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JOHN SHELBY SPERRY

Date and place of birth: December 8, 1957 - Normal, Illinois

CONTACT INFORMATION

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RESEARCH INTEREST

General: plant structure and function, environmental physiology, and water relations.
Specific: xylem function in relation to ecology, physiology, evolution, climate change.

DEGREES

B. S. Duke University, summa cum laude, 1980 - Botany

Ph.D. Harvard University, 1985 – Biology

Mentors: Martin Zimmermann and Phillip Barry Tomlinson

POSITIONS HELD

2001-	University of Utah. Professor, Department of Biology.
1999-2001	University of Utah. Associate Professor with tenure, Department of Biology
1997-98	Duke University. Assistant Professor, Department of Botany.
1994-97	University of Utah. Associate Professor with tenure, Department of Biology.
1989-94	University of Utah. Assistant Professor, Department of Biology.
1986-89	University of Vermont. Research Assistant Professor.
1985-86	University of Vermont. Post-doctoral fellowship under M. T. Tyree.

FUNDING

Past 10 years

NSF IOS: Integrating plant hydraulics with climate and hydrology to understand and predict responses to climate change. \$777,757 to U of U. June 1 2015 – May 30 2019. Paul Brooks (U of U) and Scott MacKay (SUNY Buffalo) Co-PI's.

University of Utah Distinguished Scholarly and Creative Research Award. 2011. \$10,000

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NSF Physiological and structural systems panel: Comparative analysis of xylem function. \$549,061 to U of U. March 2008 – February 2014.

NSF Theoretical Biology Program: Combining theories for plant architecture, allometry, and traits to develop the next generation of scaling theory. January 2008-December 2012. Co-PI's Brian Enquist (University of Arizona), Peter Reich (University of Minnesota), Van Savage (Harvard University). (\$31,246 to U of U)

NSF Ecological and Evolutionary Physiology Program: Collaborative Research; Comparative hydraulic architecture and transport efficiency. March 2006 – February 2009 (\$113,960 to U of U); Co-PI's F. Meinzer, B. Gartner of Oregon State University.

NSF Ecological and Evolutionary Physiology Program: Structure-function trade-offs in xylem. August 1 2004-July 31 2008 (\$429,114)

PUBLICATIONS

In review:

Anderegg WRL, Wolf A, Arango-Velez A, Choat B, Chmura DJ, Jansen S, Kolb T, Li S, Meinzer F, Pita P, de Dios VR, Sperry JS, Wolfe BT, Pacala S. Stomata are regulated to manage hydraulic damage: empirical evidence and global consequences. *Ecology Letters*.

Published or in press:

137. Love E, Sperry JS 2018. In situ embolism induction reveals vessel refilling in a natural aspen stand. *Tree Physiology* (In Press).

136. Adams H, Zeppel M, Anderegg WRL, Hartmann H, Tissue DT, Huxman TE, Hudson PJ, Franz TE, Sperry JS (and 51 others). 2017. A multi-species synthesis of physiological mechanisms in drought-induced tree mortality. *Nature Ecology and Evolution* DOI:10.1038/s41559-017-0248.

135. Venturas MD, Sperry JS, Hacke UG. 2017. Plant xylem hydraulics: what we understand, current research, and future challenges. *Journal of Integrative Plant Biology*. Invited Expert Review.

134. Sperry JS, Venturas MD, Anderegg WRL, Mencucinni M, Mackay DS, Wang Y, Love DM. 2016 Predicting stomatal responses to the environment from the optimization of photosynthetic gain and hydraulic cost. *Plant Cell and Environment*. doi: 10.1111/pce.12852 (Solicited article for special issue on water transport)

133. Smith DD, Sperry JS, Adler FR 2017. Convergence in leaf size vs. twig leaf area

scaling: Do plants optimize leaf area partitioning? *Annals of Botany* 119:447-456

132. Tai X, Mackay DS, Anderegg WRL, Sperry JS, Brooks PD. 2017. Plant hydraulics improves and topography mediates prediction of aspen mortality in southwestern US. *New Phytologist* 213:113-127

131. Wolfe B, Sperry JS, Kursar T 2016. Does leaf shedding protect stems from cavitation during seasonal droughts? A test of the hydraulic fuse hypothesis. *New Phytologist* 212:1007-1018

130. Sperry JS, Wang J, Wolfe B, Mackay DS, Anderegg WRL, McDowell NG, Pockman WT. 2016. Pragmatic hydraulic theory predicts stomatal responses to climatic water deficits. *New Phytologist* 212:577-589

129. Gleason SM, Westoby M, Jansen J, Choat B, Hacke UG, Pratt RB, Bhaskar R, Brodribb TJ, Bucci SJ, Cao K, Cochard H, Delzon S, Domec JC, Fan ZX, Feild TS, Jacobsen AL, Johnson DM, Lens F, Maherali H, Martinez-Vilalta J, Mayr S, McCulloh K, Mencuccini M, Mitchell PJ, Morris H, Nardini A, Pittermann J, Plavcova L, Schreiber SG, Sperry JS, Wright IJ, Zanne AE. 2015. Weak tradeoff between xylem safety and xylem-specific hydraulic efficiency across the world's woody plant species. *New Phytologist* 209:123-136.

128. MacKay SD, Roberts DE, Ewers BE, Sperry JS, McDowell NG, Pockman WT. 2015. Interdependence of chronic hydraulic dysfunction and canopy processes can improve integrated models of tree response to drought. *Water Resources Research*. DOI 10.1002/2015WR017244

127. Anderegg WRL, Flint A, Huang CH, Flint L, Berry JA, Davis F, Sperry JS, Field CB. 2015. Tree mortality predicted from drought-induced vascular damage. *Nature Geoscience*. 8: 367-371.

