U. Lee, E. Vierling. S-Nitrosoglutathione reductases are low-copy number, cysteine-rich proteins in plants that control multiple developmental and defense responses in *Arabidopsis*. *Front. Plant Sci.* 4: 1-13 (2013). doi: 10.3389/fpls.2013.00430. PMID:24204370
- 87) Basha, E. C. Jones, A.E. Blackwell, G. Cheng, E.R. Waters, K.A. Samsel\*, M. Siddique, V. Pett, V. Wysocki, E. Vierling. An unusual dimeric small heat shock protein provides insight into the mechanism of this class of chaperones. *J. Mol. Biol.* 425:1683-96 (2013). PMID: 23416558

- 86) Kim, M., U. Lee, I. Small, C. des Francs-Small, E. Vierling. Mutations in a mitochondrial transcription termination factor (mTERF)-related protein enhance thermotolerance in the absence of the major molecular chaperone HSP101. *Plant Cell* 24:3349-65 (2012). PMID: 22942382
- 85) Stengel, F., A. J. Baldwin, M. F. Bush, G. R. Hilton, H. Lioe, E. Basha, N. Jaya, E. Vierling, J. L.P. Benesch. Dissecting heterogeneous molecular chaperone complexes using a mass spectrum deconvolution approach. *Chem. Biol.* 19: 599-607 (2012). Subject of commentary: *Chem. Biol.* 19:547-548 (2012). PMID: 22633411
- 84) Basha, E., H. O'Neill, E. Vierling. Small Heat Shock Proteins/ $\alpha$ -crystallins: Dynamic proteins with flexible functions. *Trends Biochem. Sci.* 37:106-117 (2012). PMID: 22177323
- 83) Benesch, J.L.P., J.A. Aquilina, A. J. Baldwin, A. Rekas, F. Stengel, R. A Lindner, E. Basha, G. L. Devlin, J. Horwitz, E. Vierling, J. A. Carver, & C. V. Robinson. The quaternary organization and dynamics of the molecular chaperone HSP26 are thermally regulated. *Chem. Biol.* 17:1008-1017 (2010). PMC3388541.
- 82) Basha, E., C. Jones, V. Wysocki, E. Vierling. Mechanistic differences between two conserved classes of small heat shock proteins found in the plant cytosol. *J. Biol. Chem.* 285:11489-11497 (2010). PMID: 20145254
- 81) Stengel, F., A. J. Baldwin, A. J. Painter, N. Jaya, E. Basha, L. E. Kay, E. Vierling, C. V. Robinson, J. L.P. Benesch. Quaternary dynamics and plasticity underlie small heat shock protein chaperone function. *Proc. Natl. Acad. Sci.* 107:2007-2012 (2010). Featured in PNAS commentary: 107:2727-2728. PMID: 20133845
- 80) Jaya, N., V. Garcia\*, E. Vierling. Substrate binding site flexibility of the small heat shock protein molecular chaperones. *Proc. Natl. Acad. Sci.* 106:15604-15609 (2009) PMID: 19717454
- 79) Cheng, G., E. Basha, V.H. Wysocki, E. Vierling. Insights into small heat shock protein and substrate structure during chaperone action derived from hydrogen/deuterium exchange and mass spectrometry. *J. Biol. Chem.* 283:26634-42 (2008). Featured as "Paper of the Week". PMID: 18621732
- 78) Bologi, Z., O. Cheregi, K.C. Giese, K. Juhász, E. Vierling, I. Vass, L. Vigh, I. Horváth. A mutant small heat shock protein with increased thylakoid association provides an elevated resistance against UV-B damage in *Synechocystis* 6803. *J. Biol. Chem.* 283:22983-22991 (2008). PMID: 18574246
- 77) Painter, A.J., N. Jaya, E. Basha, E. Vierling, C.V. Robinson, J.L. Benesch. Real-Time Monitoring of Protein Complexes Reveals their Quaternary Organization and Dynamics. *Chem Biol.* 15:246-53 (2008). PMID: 18355724
- 76) Lee, U., C. Wie\*, B. O. Fernandez, M. Feelisch, E. Vierling. Modulation of nitrosative stress by S-nitrosoglutathione reductase is critical for thermotolerance and plant growth. *Plant Cell* 20:786-802, (2008). PMID: 18326829
- 75) Offerdahl, E., T. Baldwin, L. Elfring, E. Vierling, M. Ziegler. Reading questions in large lecture courses. *J. College Teaching*, March/April:34-38 (2008).

- 74) Tonsor, S.J., C. Scott, I. Boumanza\*, T.R. Liss, J.L. Brodsky, E. Vierling. Heat shock protein 101 effects in *Arabidopsis thaliana*: Genetic variation, fitness and pleiotropy in controlled environments. *Mol. Ecol.* 17:1614-1626 (2008). PMID:18321256
- 73) Larkindale, J., E. Vierling. Core genome responses involved in acclimation to high temperature. *Plant Physiol.* 146:748-761 (2008). PMID: 18055584
- 72) Siddique, M., S. Gernhard, P. von Koskull-Döring, E. Vierling, K-D. Scharf. The plant sHSP superfamily: Five new members in *Arabidopsis thaliana* with unexpected properties. *Cell Stress & Chaperones* 13:183-197 (2008). PMID:18369739
- 71) Schramm, F., J. Larkindale, K. Kiehlmann, G. Arnab, G. Englich, G., E. Vierling, P. von Koskull-Döring. A cascade of transcription factor DREB2A and heat stress transcription factor HsfA3 regulates the heat stress response of *Arabidopsis*. *Plant J.* 53: 264-274 (2008). PMID:17999647
- 70) McClellan, C.A., T.J. Turbeyville, E.M. K. Wijeratne, A. Kerschen, E. Vierling, C. Queitsch, L. Whitesell, A.A. Gunatilaka. A rhizosphere fungus enhances *Arabidopsis* thermotolerance through production of an Hsp90 inhibitor. *Plant Physiol* 145: 174-182 (2007). Highlighted in Science Stke <http://stke.sciencemag.org/cgi/content/abstract/sigtrans;2007/403/tw333>. PMID: 17631526
- 69) Kotak, S., E. Vierling, H. Bäumlein, P. von Koskull-Döring. A novel transcriptional cascade regulating heat stress proteins during seed development in *Arabidopsis*. *Plant Cell* 19:182-195 (2007). PMID:17220197
- 68) Kwon, Y., S-H. Kim, M-S. Jung, M-S. Kim, J-E. Oh, H-W. Ju, K-I. Kim, E. Vierling, H. Lee, S-W. Hong. *Arabidopsis hot2* encodes an endochitinase-like protein that is essential for tolerance to heat, salt and drought stresses. *Plant J.* 49:184-193 (2007). PMID:17156413
- 67) Lee, U., I. Rioflorido, S-W. Hong, J. Larkindale, E. R. Waters, E. Vierling. The *Arabidopsis* ClpB/Hsp100 family of proteins: Chaperones for stress and chloroplast development. *Plant Journal* 49:115-127 (2007). PMID:17144892
- 66) Basha, E., K.L. Friedrich, E. Vierling. The N-terminal arm of small heat shock proteins is important for both chaperone activity and substrate specificity. *J. Biol. Chem.* 281: 39943-39952 (2006). PMID:17090542
- 65) Giese, K.C., E. Basha, B.Y. Catague\*, E. Vierling. Evidence for an essential function of the N-terminus of a small heat shock protein in vivo, independent of in vitro chaperone activity. *Proc. Natl. Acad. Sci.* 102: 18896-18901 (2005). PMID:16365319
- 64) Larkindale, J. J, D. Hall, M. R. Knight, E. Vierling. Heat stress phenotypes of *Arabidopsis* mutants implicate multiple signaling pathways in the acquisition of thermotolerance. *Plant Physiol.* 138:882-97 (2005). PMID:15923322
- 63) Balogi, Z., Z. Török, G. Balogh, K. Jósvay, N. Shigapova, E. Vierling, L. Vígh, I Horváth. "Heat shock lipid" in cyanobacteria during heat/light-acclimation. *Arch. Biochem. Biophys. Membrane Biochem. Biophys.* 436:346-54 (2005). PMID:15797247

