

Peter J. Melcher

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Current Position

Associate Professor; Department of Biology, Ithaca College, Ithaca, NY (2002 - present).

Education

B.A. Human Resources 1991. Hawaii Pacific University, Honolulu, HI.

B.S. Biological Sciences. 1994. Biology Dept., University of Hawaii, Manoa, Honolulu, HI.

Doctorate of Philosophy in Botanical Sciences 1999. Department of Botany University of Hawaii, Manoa, Honolulu, HI. *A study of Unresolved Issues on Long Distance Water Transport in Plants*. Advisor: Guillermo Goldstein.

Post Doctorate Research Associate

Department of Organismic and Evolutionary Biology, Harvard University (1999 - 2002).

Teaching Experiences

Ithaca College

Alternative Futures: An Honors Seminar on current global environmental issues.

Plants, People and Food Production: A course on plant function, agriculture and factors that influence demography and food production capacity.

Plant Physiology: An upper-level biology elective (lecture and laboratory) course on the plants.

Principles in Biology: A required course for biology majors (lecture and lab).

Harvard Forest Mentor (1999–2000)

Mentored undergraduate students at Harvard Forest's summer internship program.

Fellowship

Smithsonian Tropical Research Institute Fellow (1994). Studied the physiological response of the co-evolutionary symbiosis between *Ficus* fruits of varying size and species-specific pollinators located on Borro Colorado Island (BCI), Panama.

Publications (Undergraduate students are underlined)

1. Sack L, Melcher PJ, Liu W, Middleton E, Pardee T. (2006) How strong is intra-canopy leaf plasticity in temperate deciduous trees? *American Journal of Botany* 57: 361-381.
2. Pickard WF and Melcher PJ. (2005) Perspectives on the Biophysics of Xylem Transport. In: *Vascular Transport in Plants*. Eds: Holbrook NM and Zwieniecki MA. Elsevier/Academic Press, Oxford, 3-18.

3. Choat B, Lahr E, Melcher PJ, Zwieniecki MA, Holbrook NM. (2005) Variation in air seeding threshold along the axis of mature sugar maple trees. *Plant Cell and Environment*. 28: 1082-1089.
4. Zwieniecki MA, Melcher PJ, Feild TS, Holbrook NM (2004). A potential role for xylem-phloem interactions in the hydraulic architecture of trees: effects of phloem girdling on xylem hydraulic conductance. *Tree Physiology* 24: 911-917.
5. Angeles G, Bond B, Boyer JS, Brodribb T, Brooks JR, Burns MJ, Cavender-Bares J, Clearwater M, Cochard H, Comstock J, Davis SD, Domec J-C, Donovan L, Ewers F, Gartner B, Hacke U, Hinckley T, Holbrook NM, Jones HG, Kavanagh K, Law B, López-Portillo J, Lovisolo C, Martin T, Martínez-Vilalta J, Mayr S, Meinzer FC, **Melcher PJ**, Mencuccini M, Mulkey S, Nardini A, Neufeld HS, Passioura J, Pockman WT, Pratt RB, Rambal S, Richter H, Sack L, Salleo S, Schubert A, Schulte P, Sparks JP, Sperry J, Teskey R, Tyree M. (2004). *Letter: The cohesion-tension theory. New Phytologist* 163, 451-452.
6. Melcher PJ, Zwieniecki MA, Holbrook NM. (2003) Vulnerability of xylem vessels to cavitation in sugar maple. Scaling from individual vessels to whole branches. *Plant Physiology* 131: 1775-1780.
7. Zwieniecki MA, Orians CM, Melcher PJ, Holbrook NM (2003) Ionic control of the lateral exchange of water between vascular bundles in tomato. *Journal of Experimental Botany* 54: 1399-1405.
8. Zwieniecki MA, Melcher PJ, Boyce CK, Sack L, Holbrook NM. (2002) Hydraulic architecture of leaf venation in *Laurus nobilis* L. *Plant, Cell and Environment* 25:1445-1450.
9. Sack L, Melcher PJ, Zwieniecki MA, Holbrook NM (2002) The hydraulic conductance of the angiosperm leaf lamina: a comparison of three measurement methods. *Journal of Experimental Botany* 53: 2177-2184.
10. Holbrook NM, Zwieniecki MA, Melcher PJ. (2002) The dynamics of “dead” wood: maintenance of water transport through plant stems. *Integrative and Comparative Biology* 42, 492-496.
11. Melcher PJ, Goldstein G, Meinzer FC, Jones TJ, Holbrook NM, Huang C. (2001) Water relations of coastal and estuarine *Rhizophora mangle*: The dynamics of embolism formation and repair. *Oecologia* 126:182-192.
12. Zwieniecki MA, Melcher PJ, Holbrook NM (2001) Hydrogel control of xylem hydraulic resistance in plants. *Science*. February 9, 291:1059-1062.
13. Zwieniecki MA, Melcher PJ, Holbrook NM. (2001) Hydraulic properties of individual xylem vessels of *Fraxinus americana*. *Journal of Experimental Botany* 52 (355): 257-264.
14. Melcher PJ, Cordell S, Jones T, Giambelluca T, Scowcroft P, Goldstein G. (2000) Supercooling capacity increases from sea level to treeline in the Hawaiian tree species *Metrosideros polymorpha*. *International Journal of Plant Sciences* 161(3) 369-379.
15. Cordell S, Goldstein G, Melcher PJ, Meinzer FC. (2000) Photosynthesis and freezing avoidance in Ohia (*Metrosideros polymorpha*) at treeline in Hawai'i. *Arctic, Antarctic, and Alpine Research* 32(4) 381-387.
16. Santiago L, Lau TS, Melcher PJ, Steele OC, Goldstein G. (2000) Morphological and physiological responses of Hawaiian *Hibiscus tiliacius* populations to light and salinity. *International Journal of Plant Sciences* 161(1) 99-106.