126. Sperry JS, Love DM. 2015. What plant hydraulics can tell us about responses to climate-change droughts. *Tansley Review*. *New Phytologist*. 207: 14-27

125. von Allmen EI, Sperry JS. 2015. Contrasting whole tree water use, hydraulics, and growth in a co-dominant diffuse-porous vs. ring-porous species pair. *Trees Structure and Function*. 29: 717-728.

124. Hacke UG, Jacobsen A, Venturas MD, MacKinnon ED, Sperry JS, Pratt RB. 2014. The standard centrifuge method accurately measures vulnerability curves in long vesseled olive stems. *New Phytologist*. 205:116-127

123. Smith DD, Sperry JS. 2014. Coordination between water transport capacity, biomass growth, metabolic scaling, and species stature in co-occurring shrub and tree species. *Plant Cell and Environment*. 37: 2679-2690

122. Smith DD, Sperry JS, Enquist BJ, Savage VM, McCulloh KA, Bentley LP. 2013. Deviation from symmetrically self-similar branching in trees predicts altered hydraulics, mechanics, light interception, and metabolic scaling. *New Phytologist*. 201: 217-229.
121. Holtta T, Sperry JS. 2013. Plant water transport and cavitation. In: *Transport and Reactivity of Solutions in Confined Hydrosystems* (Eds: L. Mercury, N. Tas, and M. Zilberbrand) NATO Science for Peace and Security Series C, Environmental security. Springer, Dordrecht. pp 173-181.
120. Bentley LP, Stegen JC, Savage VM, Smith DD, von Allmen EI, Sperry JS, Reich PB, Enquist BJ. 2013. An empirical assessment of tree branching networks and implications for plant allometric scaling models. *Ecology Letters* 16: 1069-1078.
119. McDowell N, Fisher R, Xu C, Domec JC, Holtta T, McKay S, Sperry J, Boutz A, Dickman L, Gehres N, Limousin JM, Macalady A, Martinez-Vilalta J, Mencuccini M, Plaut J, Ogee J, Pangle R, Rasse D, Ryan M, Sanna S, Waring R, Yepez E, Pockman W. 2013. Evaluating theories of drought-induced vegetation mortality using a multimodel-experiment framework. *New Phytologist*. 200:304-321
118. Lens F, Tixier A, Cochard H, Sperry JS, Jansen S, Herbette S. 2013. Embolism resistance as a key mechanism to understand adaptive plant strategies. *Current Opinion in Plant Biology* 16: 287-292
117. Lucas WJ, Groover A, Lichtenberger R, Furuta K, Yadav SR, Helariutta Y, He XQ, Fukuda H, Kang J, Brady SM, Patrick JW, Sperry J, Yoshida A., Lopez-Millan AF, Grusak MA, Kachroo P. 2013. The plant vascular system: evolution development and functions. *Journal of International Plant Biology* 55:294-388
116. Diaz-Espejo A, Buckley TN, Sperry JS, Cuevas MV, de Cires A, Elsayed-Farag S, Martin-Palomo MJ, Muriel JL, Perez-Martin A, Rodriguez-Dominguez CM, Rubio-Casal AE, Torres-Ruiz JM, Fernández JE 2012. Steps toward an improvement in process-based models of water use by fruit trees: a case study in olive. *Agricultural and Water Management* 114:37-49
115. Choat B, Jansen S, Brodribb TJ, Cochard H, Bhaskar R, Delzon S, Feild TS, Hacke, U.G., Gleason S, Jacobsen A, Lens F, Maherali H, Martinez-Vilalta J, Mayr S, Mencuccini M, Mitchell PJ, Nardini A, Pittermann J, Pratt RB, Sperry JS, Westoby M, Wright IJ, Zanne A. 2012. Global convergence in the vulnerability of forests to drought. *Nature*. 491: 752-755
114. Sperry JS, Smith DD, Savage VM, Enquist BJ, McCulloh KA, Reich PB, Bentley LP, von Allmen, EI. 2012. A species-level model for metabolic scaling of trees I: Exploring boundaries to scaling space within and across species. *Functional Ecology*. 26:1054-1064

113. von Allmen EI, Sperry JS, Smith DD, Savage VM, Reich PB, Enquist BJ, Bentley LP. 2012. A species-level model for metabolic scaling of trees II: Testing in a ring- and diffuse-porous species. *Functional Ecology*. 26: 1066-1076.
112. Plaut JA, Yopez EA, Hill J, Pangle R, Sperry JS, Pockman WT, McDowell NG. 2012. Hydraulic limits preceding mortality in a pinon-juniper woodland under experimental drought. *Plant Cell and Environment*. 35: 1601-1617
111. Torres-Ruiz JM, Sperry JS, Fernandez JE. 2012. Improving measurements of hydraulic conductivity by correcting error caused by passive water uptake. *Physiologia Plantarum*. 146:129-135
110. Christman MA, Sperry JS, Smith DD. 2012. Rare pits, large vessels, and extreme vulnerability to cavitation in a ring-porous tree species. *New Phytologist*. 193: 713-720
109. Sperry JS, Christman MA, Torres-Ruiz JM, Taneda H, Smith DD. 2011. Vulnerability curves by centrifugation: is there an open vessel artifact, and are "r" shaped curves necessarily invalid? *Plant Cell and Environment*. 35: 601-610.
108. Anderegg WRL, Berry JA, Smith DD, Sperry JS, Anderegg LDL, Field CB. 2011. The roles of hydraulic and carbon stress in a widespread climate-induced forest die-off. *PNAS*. doi/10.1073/pnas.1107891109
107. Sperry JS. 2011. Hydraulics of vascular water transport. In: Wojtaszek (ed) *Mechanical integration of plant cells and plants*. Springer, Berlin, pp 303-327
106. McCulloh KA, Meinzer FC, Sperry JS, Lachenbruch B, Voelker SL, Woodruff DR, Domec, JC. 2011. Comparative hydraulic architecture of tropical tree species representing a range of successional status and wood density. *Oecologia*. 167:27-37
105. Savage VM, Bentley LP, Enquist BJ, Sperry JS, Smith DD, Reich PB, vonAllmen, EI. 2010. Hydraulic trade-offs and space filling enable predictions of vascular structure and function in plants. *PNAS*. 107:22722-22727
104. Plavcova L, Hacke UG, Sperry JS. 2011. Linking irradiance-induced changes in pit membrane ultrastructure with xylem vulnerability to cavitation. *Plant Cell and Environment* 34:501-513.
103. Bush SE, Hultine KR, Sperry JS, Ehleringer JR. 2010. Calibration of thermal dissipation sap flow probes for ring- and diffuse-porous trees. *Tree Physiology*. 30:1545-1554.
102. Lens F, Sperry JS, Christman MA, Choat B, Rabaey D, Jansen S. 2010. Testing hypotheses that link wood anatomy to cavitation resistance and hydraulic conductivity