- 62) Lee, U., C. Wie\*, M. Escobar\*, B. Williams, S.-W. Hong, E. Vierling. Genetic analysis reveals domain interactions of Arabidopsis Hsp100/ClpB and cooperation with the sHsp chaperone system. *Plant Cell* 17:559-571 (2005). PMID:15659638
- 61) Giese, K.C., E. Vierling. Mutants in a small heat shock proteins that affect the oligomeric state: analysis and allele specific suppression. *J. Biol. Chem.* 279: 32674 - 32683 (2004). PMID:15152007
- 60) Lum, R., J. M. Tkach, E. Vierling, and J. R. Glover. Evidence for an unfolding/threading mechanism for protein disaggregation by *Saccharomyces cerevisiae* Hsp104. *J. Biol. Chem.* 279: 29139 - 29146 (2004). PMID:15128736
- 59) Clercx, E.J.M., M. E. El-Lithy, E. Vierling, G.J. Ruys, H. Blankestijn-DeVries, S.P.C. Groot, D. Vreugdenhil, M. Koornneef. Analysis of natural allelic variation of Arabidopsis seed quality traits between the accessions Landsberg erecta and Shakedown, using a new recombinant inbred line population. *Plant Physiol.* 135: 432-443 (2004). PMID:15122038
- 58) Basha, E., G.J. Lee, B. Demeler, E. Vierling. Chaperone activity of cytosolic small heat shock proteins in wheat. *Eur. J. Biochem.* 271:1-11 (2004). PMID:15066169
- 57) Basha, E., G. J. Lee, L. A. Brecci, A.C. Hausrath, N. R. Buan\*, K. C. Giese, E. Vierling. The identity of proteins associated with a small heat shock protein during heat stress *in vivo* indicates these chaperones protect a wide range of cellular functions. *J. Biol. Chem.* 279: 7566-7575 (2004). PMID:14662763
- 56) Friedrich, K. L., K. C. Giese, N. R. Buan\*, E. Vierling. Interactions between small heat shock protein subunits and substrate in small heat shock protein/substrate complexes. *J. Biol. Chem.* 279:1080-1089 (2004). PMID:14573605
- 55) Mogk, A., E. Deuerling, S. Vorderwülbecke, E. Vierling, B. Bukau. Small heat shock proteins, ClpB and the DnaK system form a functional triade in reversing protein aggregation. *Mol. Microbiol.* 50:585-595 (2003). PMID:14617181
- 54) Wintrode, P.L., K. L. Friedrich, E. Vierling, J. B. Smith, D. L. Smith. Solution structure and dynamics of a heat shock protein complex probed by hydrogen exchange/mass spectrometry. *Biochemistry* 42:10667-10673 (2003). DOI: 10.1021/bi034117m
- 53) Mogk, A., C. Schlieker, K. L. Friedrich, H.-J. Schönfeld, E. Vierling, B. Bukau. Refolding of substrates bound to small Hsps relies on a disaggregation reaction mediated most efficiently by ClpB/DnaK. *J. Biol. Chem.* 278:31033-31042 (2003). PMID:12788951
- 52) Liu, Z., S.-W. Hong, M. Escobar\*, E. Vierling, D. L. Mitchell, D. W. Mount, J. D. Hall. Arabidopsis UVH6, a homolog of human XPD and yeast RAD3 DNA repair genes, functions in DNA repair and is essential for plant growth. *Plant Physiol.* 132:757-767 (2003). PMID:12857822
- 51) Hong, S.-W., U. Lee, E. Vierling. Arabidopsis *hot* mutants define multiple functions required for acclimation to high temperature. *Plant Physiol.* 132:1405-1414 (2003). PMID: 12805605

- 50) Giese, K.C., E. Vierling. Changes in oligomerization are essential for the chaperone activity of a small heat shock protein in vivo and in vitro. *J. Biol. Chem.* 277: 46310-46318 (2002). PMID:12297515
- 49) Sobott, F., J.L.P. Benesch, E. Vierling, C.V. Robinson. Subunit exchange of multimeric protein complexes Real-time monitoring of subunit exchange between small heat shock proteins by using electrospray-mass spectrometry. *J. Biol. Chem.* 277: 38921-38929 (2002). PMID:12138169
- 48) Tsvetkova, N.M., I. Horváth, Z. Török, W.F. Wolkers,, Z. Balogi, N. Shigapova, L.M. Crowe, F. Tablin, E. Vierling, J.H. Crowe, L. Vigh. Small heat shock proteins regulate lipid polymorphism. *Proc. Natl. Acad. Sci.* 99:13504-13509 (2002). PMID:12368478
- 47) van Montfort, R., E. Basha, K.L. Friedrich, C. Slingsby, E. Vierling. Structure and assembly of a eukaryotic small heat shock protein. *Nature Struct. Biol.* 8:1025-1030 (2001). PMID:11702068
- 46) Salvucci, M. E., K.O. Osteryoung, S.-J. Crafts-Brandner, E. Vierling. Exceptional sensitivity of rubisco activase to thermal denaturation in vitro and in vivo. *Plant Physiol.* 127:1053-1064 (2001). PMID:11706186
- 45) Hong, S-W., E. Vierling. Hsp101 is necessary for heat tolerance but dispensable for development and germination in the absence of stress. *Plant J.* 27:25-35 (2001). PMID:11489180
- 44) Sung, D.Y., E. Vierling, C. Guy. Comprehensive expression profile analysis of the Arabidopsis Hsp70 gene family. *Plant Physiol.* 126:789-800 (2001). PMID:11402207
- 43) Török, Z., P. Goloubinoff, I. Horváth, N.M. Tsvetkova, A. Glatz, G. Balogh, V. Varvasovszki, D.A.Los, E. Vierling, J.H. Crowe and L. Vigh. HSP17 is an amphitropic protein that stabilizes heat-stressed membranes and binds denatured proteins for subsequent chaperone-mediated refolding. *Proc. Natl. Acad. Sci.* 98:3098-3103 (2001). PubMed:11248038
- 42) Queitsch, C., S-W. Hong, E. Vierling, S. Lindquist. Hsp101 plays a crucial role in thermotolerance in Arabidopsis. *Plant Cell* 12:479-492 (2000). PMID:10760238
- 41) Hong, S-W., E. Vierling. Mutants of *Arabidopsis thaliana* defective in the acquisition of tolerance to high temperature stress. *Proc. Natl. Acad. Sci.* 97: 4392-4397 (2000). PubMed: 10760305
- 40) Wehmeyer, N., E. Vierling. The expression of sHsps in seeds responds to discrete developmental signals and suggests a general protective role in desiccation tolerance. *Plant Physiol.* 122:1099-1108 (2000).
- 39) Lee, G.J., E. Vierling. A small heat shock protein cooperates with heat shock protein 70 systems to reactivate a heat-denatured protein. *Plant Physiol.* 122:189-198 (2000). PMID:10631262
- 38) Waters, E., E. Vierling. Chloroplast small heat shock proteins: Evidence for atypical evolution of an organelle-localized protein. *Proc. Natl Acad. Sci* 96:14394-14399 (1999). PubMed:10588716