17. Scowcroft P, Meinzer FC, Goldstein G, Melcher PJ, Jeffery J. (2000) Moderating night radiative cooling reduces frost damage to *Metrosideros polymorpha* seedlings used for forest restoration in Hawaii. *Restoration Ecology* 8(2) 161-169.
18. Melcher PJ, Meinzer FC, Yount DE, Goldstein G. (1998) Measuring High Tensions in Plants. In: *High Pressure Biology and Medicine*. Eds. Bennet PB, Demchenko I, Marquis RE. University of Rochester Press. New York. (Chap 13. pp 93-101).
19. Melcher PJ, Meinzer FC, Yount DE, Goldstein G, Zimmermann U. (1998) Comparative measurements of xylem pressure in transpiring and non-transpiring leaves by means of the pressure chamber and the xylem pressure probe. *Journal of Experimental Botany* 49(327) 1757-1760.
20. Schneider H, Wistuba N, Miller B, Gessner P, Thürmer F, Melcher PJ, Meinzer FC, and Zimmermann U. (1997) Diurnal variation in the radial reflection coefficient of intact maize roots determined with the xylem pressure probe. *Journal of Experimental Botany* 48(317) 2045-2053.
21. Goldstein G, Drake DR, Melcher PJ, Giambelluca TW, Heraux J. (1996) Photosynthetic gas exchange and temperature-induced damage in seedlings of the tropical alpine species *Argyroxiphium sandwicense*. *Oecologia* 106:298-307.
22. Goldstein G, Drake DR, Alpha C, Melcher PJ, Heraux J, and Azocar A. (1996) Growth and photosynthetic responses of *Scaevola sericea*, a Hawaiian coastal shrub, to substrate salinity and salt spray. *International Journal of Plant Sciences* 157(2) 171-179.
23. Zimmermann U, Zhu JJ, Meinzer FC, Goldstein G, Schneider H, Zimmermann G, Benkert R, Thürmer F, Melcher PJ, Webb D, and Haase A. (1994) High molecular weight organic compounds in the xylem sap of mangroves: Implications for long distance water transport. *Botanica Acta* 107: 218-229.
24. Melcher PJ, Goldstein G, Meinzer FC, Minyard B, Giambelluca TW, Loope LL. (1994) Determinants of thermal balance in the Hawaiian giant rosette plant, *Argyroxiphium sandwicense*. *Oecologia* 98:412-418.

Selected Presentations (Invited talks; Professional Meetings and Workshops)

- Melcher PJ (2004) Surfing the Xylem Pipeline: “Gels and Bordered Pits”. Department of Horticulture, Cornell University. (Invited speaker).
- Melcher PJ (2001) Environmental boundaries - Living at the edge. Department of Botany, University of Hawaii, Manoa, Honolulu, HI. (Invited speaker).
- Melcher PJ (2000) The role of hydrogels in xylem: Linking hydraulic flow control processes to whole plant function. Institute of Pacific Islands Forestry. USDA Forest Service (Invited speaker).
- Melcher PJ, Holbrook NM, Zwieniecki MZ (2001) Hydrogel control of xylem hydraulic resistance in plants. Water transport in woody plants and linkages to plant structure and productivity. Workshop at the Hyttiälä Forest Station (Juupajoki, Finland. (Invited speaker)
- Melcher, PJ, Zwieniecki, MA, Holbrook, NM. Age related cavitation decline: measurements made at an individual vessel level. *Poster Presentation*. Water Transport Processes in Plants. Workshop held at the Harvard Forest Research Station, Harvard University. September, 2002

Melcher PJ, Meinzer F, Goldstein G. (2000). Xylem cavitation thresholds and embolism repair in *Hibiscus rosa* assessed with independent techniques ESA 85th annual meeting.

Melcher PJ, Goldstein G, Meinzer FC, Huang CX, Holbrook NM. (1999) Water Relations of Coastal and Estuarine *Rhizophora mangle*: The Dynamics of Embolism Formation and Repair. ESA 84th annual meeting. Poster abstract (pp. 281).

Jones TJ, Melcher PJ, Cordell S, Scowcroft PG, and Goldstein G. (1999) Supercooling capacity increases from sea level to treeline in the Hawaiian tree species *Metrosideros polymorpha*. ESA 84th annual meeting. Poster abstract (pp. 266).

Melcher PJ, Meinzer FC, Yount DE, Goldstein G, Zimmermann U. (1998) Direct and indirect measurements of xylem pressure in leaves: can the xylem probe and the pressure chamber be reconciled? Society of Experimental Biology (SEB) meeting, held at the University of York, York, England. *Journal of Experimental Botany*, Vol. 49 #P1.24. (pp. 7).

Melcher PJ, Meinzer FC, Yount DE and Goldstein G. (1997) Measuring High Tensions in Plants. Vth International High Pressure Biology Meeting, Hosted by Duke University and held at the Russian Academy of Sciences, St. Petersburg, Russia.

Activities related to my field

I am an *ad hoc* reviewer for several leading journals in my field: *American Journal of Botany*, *Ecology*, *Oecologia*, *Plant Cell and Environment*; *Plant Physiology*; *Trees Structure Function*, *Journal of Theoretical Biology*. I have also provided outside reviews for grant proposals submitted to the United States Department of Agriculture and the National Science Foundation.

I am an active member of the American Society of Plant Biologists and the Botanical Society of America.

I also participate in Ithaca College's partnership in teaching program. The goal of the program is to assist teachers in elementary, middle, and high schools by having faculty provide external resources and teaching interactions K-12 students.