in the genus *Acer*. *New Phytologist*. 190: 709-723 (Winner of the Tansley Medal).

101. Rosenthal D, Sperry JS, Donovan L, Stiller, V. 2010. Contrasting drought strategies in two desert annuals of hybrid origin. *Journal of Experimental Botany*. 61:2769-2778.

100. Mayr, S, Sperry JS 2010. Freeze-thaw induced embolism in *Pinus contorta*: centrifuge experiments validate the "thaw-expansion hypothesis" but conflict with ultrasonic data. *New Phytologist*. 185:1016-1024.

99. Christman, MA, Sperry JS 2010. Single vessel flow measurements indicate scalariform perforation plates confer higher flow resistance than previously estimated. *Plant Cell and Environment* 33:431-443.

98. McCulloh KA, Sperry JS, Lachenbruch B, Meinzer FC, Reich PB, Voelker S. 2010 Moving water well: comparing hydraulic efficiency in twigs and trunks of coniferous, ring-porous, and diffuse-porous saplings from temperate and tropical forests. *New Phytologist*. 186: 439-450.

97. McCulloh KA, Sperry JS, Meinzer FC, Lachenbruch B, Atala C. 2009. Murray's Law, the Yarrum Optimum, and the hydraulic architecture of compound leaves. *New Phytologist*. 184: 234-244

96. Li Y, Sperry JS. 2009. Hydraulic conductance and vulnerability to cavitation in corn (*Zea mays*) genotypes of differing drought resistance. *Environmental and Experimental Botany*. 66: 341-346

95. Christman MA, Sperry JS, Adler FR. 2009. Testing the "rare pit" hypothesis in three species of *Acer*. *New Phytologist*: 182:664-674.

94. Taneda H., Sperry JS. 2008. A case study of water transport in co-occurring ring- vs. diffuse-porous trees: contrasts in water status, conducting capacity, cavitation, and vessel refilling. *Tree Physiology* 28:1641-1652.

93. McDowell N, Pockman WT, Allen CD, Breshears DD, Cobb N, Kolb T, Plaut J, Sperry JS, West A, Williams DG, Yezpe EA. Tansley Review. 2008. Mechanisms of plant survival and mortality during drought. Why do some plants survive while others succumb to drought? *New Phytologist* 178:719-739

92. Sperry JS, Meinzer FC, McCulloh KA. 2008. Safety and efficiency conflicts in hydraulic architecture: scaling from tissues to trees. *Plant Cell and Environment* 31:632-645.

91. Bush SE, Pataki DE, Hultine KR, West AG, Sperry JS, Ehleringer JR. 2008. Wood anatomy constrains stomatal responses to atmospheric vapor pressure deficit in irrigated,

urban trees. *Oecologia*. 156: 13-20.

90. Li Y, Sperry JS, Taneda H, Bush SE, Hacke UG. 2008. Evaluation of centrifugal methods for measuring xylem cavitation in conifers, diffuse- and ring-porous angiosperms. *New Phytologist*. 177:558-568.

89. West AG, Hultine KR, Sperry JS, Bush SE, Ehleringer JR. 2008. Interannual and seasonal variations in transpiration in a piñon-juniper woodland. *Ecological Applications*. 18: 911-927

88. Hacke U.G., Sperry J.S., Feild T.S., Sano Y., Sikkema E.H., Pittermann J. 2007. Water transport in vesselless angiosperms: conducting efficiency and cavitation safety. *International Journal of Plant Science*. 168: 1113-1126

87. Sperry J.S., Hacke U.G., Feild T.S., Sano Y., Sikkema E.H. 2007. Hydraulic consequences of vessel evolution in angiosperms. *International Journal of Plant Science*. 168: 1127-1139.

86. Pratt R., Jacobsen A., Sperry J.S., Davis S.D., Ewers F.W. 2007. Life history type coupled to water stress tolerance in nine Rhamnaceae species of the California chaparral. *Ecology*. 77: 239-253.

85. Sperry J.S., Hacke U.G., Pittermann J. 2006. Size and function in conifer tracheids and angiosperm vessels. *American Journal of Botany*. 93: 1490-1500.

84. Pittermann J., Sperry J.S., Wheeler J.K., Hacke U.G., Sikkema E.H. 2006. Mechanical reinforcement of tracheids compromises the hydraulic efficiency of conifer xylem. *Plant Cell and Environment*. 29: 1618-1628.