- 37) Härndahl, U., R.B. Hall, K.O. Osteryoung, E. Vierling, J. Bornman, C. Sundby. The chloroplast small heat shock protein undergoes oxidation-dependent conformational changes and may protect plants from oxidative stress. *Cell Stress & Chaperones* 4:129-138 (1999). PMID:10547062
- 36) Basha, E.M., E.R. Waters, E. Vierling. *Triticum aestivum* cDNAs homologous to nuclear-encoded mitochondrion-localized small heat shock proteins. *Plant Sci.* 141:93-103 (1999). [https://doi.org/10.1016/S0168-9452\(98\)00219-2](https://doi.org/10.1016/S0168-9452(98)00219-2)
- 35) Waters, E.R., E. Vierling. The diversification of plant cytosolic small heat shock proteins preceded the divergence of mosses. *Mol. Biol. & Evol.* 16:127-139 (1999). PMID:10331257
- 34) Suzuki, T.C., D.C. Krawitz\*, E. Vierling. The chloroplast small heat shock protein oligomer is not phosphorylated and does not dissociate during heat stress in vivo. *Plant Physiol.* 116:1151-1161 (1998). PMID: 9501148
- 33) Helm, K.W., G.J. Lee, E. Vierling. Expression and native structure of cytosolic class II small heat shock proteins. *Plant Physiol.* 114:1477-1485 (1997). PMID: 9276957
- 32) Lee, G.J., A.M. Roseman, H.R. Saibil, E. Vierling. A small heat shock protein stably binds heat-denatured model substrates and can maintain a substrate in a folding competent state. *EMBO J.* 16:659-671 (1997). PMID: 9034347
- 31) Willett, D.A., E. Basha, E. Vierling. Nucleotide sequence of a cDNA encoding a mitochondrion-localized small HSP from *Arabidopsis thaliana*: AtHsp23.6 (Accession No. U72958). *Plant Physiol.* 112:1400 (1996).
- 30) Wehmeyer, N., L.D. Hernandez\*, R.R. Finkelstein, E. Vierling. Synthesis of a small heat shock protein is part of the developmental program of late seed maturation. *Plant Physiol.* 270:10432-10438 (1996). PMID: 8883386
- 29) LaFayette, P.R., R.T. Nagao, K. O'Grady, E. Vierling, J.L. Key. Molecular characterization of cDNAs encoding low-molecular-weight heat shock proteins of soybean organelles. *Plant Mol. Biol.* 30:159-169 (1996). DOI: 10.1007/BF00017810
- 28) Waters, E.R., G.J. Lee, E. Vierling. Evolution, structure and function of the small heat shock proteins in plants. *J. Exper. Bot.* 47:325-338 (1996). <https://doi.org/10.1093/jxb/47.3.325>
- 27) Osteryoung, K.W., E. Vierling. Conserved cell and organelle division mechanisms. *Nature* 376:473-474 (1995). PMID:7637778
- 26) Viitanen, P.V., M. Schmidt, J. Buchner, T. Suzuki, E. Vierling, R. Dickson, G.H. Lorimer, A. Gatenby, J. Soll. Functional characterization of the higher plant chloroplast chaperonins. *J. Biol. Chem.* 270:10432-10438 (1995). PMID:7629128
- 25) Lee, G.J., E. Vierling. Structure and in vitro molecular chaperone activity of cytosolic small heat shock proteins from pea. *J. Biol. Chem.* 270:10432-10438 (1995). PMID:7737977

- 24) DeRocher, A., E. Vierling. Cytoplasmic HSP70 homologues of pea: differential expression in vegetative and embryonic organs. *Plant Mol. Biol.* 27:441-456 (1995). PMID:7894010
- 23) Helm, K.W., J. Schmeits\*, E. Vierling. An ER-localized small heat shock protein from Arabidopsis. *Plant Physiol.* 107:287-288 (1995). PMID: 7870826
- 22) Schirmer, E.C., S. Lindquist, E. Vierling. An Arabidopsis heat shock protein complements a thermotolerance defect in yeast. *Plant Cell* 6:1899-1909 (1994). PMID:7866032
- 21) Osteryoung, K.W., E. Vierling. Dynamics of small heat shock protein distribution within the chloroplast of higher plants. *J. Biol. Chem.* 269:28676-28682 (1994).  
[www.jbc.org/content/269/46/28676.full.pdf](http://www.jbc.org/content/269/46/28676.full.pdf)
- 20) Chen, Q., K.W. Osteryoung, E. Vierling. A 21 kDa chloroplast heat shock protein assembles into high molecular weight complexes *in vivo* and *in organelle*. *J. Biol. Chem.* 269:13216-13223 (1994).  
<http://www.jbc.org/content/269/18/13216>
- 19) DeRocher, A.E., E. Vierling. Developmental control of small heat shock protein expression during pea seed maturation. *Plant J.* 5:93-102 (1994). <https://doi.org/10.1046/j.1365-313X.1994.5010093.x>
- 18) Osteryoung, K.W., H. Sundberg\*, E. Vierling. Poly(A) tail length of a heat shock protein RNA is increased by severe heat stress, but intron splicing is unaffected. *Mol. Gen. Genet.* 239:323-333 (1993). PMID:8391109
- 17) Hernandez, L.D.\*, E. Vierling. Expression of low molecular weight heat shock proteins under field conditions. *Plant Physiol.* 101:1209-1216 (1993). PMID: 12231775
- 16) Helm, K.W., P. Lafayette, R.T. Nagao, J.L. Key, E. Vierling. Localization of small HSPs to the higher plant endomembrane system. *Mol. Cell. Biol.* 13:238-247 (1993). PMID:8417329
- 15) DeRocher, A., K.W. Helm, L.M. Lauzon, E. Vierling. Expression of a conserved family of cytoplasmic low molecular weight heat shock proteins during heat stress and recovery. *Plant Physiol.* 96:1038-1047 (1991). PMID: 16668295
- 14) Chen, Q., E. Vierling. Analysis of conserved domains identifies a unique structural feature of a chloroplast heat shock protein. *Mol. Gen. Genet.* 226:425-431 (1991). PMID:2038305
- 13) Nieto-Sotolo, J., E. Vierling, T-H. D. Ho. Cloning, sequence analysis and expression of a cDNA encoding a plastid-localized heat shock protein in maize. *Plant Physiol.* 93:1321-1328 (1990). PMID: 16667620
- 12) Chen, Q., L.M. Lauzon, A.E. DeRocher, E. Vierling. Accumulation, stability and localization of a major chloroplast heat shock protein. *J. Cell Biol.* 110:1873-1883 (1990). PMID:2351688
- 11) Lauzon, L., K. Helm, E. Vierling. A cDNA clone from *Pisum sativum* encoding a low molecular weight heat shock protein. *Nuc. Acids Res.* 18:4274 (1990). PMID: 2377479