83. Pittermann J., Sperry JS, Hacke UG, Wheeler JK, Sikkema E.H. 2006. Inter-tracheid pitting and the hydraulic efficiency of conifer wood: the role of tracheid allometry and cavitation protection. *American Journal of Botany*. 93: 1105-1113

82. Pittermann J., Sperry JS, Hacke UG, Wheeler JK, Sikkema EH. 2005. Torus-margo pits help conifers compete with angiosperms. *Science* 310:1924

81. Hacke UG, Sperry JS, Wheeler JK, Castro L. 2006. Scaling of angiosperm xylem structure with safety and efficiency. *Tree Physiology*. 26: 689-701

80. Pittermann J., Sperry JS. 2006. Analysis of freeze-thaw embolism in conifers: the interaction between cavitation pressure and tracheid size. *Plant Physiology* 140: 374-382

79. Stiller V., Sperry JS, Lafitte, R. 2005. Embolized conduits of rice (*Oryza sativa* L.) refill despite negative xylem pressure. *American Journal of Botany*. 92: 1970-1974

78. Addington RN, Donovan LA, Mitchell RJ, Vose JM, Pecot SD, Jack SB, Hacke UG, Sperry JS, Oren R. 2006. Adjustments in hydraulic architecture of *Pinus palustris* maintain stomatal conductance in xeric and mesic habitats. *Plant Cell and Environment*: 29:535-545.
77. Hultine KR, Koepke DF, Pockman WT, Fravolini A, Sperry JS, Williams DG. 2006. Influence of soil texture on hydraulic properties and water relations of a dominant warm-desert phreatophyte. *Tree Physiology* 26: 313-323.
76. Wheeler JK, Sperry JS, Hacke UG, Huang, N. 2005 Inter-vessel pitting and cavitation in woody Rosaceae and other vesseled plants: a basis for a safety vs. efficiency trade-off in xylem transport. *Plant Cell and Environment*. 28: 800-812.
75. Sperry JS, Hacke UG, Wheeler JK. 2005. Comparative analysis of end wall resistance in xylem conduits. *Plant, Cell and Environment*. 28: 456-465.
74. McCulloh KA, Sperry JS. 2005. The evaluation of Murray's law in *Psilotum nudum* (Psilotaceae), an analogue of ancestral vascular plants. *American Journal of Botany* 92: 985-989
73. McCulloh KA, Sperry JS. 2005. Patterns in hydraulic architecture and their implications for transport efficiency. *Tree Physiology* 25:257-267.
72. McCulloh KA, Sperry JS. 2006. Murray's law and the vascular architecture of plants. *In: Ecology and Biomechanics: a Mechanical Approach to the Ecology of Animals and Plants* (A. Herrel, T Speck, N. Rowe eds.) CRC Press. pp. 85-100.
71. Hacke UG, Sperry JS, Pittermann J. 2005. Efficiency vs. safety trade-offs for water conduction in angiosperm vessels vs. gymnosperm tracheids. *In: Holbrook N.M., Zwieniecki M., eds., Vascular Transport in Plants*. Elsevier Inc. pp. 333-353.
70. Hacke UG, Sperry JS. 2005. Water transport in plants. *In: Molecular Plant Physiology* (ed. R. Sharma). Haworth Press, New York.
69. McCulloh KA, Sperry JS, Adler FR. 2004. Murray's law and the hydraulic vs. mechanic functioning of wood. *Functional Ecology*. 18:931-938
68. Sperry JS, Hacke UG. 2004. Analysis of circular bordered pit function I. Angiosperm vessels with homogenous pit membranes. *American Journal of Botany*. 91:369-385
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65. Pittermann J., Sperry J.S. 2003. Tracheid diameter determines the extent of freeze-thaw induced cavitation in conifers. *Tree Physiology.* 23: 907-914.
64. McCulloh K.A., Sperry J.S., Adler F. R. 2003. Water transport in plants obeys Murray's law. *Nature.* 421:939-942.
63. Sperry J.S. 2003. Evolution of water transport and xylem structure. *International Journal of Plant Science.* 164: S115-S127.
62. Sperry J.S., Stiller V., Hacke U.G. 2003. Xylem hydraulics and the soil-plant-atmosphere continuum: opportunities and unresolved issues. *Agronomy Journal.* 95: 1362-1370.
61. Hacke U.G., Sperry J.S. 2003. Limits to xylem refilling under negative pressure in *Laurus nobilis* and *Acer negundo*. *Plant Cell and Environment.* 26:303-311.
60. Hacke U.G., V. Stiller, J.S. Sperry 2003. Cavitation fatigue - the weakening of cavitation resistance of xylem and its reversibility. *In: Advances in Plant Physiology*, Vol. 6 (ed. A. Hemantaranjan). Scientific Publishers (India), Jodhpur, pp. 225-234.
59. Sperry J.S., Hacke U.G. 2002. Desert shrub water relations with respect to soil characteristics and plant functional type. *Functional Ecology.* 16:367-378.
58. Stiller V., Sperry J.S. 2002. Cavitation fatigue and its reversal in sunflower. *Journal of Experimental Botany.* 53:1155-1161.
57. Davis S.D., Ewers F.W., Portwood K.A., Sperry J.S., Crocker M.C., Adams G.C. 2002. Shoot dieback during prolonged drought in *Ceanothus* chaparral of California: a possible case of hydraulic failure. *American Journal of Botany.* 89:820-828.
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55. Sperry J.S., Stiller V., Hacke U.G. 2002. Soil water uptake and water transport through root systems. *In: Waisel Y., Eshel A. eds. Plant Roots: The Hidden Half.* Marcel Dekker, New York. pp. 663-681.
54. Hacke U.G., Sperry J.S. 2001. Functional and ecological xylem anatomy. *Perspectives in Plant Ecology, Evolution, and Systematics.* 4:97-115.

53. Hacke U.G., Sperry J.S., Pockman W.T., Davis S.D., McCulloh K.A. 2001. Trends in wood density and structure are linked to prevention of xylem implosion by negative pressure. *Oecologia*. 126:457-461
52. Hacke U.G., Stiller V., Sperry J.S., Pittermann J., McCulloh K.A. 2001. Cavitation fatigue: embolism and refilling cycles can weaken cavitation resistance of xylem. *Plant Physiology*. 125: 779-786.
51. Oren R., Sperry J.S., Ewers B.E., Pataki D.E., Phillips N., Megonigal J.P. 2001. Sensitivity of mean canopy stomatal conductance to vapor pressure deficit in a flooded *Taxodium distichum* L. Forest: hydraulic and non-hydraulic effects. *Oecologia*. 126:21-29.
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49. Sperry J.S., Robson D.G. 2001. Xylem cavitation and freezing in conifers. In: *Conifer Cold Hardiness*, eds. S. Colombo and F. Bigras. Kluwer Academic Publishers, Dordrecht. pp.121-136.
48. Jackson R.B., Sperry J.S., and Dawson T.E. 2000. Root water uptake and transport: scaling physiological processes for global predictions. *Trends in Plant Science*. 5:482-488.
47. Ewers B.E., Oren R., and Sperry J.S. 2000. Influence of nutrient *versus* water supply on hydraulic architecture and water balance in *Pinus taeda*. *Plant Cell and Environment*. 23:1055-1066
46. Hacke U.G., Sperry J.S., Ewers, B.E., Ellsworth, D.S., Schafer, K.V.R., Oren, R. 2000. Influence of soil porosity on water use in *Pinus taeda*. *Oecologia*. 124:495-505.
45. Hacke U.G., Sperry J.S., Pittermann, J.P. 2000. Drought experience and cavitation resistance in six desert shrubs of the Great Basin, Utah. *Basic and Applied Ecology*. 1:31-41.
44. Pockman W.T., Sperry J.S. 2000. Vulnerability to cavitation and the distribution of Sonoran Desert vegetation. *American Journal of Botany*. 87:1287-1299
43. Comstock J.P., Sperry J.S. Tansley Review No. 119. 2000. Some theoretical considerations of optimal conduit length for water transport in plants. *New Phytologist*. 148:195-218.
42. Sperry J.S. Hydraulic constraints on plant gas exchange. 2000. *Agricultural and*

Forest Meteorology. 101:13-23.

41. Oren R., Sperry J.S., Katul C.G., Pataki D.E., Ewers B.E., Phillips N., Schäfer, KVR. 1999. Survey and synthesis of intra- and interspecific variation in stomatal sensitivity to vapour pressure deficit. *Plant Cell and Environment*. 22:1515-1526.

40. Stiller V., Sperry J.S. 1999. Canny's compensating theory fails a test. *American Journal of Botany*. 86:1082-1086.

39. Kolb K.J., Sperry J.S. 1999. Transport constraints on water use by the Great Basin shrub, *Artemisia tridentata*. *Plant Cell and Environment*. 22: 925-935.

38. Davis S.D., Sperry J.S., Hacke U.G. 1999. The relationship between xylem conduit diameter and cavitation caused by freeze-thaw events. *American Journal of Botany*. 86:1367-1372.

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35. Linton M.J., Sperry J.S., Williams D.G. 1998. Limits to water transport in *Juniperus osteosperma* and *Pinus edulis*: implications for drought tolerance and regulation of transpiration. *Functional Ecology*. 12:906-911.

34. Alder N.N., Pockman W.T., Sperry J.S., Nuismer, S. 1997. Use of centrifugal force in the study of xylem cavitation. *Journal of Experimental Botany*, 48:665-674

33. Pockman W.T., Sperry, J.S. 1997. Freezing-induced xylem cavitation and the northern limit of *Larrea tridentata*. *Oecologia*. 109:19-27

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30. Blake, T.J., Sperry, J.S., Tschaplinski T., S. Wang. 1996. Water relations. *In*: Stettler R.F., Bradshaw H.D., Heilman P.E., Hinckley T.M, eds., *Biology of Populus and its implications for management and conservation*. Part II, Chapter 16. NRC Research Press,

National Research Council of Canada, Ottawa. Pp. 401-442.

29. Kolb, K.J., Sperry, J.S., Lamont, B. 1996 A method for measuring xylem embolism in root and shoot systems. *Journal of Experimental Botany*. 47:1805-1810

28. Alder, N.N., Sperry, J.S., Pockman, W.T. 1996. Root and stem xylem cavitation, stomatal conductance, and leaf turgor in *Acer grandidentatum* across a soil moisture gradient. *Oecologia* 105:293-301.

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26. Pockman, W.T., Sperry J.S., O'Leary J.W. 1995. Evidence for sustained and significant negative pressure in xylem. *Nature*, 378:715-716.

25. Saliendra, N.Z., Sperry, J.S., Comstock, J.P. 1995. Influence of leaf water status on stomatal responses to hydraulic conductance, atmospheric drought, and soil drought in *Betula occidentalis*. *Planta*. 196:357-366.

24. Sperry, J.S. 1995. Limitations of water transport and their consequences. *In: Gartner, B. ed., Plant Stems: Physiology and Functional Morphology*. Physiological Ecology Series, Academic Press. Pp. 105-120.

23. Pallardy, S.G., Cermak, J., Ewers, F.W., Kaufmann, M.R., Parker, B., Sperry, J.S. 1995. Water transport dynamics in trees and stands. *In: Hinckley, T., Smith WK eds., Physiological Ecology of Coniferous Forests: Past and Future*. Physiological Ecology Series, Academic Press.