- 10) Marshall, J., A.E. DeRocher, K. Keegstra, E. Vierling. Identification of HSP70 homologues in chloroplasts. *Proc. Natl Acad. Sci.* 87:374-378 (1990). PMID:2296591
- 9) Helm, K., E. Vierling. An *Arabidopsis thaliana* cDNA clone encoding a low molecular weight heat shock protein. *Nuc. Acids Res.* 17:7995 (1989). PMID:2798141
- 8) Vierling, E., L. M. Harris, Q. Chen. The major low molecular weight heat shock protein in chloroplasts shows antigenic conservation among diverse higher plant species. *Mol. Cell. Biol.* 9:461-468 (1989). PMID: 2710111
- 7) Vierling, E., R.T. Nagao, A.E. DeRocher, L.M. Harris. A chloroplast-localized heat shock protein is a member of a eukaryotic superfamily of heat shock proteins. *EMBO J.* 7:575-581 (1988). PMID: 3396532
- 6) Vierling, E., M.L. Mishkind, G.W. Schmidt, J.L. Key. Specific heat shock proteins are transported into chloroplasts. *Proc. Natl Acad. Sci.* 83:361-365 (1986). PMID: 16593647
- 5) Vierling, E., J.L. Key. Ribulose 1,5-bisphosphate carboxylase synthesis during heat shock. *Plant Physiol.* 78:155-162 (1985). PMID: 16664190
- 4) Vierling, E., R.S. Alberte. P700 chlorophyll a-protein: purification, characterization, and antibody production. *Plant Physiol.* 72:625-633 (1983). PMID: 16663057
- 3) Vaughn, K.C., E. Vierling, S.O. Duke, R.S. Alberte. Immunocytochemical and cytochemical localization of photosystems I and II. *Plant Physiol.* 73:203-207 (1983). PMID: 16663195
- 2) Vierling, E., R.S. Alberte. Regulation of synthesis of the photosystem I reaction center. *J. Cell Biol.* 97:1806-1814 (1983). DOI: 10.1083/jcb.97.6.1806
- 1) Vierling, E., R.S. Alberte. Functional organization and plasticity of the photosynthetic unit of the cyanobacterium *Anacystis nidulans*. *Physiologia Plant.* 50:93-98 (1980). <https://doi.org/10.1111/j.1399-3054.1980.tb04432.x>

**Other Invited reviews: (12 total)**

- 12) Vierling, E. Mechanism of chaperone action of small heat shock proteins, in ed. W. Houry, *Molecular Chaperones: Principles and Diseases* (Henry Stewart Talks, London, 2007). Online at: <http://www.hstalks.com/molchap/index.htm>
- 11) Kotak, S., J. Larkindale, U. Lee, P. von Koskull-Döring, E. Vierling, K-D. Scharf. Complexity of the heat stress response in plants. *Curr. Opin. Plant Biol.* 10:310-316 (2007). PMID:17482504
- 10) Scharf, K-D., M. Siddique, E. Vierling. The expanding family of *Arabidopsis thaliana* small heat stress proteins (sHsps) and a new family of proteins containing  $\alpha$ -crystallin domains (Acid proteins). *Cell Stress & Chaperones* 6:225-237 (2001). PMID: 11599564

- 9) Lee, G.J., E. Vierling. Expression, purification and molecular chaperone activity of recombinant plant small heat shock proteins. In: *Protein Folding: Catalysts, accessory proteins, and chaperones*. G. Lorimer and T.O. Baldwin, eds. Methods in Enzymology 290:350-365 (1998). PMID:7737977
- 8) E. Vierling. The small heat shock proteins in plants are members of an ancient family of heat induced proteins. *Acta Physiologiae Plantarum* 19:539-547 (1997). <https://doi.org/10.1007/s11738-997-0051-4>
- 7) Gaestel, M., E. Vierling, J. Buchner. The small heat shock proteins - an overview. In: *Handbook of molecular chaperones and protein folding catalysts*. M.J. Gething, ed. Sambrook and Tooze Publications at Oxford University Press. pp.269-272 (1997).
- 6) Vierling, E. Plant HSP100/ClpB. In: *Handbook of molecular chaperones and protein folding catalysts*. M.J. Gething, ed. Sambrook and Tooze Publications at Oxford University Press. pp.253-255 (1997).
- 5) Vierling, E. Chloroplast-localized Clp proteins. In: *Handbook of molecular chaperones and protein folding catalysts*. M.J. Gething, ed. Sambrook and Tooze Publications at Oxford University Press. pp.255- 258 (1997).
- 4) Vierling, E., G.J. Lee. Plant small heat shock proteins. In: *Handbook of molecular chaperones and protein folding catalysts*. M.J. Gething, ed. Sambrook and Tooze Publications at Oxford University Press. pp.277-280 (1997).
- 3) Boston, R.S., P.V. Viitanen, E. Vierling. Molecular chaperones and protein folding in plants. In: *Post-transcriptional control of gene expression in plants*. W. Filipowicz and T. Hohn, eds. *Plant Mol. Biology* 32:191-222 (1996). PMID:8980480
- 2) Vierling, E., J.A. Kimpel. Plant responses to environmental stress. *Curr. Opin. Biotechnology* 3:164-179 (1992). DOI: 10.1016/0960-9822(92)90905-P
- 1) Vierling, E. The roles of heat shock proteins in plants. *Ann. Rev. Plant Physiol. Plant Mol. Biol.* 42:579-620 (1991). <https://doi.org/10.1146/annurev.pp.42.060191.003051>

**Book Chapters: (7 total)**

- 7) Santhanagopalan, I., E. Basha, K. N. Ballard, N. E. Bopp, E. Vierling. Model Chaperones: Small Heat Shock Proteins from Plants. in: *The Big Book of Small Heat Shock Proteins*, Ed. R.M. Tanguay and L. Hightower, Stuart Calderwood Series, Springer Verlag, pp 119-153 (2015).
- 6) Larkindale, J., M. Mishkind, E. Vierling. Plant responses to high temperature: In: *Plant Abiotic Stress*. Matthew A. Jenks and P.M. Hasegawa, eds. Blackwell Publishing (2005).
- 5) van Montfort, R., C. Slingsby, E. Vierling. Structure and function of the small heat shock protein/ $\alpha$ -crystallin family of molecular chaperones. In: *Protein Folding in the Cell*. Advances in Protein Chemistry Series. A. Horwich, ed. Academic Press. Vol 59:105-156 (2002).
- 4) Vierling, E. Heat shock protein function and expression in plants. In: *Stress Responses in Plants: Adaptation Mechanisms*. Ruth Alscher, ed. Alan R. Liss, Inc. N.Y. pp.357-375 (1990).

3) Nagao, R.T., J.A. Kimpel, E. Vierling, J.L. Key. The heat shock response: A comparative analysis. In: *Oxford Surveys of Plant Molecular and Cell Biology*. B. Miflin, ed. Oxford Univ. Press, pp. 384-438 (1986).

2) Key, J.L., J. Kimpel, E. Vierling, C.-Y. Lin, R.T. Nagao, E. Czarnecka, F. Schöffl. Physiological and molecular aspects of the heat shock response in plants. In: *Changes in Gene Expression in Response to Environmental Stress*. B. Atkinson & D. Walden, eds. Academic Press (1985).

1) Key, J.L., J.A. Kimpel, C.Y. Lin, R.T. Nagao, E. Vierling, et al. The heat shock response in soybean. In: *Cellular and Molecular Biology of Plant Stress*. J.L. Key & T. Kosuge, eds. Alan R. Liss, N.Y. (1985).

#### **Symposium Articles - invited: (7 total)**

7) Carra, S., S. Alberti, P.A. Arrigo, J. L. Benesch, I. J. Benjamin, W. Boelens, B. Bartelt-Kirbach, B. J. J. M. Brundel, J. Buchner, B. Bukau, J. A. Carver, H. Ecroyd, C. Emanuelsson, S. Finet, N. Golenhofen, P. Goloubinoff, N. Gusev, M. Haslbeck, L. E. Hightower, H. H. Kampinga, R. E. Klevit, K. Liberek, H. S. Mchaourab, K. A. McMenimen, A. Poletti, R. Quinlan, S. V. Strelkov, M. E. Toth, E. Vierling, R. M. Tanguay. The growing world of small heat shock proteins: from structure to functions. *Cell Stress Chaperones*. DOI 10.1007/s12192-017-0787-8 March (2017).

6) Waters, E.R., E. Vierling. Molecular adaptation: A phylogenetic approach to the evolution of the small heat shock proteins in plants. Proceedings of the US-Japan Binational Workshop in Molecular Evolution. The Graduate University for Advanced Studies, Hayama, Japan. (1995).

5) Osteryoung, K.W., B. Pipes, N. Wehmeyer, E. Vierling. Studies of a chloroplast-localized small heat shock protein in *Arabidopsis*. In: *Biochemical and Cellular Mechanisms of Stress Tolerance in Plants*. J. Cherry, ed. NATO ASI Series. Vol H 86: 97-113. Springer-Verlag, Berlin (1994).  
<https://www.springer.com/us/book/9783642791352>

4) Osteryoung, K., E. Vierling. Genetic approaches to the function of the chloroplast low molecular weight heat shock proteins. In: *Research in Photosynthesis*, Norio Murata, ed. Vol IV, pp.129-136. Kluwer Academic Publishers, Dordrecht, The Netherlands (1992).

3) Vierling, E., A. Sun. Developmental regulation of heat shock proteins in higher plants. NATO ASI Series. *Environmental Stress in Plants*. J. Cherry, ed. Vol. G19: 343-354. Springer-Verlag, Berlin. (1989). <https://link.springer.com/book/10.1007%2F978-3-642-73163-1>

2) Vierling, E. Characterization of chloroplast-localized heat shock proteins. In: *Plant Gene Systems and their Biology*, L. McIntosh, J.L. Key, eds. A.R. Liss, Inc., pp. 99-108 (1987).

1) Vierling, E., J.K. Roberts, R.T. Nagao, J.L. Key. A chloroplast heat shock protein has homology to cytoplasmic heat shock proteins. In: *Progress in Photosynthesis Research*. J. Biggins, ed. Vol IV: 143-145 (1987). [https://doi.org/10.1007/978-94-017-0519-6\\_31](https://doi.org/10.1007/978-94-017-0519-6_31)

## SCHOLARLY PRESENTATIONS

### Invited Seminars:

Zoecon Corporation, Palo Alto, CA - February 1986  
University of California, Davis, CA - May 1987  
Arizona State University, Tempe, AZ - October 1987  
Washington University, St. Louis, MO - January 1989  
Michigan State University, East Lansing, MI - October 1989  
University of Florida, Gainesville, FL - October 1989  
University of Arizona, Tucson, AZ - November 1989  
Akademie der Wissenschaften der DDR, Halle, East Germany - June 1990  
Universität Tübingen, Tübingen, West Germany - June 1990  
University of Missouri, Columbia, MO - November 1990  
University of California, Berkeley, CA - November 1990  
University of California, Los Angeles, CA - May 1991  
University of Illinois, Champaign, IL - September 1991  
Columbia College of Physicians and Surgeons, NY, NY - November 1991  
Carnegie Institute of Plant Biology, Stanford, CA - January 1992  
DuPont de Nemours & Co., Wilmington, DE - June 1993  
New Mexico State University, Las Cruces, NM - October 1994  
University of California, Davis, CA - September 1995  
University of Illinois, Champaign, IL - December 1995  
University of Arizona, Cancer Center - September 1996  
University of California, Riverside, CA - January 1997  
Colorado State University, Fort Collins, CO - May 1997  
National Taiwan University, Taipei, Taiwan - October 1997  
Academica Sinica, Taipei, Taiwan - October 1997  
Ehime University, Matsuyama, Japan - March 1998  
Kyoto University, Kyoto Japan - March 1998  
Saitama University, Urawa, Japan - March 1998  
Albert-Ludwigs Universität, Freiburg, Germany - December 1998  
University of Frankfurt, Frankfurt, Germany - December 1998  
University of Nebraska, Biotechnology Center, Lincoln, NE - August 1999  
University of South Dakota, Vermillion, SD - November 1999  
University of Nijmegen, Nijmegen, The Netherlands - September 2000  
Wageningen University, Wageningen, The Netherlands - October 2000  
Goethe Universität, Frankfurt, Germany - November 2000  
Max Planck Institute, Cologne, Germany - December 2000  
Birkbeck College, University of London - February 2001  
University of Utrecht, Utrecht, The Netherlands - March 2001  
Kiel University, Kiel, Germany - May 2001  
Institute of Biology, Seville, Spain - June 2001  
Michigan State University - October 2001  
University of British Columbia - September 2002  
University of Missouri, Columbia; Department of Biochemistry - December 2003  
Cornell University, Ithaca, NY - November 2004  
University of Arizona, EEB Department - February 2005  
Rice University, Houston, TX, Department of Biology - February 2005