22. Sperry, J.S., Saliendra, N.Z. 1994. Intra- and inter-plant variation in xylem cavitation in *Betula occidentalis* *Plant Cell and Environment*. 17:1233-1241.

21. Sperry, J.S., Nichols, K.L., Sullivan, J.E.M., Eastlack, S.E. 1994. Xylem embolism in ring-porous, diffuse-porous, and coniferous trees of Northern Utah and Interior Alaska. *Ecology* 75:1736-1752.

20. Sperry, J.S., Alder, N.N., Eastlack, S.E. 1993. The effect of reduced hydraulic conductance on stomatal conductance and xylem cavitation. *Journal of Experimental Botany* 44:1075-1082

19. Sperry, J.S., W.P. Pockman. 1993. Limitation of transpiration by hydraulic conductance and xylem cavitation in *Betula occidentalis*. *Plant Cell Environ*. 16: 279-288.

18. Sperry, J.S. 1993. Winter embolism and spring recovery in *Betula cordifolia*, *Fagus*

grandifolia, *Abies balsamifera*, and *Picea rubens*. pp. 86-98 In: Water Transport in Plants Under Climatic Stress. Cambridge University Press, Cambridge, UK.

17. Sperry, J.S., J.E.M. Sullivan. 1992. Xylem embolism in response to freeze-thaw cycles and water stress in ring-porous, diffuse-porous, and conifer species. *Plant Physiology*. 100:605-613.

16. Sperry, J.S., A. Perry, J.E.M. Sullivan. 1991. Pit membrane degradation and air-embolism formation in aging xylem vessels of *Populus tremuloides*. *Journal of Experimental Botany*. 42:1399-1406.

15. Sperry, J.S., M.T. Tyree. 1990. Water-stress-induced xylem embolism in three species of conifers. *Plant Cell and Environment*. 13:427-436.

14. Tyree, M.T., J.S. Sperry. 1989. Vulnerability of xylem to cavitation and embolism. *Annual Review of Plant Physiology and Molecular Biology*. 40:19-38.

13. Sperry, J.S., M.T. Tyree. 1988. Mechanism of water-stress induced xylem embolism. *Plant Physiology*. 88:581-587.

12. Tyree, M.T., J.S. Sperry. 1988. Do woody plants operate near the point of catastrophic xylem dysfunction caused by dynamic water stress? Answers from a model. *Plant Physiology*. 88:574-580.

11. Sperry, J.S., M.T. Tyree, J.R. Donnelly. 1988. Vulnerability of xylem to embolism in a mangrove vs. an inland species of Rhizophoraceae. *Physiologia Plantarum*. 74:276-283.

10. Tyree, M.T., J.S. Sperry. 1989. Characterization and propagation of acoustic emission signals in woody plants: towards an improved acoustic emission counter. *Plant Cell and Environment*. 12:371-382.

9. Sperry, J.S., J.R. Donnelly, M.T. Tyree. 1988. Seasonal occurrence of xylem embolism in sugar maple (*Acer saccharum*). *American Journal of Botany*. 75:1212-1218.

8. Sperry, J.S., J.R. Donnelly, M.T. Tyree. 1988. A method for measuring hydraulic conductivity and embolism in xylem. *Plant Cell and Environment*. 11:35-40.

7. Sperry, J.S., N.M. Holbrook, M.H. Zimmermann, and M.T. Tyree. 1987. Spring filling of xylem vessels in wild grapevine. *Plant Physiology*. 83:414-417.

6. Sperry, J.S. 1986. Relationship of xylem embolism to xylem pressure potential, stomatal closure, and shoot morphology in the palm *Rhapis excelsa*. *Plant Physiology*. 80:110-116.

5. Sperry, J.S. 1985. Xylem embolism in the palm *Rhapis excelsa*. IAWA Bull. N.S. 6:283-292.
4. Sperry, J.S. 1983. Observations on the structure and function of hydathodes in *Blechnum lehmanii*. American Fern Journal. 73:65-72.
3. Zimmermann, M.H., J.S. Sperry. 1983. Anatomy of the palm *Rhapis excelsa*. IX. Xylem structure of the leaf insertion. Journal of the Arnold Arboretum. 64:599-609.
2. Zimmermann, M.H., K.F. McCue, J.S. Sperry. 1982. Anatomy of the palm *Rhapis excelsa*. VIII. Vessel network and vessel-length distribution in the stem. Journal of the Arnold Arboretum. 63:83-95.
1. Sperry, J.S. 1982. Observations of reaction fibers in leaves of dicotyledons. Journal of the Arnold Arboretum. 63:173-185.

BOOK REVIEWS AND MISCELLANEOUS PUBLICATIONS:

Sperry, JS 2013. Cutting edge research, or cutting edge artifact? An overdue control experiment complicates the xylem refilling story. Solicited commentary. Plant Cell Environment. 36: 1916-1918. (Solicited Commentary)

Angeles GB, Bond B, Boyer JS, Brodribb T, Brooks JR, Burns MJ, Cavender-Bares J, Clearwater M, Cochard H, Comstock J, Davis SD, Domec JC, Donovan L, Ewers R, Gartner B, Hacke UG, Hinckley T, Holbrook HM, Jones HG, Kavanagh K, Law B, Lopez-Portillo J, Lovisolo C, Martin T, Martinez-Vilalta J, Mayr S, Meinzer FC, Melcher P, Mencuccini M, Mulkey S, Nardinin A, Neufeld HW, Passioura J, Pockman WT, Pratt RB, Rambal S, Richter H, Sack L, Salleo S, Schubert A, Schulte P, Sparks JP, Sperry JS, Teskey R, Tyree MT. 2004. Letter: the Cohesion-Tension Theory. New Phytologist 163:507-517.

Sperry JS. 2004. An evolutionary perspective on the coordination of stomatal and xylem functioning. (Solicited Commentary). New Phytologist 162:568-570.