University of Texas, Austin, TX, Department of Biochemistry - February 2005  
Peking University – October 2005  
China Agricultural University – October 2005  
Oberlin College - March 2006  
Wooster College of Ohio - March 2006  
University of Ohio, Wooster - March 2006  
CERES, Inc., Westlake CA – August 2006  
University of Arizona, AHCC “Frontiers in Biomedical Research – October 2006  
University of Arizona, Cancer Biology Program – March, 2007  
University of Arizona, Dept. Cell Biology & Anatomy – April 2007  
Purdue University – May 2007  
Monsanto Company, St. Louis, MO – June 2007  
Max Planck Institute for Molecular Plant Physiology, Potsdam, Germany – August, 2007  
Max Planck Institute for Plant Breeding Research, Köln, Germany – June 2008  
University of Heidelberg, Heidelberg, Germany – June 2008  
University of Massachusetts, Amherst – March 2010  
Olomouc University, Olomouc, Czech Republic – November 2011  
University of Toronto, Scarborough Campus, Canada – March 2012  
University of Toronto, Toronto, Canada – March 2012  
University of Pennsylvania, Philadelphia, PA - Host: Walter Englander – March 2013  
University of Massachusetts, Stockbridge School of Ag – Host: Om Parkash – Feb 2014  
University of Florida, Gainesville, FL – March 2014  
University of Maryland, College Park, MD – Host Jianhua Zhu – May 2014  
China Agricultural University, Beijing, China – Host Huiru Peng – Sept 2014  
Northwest University of Agriculture and Forestry, Yangling, China – Host Shengbao Xu – Sept 2014  
Instituto de Biotecnología, UNAM, Cuernavaca, Mexico – Host Alejandra Covarrubias – Oct 2015  
Rhode Island College, RI. “Transgenic Plants: From Basic Research to Agricultural Applications” – Oct 2016  
Northwest University of Agriculture and Forestry, Yangling, China – Nov 2017  
Lanzhou University, Lanzhou, China – Nov. 2017  
China Agricultural University, Beijing, China – Nov 2017  
Tianjin University, Tianjin, China – Nov 2017  
Shanghai Center for Plant Stress Biology, Chinese Academy of Sciences. “Controlling protein folding and reactive oxygen species: Keys to plant stress tolerance” – Nov 2017  
University of Wollongong, Wollongong Australia. “Capturing denaturing substrates with small HSPs” March 2018  
University of Western Australia, Perth Australia. “The mTERF18/SHOT1 protein modulates mitochondrial function to confer increased plant heat tolerance”. Apr 2018  
Australian National University, Canberra Australia.”What am I doing here, and What’s up with all these small HSPs anyway?” Apr 2018.  
Australian National University, Canberra Australia. “Controlling protein folding and reactive oxygen species: Keys to plant stress tolerance” Apr 2018.  
Technische Universität München, Garching, Germany. “A Diversity of sHSP Chaperones”. July 2019.  
University of Arizona, Tucson, AZ. “Making Connections: Mitochondria & Stress Tolerance”. Feb 2020.

### **Invited Symposium/Conference Presentations:**

UCLA Symposium: Plant Gene Systems and their Biology, Tamarron, CO - February 1987  
NATO Advanced Study Workshop: Biochemical and Physiological Mechanisms Associated with Environmental Stress Tolerance in Plants, Norwich, England - August 1987  
Conference on Molecular Mechanisms of Plant Stress: Hannover, West Germany - February 1988  
Gordon Conference: Plant Response to Temperature Stress. Oxnard, CA - January 1989  
Gordon Conference: Plant Molecular Biology. Speaker and Session Chair, NH - June 1989  
UCLA Symposium: Molecular Strategies for Crop Improvement, Keystone, CO "Hot Topics" short presentation (given by Dr. K. Helm, representing the lab) - April 1990  
American Society for Horticultural Science: Tucson, AZ - November 1990  
AAAS Regional meeting (Southwest/Rocky Mountain Division): Lubbock, TX - May 1991  
US-Taiwan Workshop in Plant Molecular Biology: St. Louis, MO - June 1991  
NSF Workshop: Plant Stress Biology, Tuskegee University, Tuskegee AL - September 1991  
IXth International Congress on Photosynthesis: Nagoya, Japan - August 1992  
Biotechnology for Crop Improvement: Caracas, Venezuela - November 1992  
Gordon Conference: Plant Response to Temperature Stress. Oxnard, CA - February 1993  
Mid-Atlantic Plant Molecular Biology Symposium: Univ. of Maryland, College Park, MD - July 1994  
ASCB Annual Cell Biology Meetings: Minisymposium on Molecular Chaperones. San Francisco, CA - December 1994  
Keystone Symposium: Plant Cell Biology, Speaker and Workshop Chair - January 1995  
Gordon Conference: Plant Response to Temperature Stress. Session Chair. Oxnard, CA - February 1995  
Society for Experimental Biology: Annual meeting in St. Andrew's, Scotland. Symposium Speaker - April 1995  
Cold Spring Harbor: Molecular Chaperones and Protein Folding - May 1996  
American Society of Plant Physiologists: National meeting, San Antonio, TX. Symposium talk and session chair - July 1996  
Advances in the Molecular Biology of Photosynthesis. NSF sponsored US-Japan Workshop. Grand Canyon, AZ - November 1996  
International Conference on Molecular Biology of Plants under Environmental Stress. Symposium speaker. Poznan, Poland - September 1997  
International Society for Plant Molecular Biology: International Congress, Singapore. Symposium speaker - September 1997  
Cold Spring Harbor: Molecular Chaperones and Protein Folding. Session chair and invited speaker. Talk given by Dr. Gary Lee from my lab - May 1998  
Gordon Conference: Plant Response to Temperature Stress. Session Chair and Speaker. Oxnard, CA - February 1999  
SFB Symposium, Tübingen, Germany: Mechanisms of Cell Behavior - October 1999  
Cold Spring Harbor: Molecular Chaperones and Protein Folding. Invited short talk. May 2000.  
International Symposium of the Leopoldina Academy: Progress in Plant Sciences, Halle, Germany - November 2000  
Molecular Chaperones: Meeting of Dutch Researchers, Nijmegen, The Netherlands - January 2001  
Dutch Society of Plant Physiologists: Lunteren, The Netherlands - March 2001  
First International Congress of Seed Stress Biology: Wageningen, The Netherlands - April 2001  
EU Conference "Molecular Chaperones". St. Feliu, Spain - May 2001  
Conference on Medical Importance of Stress Proteins. Grenoble, France - June 2001  
Annual Meeting of FEBs. Lisbon, Portugal - July 2001  
Cold Spring Harbor: Molecular Chaperones and Protein Folding. Invited short talk. May 2002  
FASEB Protein Folding Meeting. Vermont - August 2002

Gordon Conference: Plant Response to Temperature - Oxnard, CA; January 2003. Organizing Committee & Session Chair.