Donovan, L. A., J.S. Sperry. 2000. Scaling the soil-plant-atmosphere continuum: from physics to ecosystems. (Symposium Summary) Trends in Plant Science.

Sperry, JS. 1991. Review of: Physiology of Trees. A.S. Raghavendra, ed. John Wiley & Sons, Somerset NJ. in Plant Science Bulletin.

Sperry, JS. 1994. Review of: Water Relations of Plants and Soils. P.J. Kramer and J.S. Boyer. Academic Press, San Diego. in Bioscience.

Sperry, JS. 1995. Review of: Growth Control in Woody Plants. T.T.Kozlowski and S.

revised January 2018

Pallardy. Academic Press. in Quarterly Review of Biology.

INVITED SPEAKING (since 1995):

December 2017. American Geophysical Union Symposium, New Orleans LA.
June 1, 2017 Pepperdine University REU seminar speaker, Malibu CA
December 16, 2016 American Geophysical Union Symposium, San Francisco CA
June 26, 2016. Session leader, Gordon Research Conference on Plant Hydraulics, ME
October 26, 2015. DOE workshop on tropical tree mortality, Sante Fe NM
October 7, 2015. Mathematical Biology Seminar, University of Utah
September 22, 2015. Wyoming Native Plants Society, Jackson WY (outreach)
August 2015. ESA meeting, symposium on drought-induced tree mortality.
May 2015. NSF workshop on plant hydraulics, Reston VA.
March 2015. University of Montana, Missoula
September 2014. University of Ulm, Germany. Workshop on plant hydraulics methods.
June 10, 2013. Conference on modeling plant hydraulics. Bordeaux, France.
July 25, 2012. Gordon Research Conference on Metabolic Ecology and Global Change.
May 7, 2012. NATO conference on alternative water resources, keynote speaker, Israel.
November 2, 2011. New Phytologist Tree Mortality workshop, Santa Fe NM
April 18, 2011. Ecology and Evolution Department, University of Arizona.
April 13, 2011. Ecology and Evolution Department, UCLA. Two seminars.
December 9, 2010. Biology Department, BYU.
September 28, 2010. Modeling of plant development, MBI, Columbus, OH
May 11, 2010. CSIC, Sevilla Spain
June 12, 2009. Pepperdine University REU program speaker.
April 16, 2009. University of California, Santa Cruz
October 22, 23, 2008. Ecology Center Seminar Series, Utah State University. Two seminars: one for general public, the other for departments.
September 18, 2008. Wageningen University, The Netherlands
September 4, 2008. Keynote speaker, 8th International Paleobotany Congress, Bonn, Germany.
May 14 2007. Minisymposium on advances in plant vascular biology. National Chung Hsing University, Taichung, Taiwan
May 7 2007. International plant vascular biology conference, Taipei, Taiwan.
March 22 2007. National Evolutionary Synthesis Center, symposium on evolutionary and ecological wood anatomy. Durham NC.
November 8, 2006. Stanford University/Carnegie Global Ecology Institute.
October 12, 2006. ASPB transpiration symposium, Snowbird, Utah
September 1, 2006. Keynote speaker, 5th International Plant Biomechanics Conference, Stockholm, Sweden.
December 2, 2005, Pacific Region Wood Anatomy Conference, Kyoto Japan
September 2005, Vascular design working group, Sydney Australia
July 2005, International Botanical Congress, Vienna Austria
May 2005, Pepperdine University SURB program speaker

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April 2005, University of Minnesota
October 21, 2004, Harvard University
October 24, 2004, Wake Forest University, North Carolina
April 21, 2004, Graduate student invited speaker, Northern Arizona University
March 30, 2004, symposium speaker at Society of Experimental Biology meeting,
Edinburgh Scotland
November 13, 2003. University of New Mexico
July 25, 2003, Keynote speaker at 4th international plant biomechanics conference.
Michigan State University, East Lansing.
April 4, 2003, University of California, Davis
October 10, 2002, International workshop on transport processes, Harvard University
June 27, 2002, International symposium on canopy biology, Cairns, Australia
March 25, 2002, Pepperdine University
October 23, 2001, G. Campbell Symposium, American Society of Agronomists meeting,
Charlotte, NC
October 16, 2001, Boyce Thompson Institute, Ithaca NY.
December 14, 2000, Agrophysics 2000 workshop, Havana Cuba
October 25, 2000, University of Utah, Department of Mathematics.
August 7, 2000, Ecological Society of America Symposium (co-organizer).
March 9, 2000, Brigham Young University, Provo UT
February 15, 2000, Symposium speaker at Range Science Meetings, Boise ID
September 1999, GTCE meeting on modeling water flux in ecosystems, Paris, France
September 1999, Second international symposium on dynamics of physiological
processes in woody roots, Nancy, France.
June 1999, USDA/Forest service meeting on process models for southern pine forests,
Asheville, NC
April 1999, University of Washington, Seattle WA.
January 1999, University of Florida, Gainesville FL
January 1999, University of North Carolina, Greensboro
November 1998, Forest Research Center, Tsukuba, Japan
November 1998, Kansai Research Center, Kyoto, Japan
October 1998, Keynote speaker, international workshop on functional and structural tree
models, Clermont-Ferrand, France.
June 1998, Pepperdine University, Malibu CA
April 1998, University of South Florida, Tampa.
March 1998, Duke University Ecology series
February 1998, Duke University Zoology Department series.
January 1998. International symposium on mechanics of plants and animals. Santa
Barbara, CA
November 1997. Appalachian State, Boone, North Carolina
October 1997. University of Georgia, Palfrey Symposium Speaker
April 1997. Michigan State University, East Lansing Michigan.
November 1996. Monteith Symposium, American Society of Agronomists meeting,
Indianapolis, IN