Indo-US Agricultural Biotechnology Conference: New Delhi, India, May 2003.

American Society for Research in Vision and Ophthalmology (ARVO). Speaker, Ft. Lauderdale, FL., May 2003.

14<sup>th</sup> International Arabidopsis Conference: June 2003; Speaker and session chair.

XII<sup>th</sup> International Congress on Genes, Gene Families and Isozymes: Berlin, Germany, July 2003.

Annual Meeting of American Society for Plant Biology: Symposium speaker, Honolulu, HI, Aug. 2003.

Keystone Conference: Plant Responses to Abiotic Stress. February 2004 Co- Organizer, Speaker and Session Chair.

Third International Conference on Biological Sciences - Tanta, Egypt, April 2004.

FASEB Conference: Protein Folding in the Cell. Vermont - August 2004.

III<sup>ce</sup> Cycle Romand Meeting: Protein Folding in Cell Biology and Disease, Villars, Switzerland - Sept 2004

14<sup>th</sup> Queenstown Molecular Biology Meeting: Queenstown, NZ, Nov. 2004.

Gordon Conference: Plant Response to Temperature - January 2005, Keynote Speaker and Vice Chair.

5<sup>th</sup> Symposium on Post-Transcriptional Mechanisms in Plant Gene Regulation: Austin TX. Invited Speaker, June 2005.

Plant Stress Symposium: Chonnam National University, Kwanju, Korea. One of five invited speakers. Sept 2005.

NAS Sackler Symposium: Washington, D.C. April 2006

Third Trinational Arabidopsis Conference: Tuebingen, Germany Sept. 2006.

First Shennong Center Symposium with Huazhong Agricultural University: Wuhan China, May 2007.

Gordon Conference: Stress Proteins in Growth, Development and Disease, August, 2007 Oxford, UK

3rd Cell Stress Society International Congress: Stress Responses in Biology and Medicine, August, 2007 Budapest, Hungary. Plenary Speaker.

Umea Plant Science Center, Umea, Sweden. Plant Abiotic Stress Symposium. August 2007.

POG: Plant Oxygen Group meeting: Ghent, Belgium. Invited talk from abstract. September, 2007

Richard and Elizabeth Hageman Distinguished Lecturer in Agricultural Biochemistry – Kansas State University – October 2007 <http://www.k-state.edu/bchem/Hageman.htm>

International Symposium: Biotechnology for Better Crops, Energy and Health – Taipei, Taiwan, May 2008

Adaptation Potential in Plants: Gregor Mendel Institute, Vienna Austria, March 2009.

Gordon Conference: Stress Proteins in Growth, Development and Disease, Andover, NH. July, 2009.

Keystone Conference: Plant Abiotic Stress Tolerance Mechanisms, Water and Global Agriculture, CO, Jan 2011.

Third EMBO Conference on "The Biology of Molecular Chaperones", Austria. May 2011.

5<sup>th</sup> International Congress on Stress Responses in Biology and Medicine: Quebec City, Canada. August, 2011

Perspectives on Modern Plant Physiology Symposium: Frankfurt Germany, August 2011.

Royal Society International Seminar Series: Combining approaches to conquer  $\alpha$ B-crystallin: a paradigm for the structural biology of heterogeneous and dynamic protein assemblies. Oxford, UK, October 2011.

10<sup>th</sup> Anniversary Symposium of The Gregor Mendel Plant Research Institute (GMI): Vienna, Austria, November 2011.

Tropical Vegetation and Rising Temperatures: Functional basis of ecological response. Invited Symposium presentation. Smithsonian Tropical Research Institute. Panama City, Republic of Panama. May 2012.

Molecular Chaperones and Stress Responses: Cold Spring Harbor, NY, Invited short talk. May 2012.  
International Symposium of the SFB594 -Molecular machines in proteins folding and translocation:  
Munich, Germany, July 2012. Unable to attend due to health reasons.  
10th International Congress on Plant Molecular Biology: Jeju, South Korea, Oct 2012  
SPOT-IN: EU Framework Program on Pollen thermotolerance and crop fertility. Keynote Lecture:  
Frankfurt, Germany, January 2013  
2013 International Symposium on Agricultural Biotechnology: Emerging topics in Plant Stress Biology.  
Academica Sinica, Taipei, Taiwan. May 2013.  
EMBO Conference: The Biology of Molecular Chaperones. Pula, Sardinia, Italy. May 2013.  
Plant Biology 2013. Minisymposium Chair and Speaker. Providence RI, July 2013.  
Plant Biology 2013. Women in Plant Biology, featured luncheon speaker. Providence R.I. July 2013.  
ARC Center of Excellence Plant Energy Biology Retreat. Partner investigator lecture. Canberra  
Australia, Sept 2014.  
Cell Stress & Chaperones International: The Small Heat Shock Protein World. Quebec City, Canada,  
Oct 2014  
SPOT-IN: EU Framework Program on Pollen Thermotolerance and Crop Fertility. Sorrento, Italy,  
March 2015  
Interdisciplinary Plant Group's (IPG) 32nd Annual Symposium. University of Missouri, Columbia, MO,  
May 2015  
Plant Center 30<sup>th</sup> Anniversary: Joe L Key Symposium. "The Heat Shock Response – 30+ years later!"  
Athens, GA. May 2016.  
6<sup>th</sup> Plant Nitric Oxide International Meeting. Selected from abstracts: "S-Nitrosoglutathione reductase:  
Role in plant fertility and regulation by NO". Granada, Spain. Sept 2016.  
The small HSP World: Second International Workshop of Cell Stress Society International (CSSI).  
"sHSP Interactions with Substrates" – Bertinoro, Italy. Oct 2016.  
13<sup>th</sup> International Conference on Reactive Oxygen and Nitrogen Species in Plants. "S-  
Nitrosoglutathione Reductase Regulation & Role in Fertilization". Kusadasi, Turkey. Sept 2017.  
5th International Conference Plant Abiotic Stress Tolerance. "Tolerance to extreme heat is linked to  
mitochondrial metabolism", Vienna Austria, July 2018.  
Gordon Research Conference: Chloroplasts and Mitochondria."Mitochondrial mTERF and ATAD3  
Proteins in Arabidopsis". Selected from Abstracts. Il-Ciocco, Italy, July 2018.  
Third International Workshop of Cell Stress Society International (CSSI). "sHSP Interactions with  
Substrates", Quebec City, Canada. Aug 2018.  
14th International Conference on Reactive Oxygen and Nitrogen Species in Plants. "Mitochondrial  
mTERF Proteins and Stress Tolerance". Munich, Germany, July 2019.  
Deutsche Forschung Gemeinschaft TRR175: Acclimation & Chloroplast Biology: from Genes to  
Systems. "Organelle Small Heat Shock Proteins", Irsee, Germany, August 2019.  
ASBMB Annual Meeting: Theme Session Speaker and Chair, Indianapolis, IN, 2020



## GRANTS AND CONTRACTS

### Active :

#### **National Science Foundation – IOS 1354960**

6/1/2014 -5/31/2020 \$800,000

“mTERF function in the control of plant respiration and stress tolerance”

#### **National Science Foundation – MCB 1817985**

8/01/18- 7/31/22 \$800,000

“Regulating Nitric Oxide Homeostasis and its Impact on Plant Growth and Reproduction”

#### **Alexander Von Humboldt Senior Research Award**

6/24/07- open € 50,000

Sabbatical research support

“Metabolism of Nitric Oxide – Impact on carbon and nitrogen metabolism and stress responses”

### Previous Awards: (since 1994)

### Federal:

#### **National Science Foundation - MCB 1517046**

7/15/15-7/14/2019 \$682,357

“Linking Reactive Nitrogen Metabolism and Redox Homeostasis in Plants”

#### **National Institutes of Health**

**RO1 GM42762** \$1,306,082 (direct plus indirect)

9/1/11-8/31/16

"Structure and function of the small heat shock proteins".

#### **DOE - Energy Biosciences Program**

8/1/11-7/31/12 \$186,109 (direct plus indirect)

Hsp100/ClpB Chaperone Function and Mechanism

#### **USDA-CSREES-NRI-001030 UMASS 2008-35318-31202**

09/1/08-08/31/13 \$400,000 total for all years (direct plus indirect)

“Function and regulation of a key enzyme in nitric oxide metabolism: S-nitrosoglutathione reductase”

#### **NSF DBI - 0820047**

03/01/09-02/28/13 \$429,700 (direct plus indirect to EV – subcontract still at U AZ)

Dan Gallie, UC Riverside, PI

“Arabidopsis 2010: Global analysis of translational regulation”

#### **NSF POWRE Award: MCB-9752978**

1997 \$4,500 a Merit Award

“A genetic approach to structure and function analysis of a new class of molecular chaperones”

#### **USDA NRICGP 96-351003232**

9/15/96 - 9/14/99 \$230,000 total for project period

"Class I small HSPs in Plant Development and Thermotolerance"

**USDA NRICGP 93-02143**

9/1/93 -8/31/96 \$190,000 total for project period

"Role of Class I Small HSPs in Development and Thermotolerance"

**USDA NRICGP 99-351007618**

9/15/99 - 9/14/02 \$200,000 total for project period

"Plant Thermotolerance: The role of small heat shock proteins and other factors"

**USDA-NRICGP 3510014857**

9/1/04-8/31/07 \$420,000 total costs

"Genes and gene networks controlling tolerance to high temperature"

**DOE - Basic Energy Biosciences DE-FG03-95ER20208**

9/1/95- 2/28/98 - \$150,000 total costs

"Role of Hsp100 proteins in plant stress tolerance"

**DOE - Energy Biosciences Program**

9/16/99-9/14/02 \$100,000/yr direct plus indirect

"Cytosolic HSP100 Proteins and Stress Tolerance in Plants"

**DOE - Energy Biosciences Program**

9/16/02-9/14/05 \$100,000/yr direct plus indirect

"Cytosolic HSP100 Proteins and Stress Tolerance in Plants"

**DOE - Energy Biosciences Program**

9/15/05-9/14/08 \$470,000 total for all years, direct plus indirect.

"Cytosolic HSP100 Proteins and Stress Tolerance in Plants"

**NIH R01 GM42762-01**

7/1/89-6/30/94 - \$770,175 (Total direct plus indirect costs)

"Expression and Function of Organelle Heat Shock Proteins"

**NIH R01 GM42762**

7/1/95-6/30/99 - \$775,000 (Total direct plus indirect costs)

"Structure and Function of Small Heat Shock Proteins"

**NIH RO1 GM42762**

7/1/00-6/30/05 ~\$800,000 (Total direct plus indirect costs)

"Structure and function of the small heat shock proteins"

**University of Arizona Hatch funds.**

1994 -1998 approx. \$15,000/yr (Direct costs)

"The Roles of Heat Shock Proteins in Plant Thermotolerance."

**USDA-Southwest Consortium for Plant Genetics and Water Resources**

Co PIs - J.J. Burke, USDA, Lubbock Texas

9/00-9/01 15% effort \$14,000 direct costs

"Identification of Arabidopsis mutants with altered thermotolerance"

**NSF POWRE Program**

8/1/00-7/31/01 \$75,000 direct plus indirect support (Sabbatical salary support)  
“QTL Mapping of heat tolerance traits in Arabidopsis”

**NSF: IBN-0213128**

10/1/02-9/30/06 \$120/yr direct plus indirect + REU and RET supplements.  
“Function of the small Hsps in stress tolerance, growth and development”

**NSF REU- DBI-0551115**

CoPi: Carol Bender

4/1/06-3/31/09 \$237,000

“REU Site: Research Experiences for Undergraduates in Molecular Biosciences”

**NIH - Fogarty Award** Collaboration with Dr. Laszlo Vigh, Szeged Hungary.

9/1/03 - 8/31/06 Funds, with the exception of some overhead, essentially all go to collaborator  
“Lipid interactions of small heat shock proteins”

**International:****Japanese Society for the Promotion of Science:**

Short-term Invitation Fellowship for Research In Japan.

Award 1997. Supported full cost of 10-day trip to Japanese Universities.

**Dutch National Science Foundation**

8/1/00-7/31/01 \$18,000 direct (Sabbatical living support)

“Genetics of stress tolerance in Arabidopsis”

**AMVIS – Czech-American Cooperation**

2011-2014 All research funds to Czech partner. Supported exchange of EV to Czech Republic, and  
Czech students to US.

PI: Marek Petrivalsky

“Plant GSNOR”

**State:****UMass President’s Fund for Science & Technology**

Co-PI: Susan Roberts, Chemical Engineering

7/1/2014 – 6/31/2016 \$150,000 (\$100,000 matching from UMass)

“Massachusetts BioFoundry: A Center for the Discovery and Synthesis of Bioreactive Natural Products”

**Private:****American Cancer Society Faculty Research Award (#FRA-420).**

1992 - 1997 - Direct costs 5 yrs. \$ 205,000.

"Roles of LMW HSPs in Eukaryotes".

**John Simon Guggenheim Memorial Fellowship**

8/1/00-7/31/01 \$34,000 direct

“Genes for heat tolerance in agriculture” (Sabbatical salary support)