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April 15, 1996, Duke University, Durham, North Carolina

December 13, 1995, Palm Symposium, Italian Botanical Society meeting, Palermo, Italy

ADVISORY AND COMMITTEE SERVICES (non-University, last 10 years):

Reviewer of articles for: *Agronomy Journal*; *American Journal of Botany*; *Annals of Botany*; *Annals of Forest Science*; *Arctic and Alpine Research*; *Australian Journal of Plant Physiology*; *Biology Letters*; *Botanical Journal of the Linnean Society*; *Canadian Journal of Botany*; *Canadian Journal of Forest Research*; *Crop Science*; *Ecology*; *Ecology Letters*; *Environmental and Experimental Botany*; *Forest Science*; *Functional Ecology*; *Geobiology*; *Global Change Biology*; *Journal of Experimental Botany*; *Journal of Theoretical Biology*; *Journal of the Torrey Botanical Society*; *Ideas in Ecology and Evolution*; *International Journal of Plant Science*; *International Association of Wood Anatomists Journal*; *Journal of Tropical Ecology*; *Molecular Plant Pathology*; *Nature*; *Nature Physics*; *Nature Plants*; *Nature Climate Change*; *New Phytologist*; *Oecologia*; *Paleobiology*; *Physiologia Plantarum*; *Physics Today*; *Plant, Cell and Environment*; *Plant Physiology*; *PNAS*; *Plant Science*; *Science*; *Tree Physiology*; *Trees: Structure and Function*; *Trends in Plant Science*.

Editorial or Advisory Boards:

New Phytologist. March 2016-present

Journal of Experimental Botany. January 1, 1997—present.

Tree Physiology. December 2000 – present.

Plant Cell and Environment 2001-2003

International Association of Wood Anatomists Journal. Associate editor, 2002-2016

Journal of Wood Science, 2009-present

Ad-hoc reviewer of proposals for NSF; USDA competitive grants program; DOE competitive grants program; various foreign/international grant programs.

Panel member: National Science Foundation; *Ecological and Evolutionary Physiology*, April, 2000. National Science Foundation; *Population Biology/Physiological Ecology Division*; April, 1991. National Science Foundation Presidential Young Investigator awards; November, 1988.

Advisory board: National Science Foundation Genomics Program Grant, J.C. Comstock, PI.

Co-organizer (with Anita Roth-Nebelsick) of plant architecture symposium for the International Botanical Congress, July 17-23 2005, Vienna, Austria.

ADVISORY AND COMMITTEE SERVICES (University, last 10 years):

University committees:

Rio Mesa Center Advisory (2008-present)
Academic Senate (2000-2003; 2014-2017)
Academic Senate Executive Committee (2015-16)
College of Science RPT Committee (2001-2004; CHAIR '02)
University RPT Standards Committee (2009-2012)
College of Science Curriculum Committee (2010--2015)

Department committees:

Curriculum Committee (2000-'05; CHAIR 2001-'02; 2010-16)
Communications Committee (2007-08; 2017-18)
Teaching assignments (CHAIR '95-'96; '94-'95; '02-'03)
Executive ('95-'96, 2001-'02; 2011-12; 2016-17)
Greenhouse (CHAIR, 1993-94; '92-'93; '01-'02; '17-'18)
Graduate admissions (1999-'00, 1992-94)
Red Butte Canyon (CHAIR, 1999-2016)
Search committees: 1995 (ecology), 1998 (ecophysiology-Duke), 2000 (environmental biology), 2004 (evolutionary biology), 2009 (ecology/evolution)
Current PhD Graduate Student committees. Yujie Wang (Chair), David Love (Chair).

GRADUATE STUDENTS SUPERVISED

Yujie Wang, PhD (Current)
David Love, PhD (Current, defending in spring 2018).
Duncan Smith, PhD 2015. Riser Award Recipient. Currently post-doctoral fellow at University of Wisconsin, Madison.
Erica von Allmen, MS 2011.
Kate McCulloh, PhD 2004. Riser Award Recipient. Currently assistant professor at University of Wisconsin, Madison.
Jarmila Pittermann, PhD 2005. Riser Award Recipient. Currently associate professor, UC Santa Cruz
Kim Kolb, PhD 1998. Currently lecturer in Biology at University of Washington, Bellingham
William Pockman, PhD 1997. Riser Award Recipient. Currently chair and professor of Biology, University of New Mexico

POST-DOCTORAL PERSONNEL

Martin Venturas (March 2016—2019) Current.
Toshihiro Umebayashi (October 2012--2014)

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Mairgareth Christman (now at Institute for Ecohydrology Research, Davis CA)
Haruhiko Taneda (now faculty at University of Tokyo, Japan)
Uwe Hacke (now Canadian Research Chair at University of Alberta, Canada)
Volker Stiller (now associate professor at Southeastern Louisiana State University)
Nicanor Saliendra (now at USDA)

UNDERGRADUATES AND TECHNICIANS (CURRENT)

Mike Allred, Ethan Frohner, undergraduate researchers

TEACHING

Current:

Biology 2010 (Evolution and Diversity of Life)
Biology 2355 (Field Botany)
Biology 5365 (Plant Form, Function and Adaptation)
(2010 and 2355 are taught in one year, alternating with 5365)

Past:

Biology 2015 (Evolution and Diversity Lab)
Biology 103 (Introductory Biology--team taught)
Biology 216 (Plant Laboratory)
Biology 788 (Graduate Seminar)
Biology 250L (Plant Form, Function and Adaptation--Duke)
Biology 295S (Plant Water Relations--Duke)
Biology 3340 (Introductory Plant Biology)
Biology 2002 (Form, Function and Diversity)