

ROGER P. HANGARTER

Distinguished Professor and Chancellor's Professor of Biology
Department of Biology, Indiana University

EDUCATION

1975 B.A., Biology, State University College at Geneseo, NY
1977 M.S., Horticulture, Michigan State University
1981 Ph.D., Plant Physiology, Michigan State University

PROFESIONAL APPOINTMENTS

1975-81 Graduate Research Assistant, Department of Botany and Plant Pathology,
Michigan State University, East Lansing, MI
1981-83 Postdoctoral Research Associate, Department of Botany and Plant Pathology,
Michigan State University, East Lansing, MI, with Norman Good
1983-86 Postdoctoral Research Associate, Department of Plant Biology, University of
Illinois, Urbana, IL, with Donald R. Ort
1986-92 Assistant Professor, Department of Plant Biology, Ohio State University,
Columbus, OH
1992-95 Associate Professor, Department of Plant Biology, Ohio State University,
Columbus, OH
1998 Program Officer, Integrative Plant Biology, National Science Foundation
1995-05 Associate Professor, Department of Biology and Indiana University Molecular
Biology Institute Fellow
2005- Professor, Department of Biology and Indiana University Molecular Biology
Institute Fellow
2007- Chancellor's Professor, Department of Biology
2016- Distinguished Professor, Department of Biology

HONORS AND AWARDS

1980 Bessey Memorial Award for Excellence in Research, Department of Botany and
Plant Pathology, Michigan State University
2000 Department of Biology Teaching Excellence Recognition Award
2000 Ameritech (SBC) Fellow Award
2000 Elected to the Executive Committee of the American Society of Plant Biologists
2001 Elected as Secretary of the American Society of Plant Biologists – 3 yr term
2003 Elected as President of the American Society of Plant Biologists
2004 A.R. Wallace – R.E. Franklin Medal for Significant yet Unappreciated
Contributions to the Life Sciences, IU Department of Biology
2004 MERLOT Award for Exemplary Online Learning Resources
2005 Science & Engineering Visualization Challenge Award for “Return of the 17-year
Cicadas”. Awarded by NSF & the journal *Science*.
2007 Excellence in Teaching Award, American Society of Plant Biologists
2007 Class of 1968 Chancellor's Professor, Indiana University

- 2007 Elected Fellow of American Society of Plant Biologists
 2008 Emmy Award for Photography (Lower Great Lakes Region) in the PBS documentary, "The Natural Heritage of Indiana - Episode 2: Life in the Water"
 2009 Charles Edwin Bessey Teaching Award, Botanical Society of America
 2011 Elected Fellow of the American Association for the Advancement of Science
 2012 Fellow of the IU Center for Integrative Photographic Studies
 2014 Outstanding Faculty Collaborative Research Award
 2016 Distinguished Professor, Indiana University

PROFESSIONAL OFFICES

- 2000 Executive Committee Member, American Society of Plant Biologists
 2001-03 Secretary, American Society of Plant Biologists
 2003-04 President Elect, American Society of Plant Biologists
 2004-05 President, American Society of Plant Biologists
 2005-06 Immediate Past President, American Society of Plant Biologists
 2005-09 Chair of Pioneer Graduate Student Award Committee, the American Society of Plant Biologists
 2006-10 Education Foundation Board, the American Society of Plant Biologists
 2006-10 Member of Fellows Award Committee, the American Society of Plant Biologists

PRIMARY RESEARCH PUBLICATIONS

- Hangarter, R., S.K. Ries and P. Carlson. 1978. Effect of triacontanol on plant cell cultures in vitro. *Plant Physiol.* 61:855-857.
- Hangarter, R.P., M.D. Peterson and N.E. Good. 1980. Biological activities of indoleacetyl amino acids and their use as auxins in tissue culture. *Plant Physiol.* 65:761-767.
- Hangarter, R.P. and N.E. Good. 1981. Evidence that IAA conjugates are slow-release sources of free IAA in plant tissues. *Plant Physiol.* 68:1424-1427.
- Hangarter, R.P. and N.E. Good. 1982. Energy thresholds for ATP synthesis in chloroplasts. *Biochim. Biophys. Acta* 681:397-404.
- Good, N.E., R.P. Hangarter and P. Carlson. 1982. The use of conjugates of indoleacetic acid as auxins in tissue culture. In, "Variability in Plants Regenerated from Tissue Culture," E.D. Earle and Y. Demarly, eds. Praeger Publishers, pp. 140-157.
- Daub, M.E. and R.P. Hangarter. 1983. Light-induced production of singlet oxygen and superoxide by the fungal toxin, cercosporin. *Plant Physiol.* 73:855-857.
- Hangarter, R.P. and N.E. Good. 1984. The energized state responsible for ATP synthesis in pre-illuminated chloroplast lamellae. *Biochemistry* 23:122-130.
- Hangarter, R.P. and D.R. Ort. 1985. Cooperation among electron transfer complexes in ATP synthesis in chloroplasts. *Eur. J. Biochem.* 149:503-510.
- Hangarter, R.P. and D.R. Ort. 1985. The phosphorylating unit of chloroplast lamellar membrane vesicles. In, "Frontiers of Membrane Research in Agriculture," (Beltsville Symposium 9) J.B. St. John, E. Berlin and P.C. Jackson, eds. Rowman & Allanheld, Totowa, pp. 275-289.

- Hangarter, R.P. and D.R. Ort. 1986. The relationship between light-induced increases in the H⁺ conductivity of thylakoid membranes and activity of the coupling factor. *Eur. J. Biochem.* 158:7-12.
- Caruso, J.L., P.I. Francis, J.A. Snider, V.C. Pence and R.P. Hangarter. 1986. Evidence for a revertant at the LA locus in regenerating hypocotyl segments in tomato. *Theor. App. Genet.* 72:240-243.
- Hangarter, R.P., P. Grandoni and D.R. Ort. 1986. The role of coupling factor activation in regulating the initiation of ATP formation. In, "Progress in Photosynthesis Research Vol. III," J. Biggins, ed. Martinus Nijhoff Publishers, Netherlands, pp. 205-212.
- Hangarter, R.P., R.W. Jones, D.R. Ort and J. Whitmarsh. 1987. Stoichiometries and energetics of proton translocation coupled to electron transport in chloroplasts. *Biochim. Biophys. Acta* 890:106-115.
- Hangarter, R.P., P. Grandoni and D.R. Ort. 1987. The effects of chloroplast coupling factor reduction on the energetics of activation and on the energetics and efficiency of ATP formation. *J. Biol. Chem.* 262:13513-13519.
- Hangarter, R.P. 1987. Electrochemical H⁺ gradients and ATP synthesis. *Photosynthetica* 21:602-603.
- Hangarter, R.P. and N.E. Good. 1988. Active transport, ion movements, and pH changes II. Changes of pH and ATP synthesis. *Photosyn. Res.* 19:237-250.
- Ort, D.R., P. Grandoni, A. Ortiz-Lopez and R.P. Hangarter. 1990. Control of photophosphorylation by regulation of the coupling factor. In, "Perspectives in Biochemical and Genetic Regulation of Photosynthesis," I. Zelitch, ed. Alan R. Liss, pp. 159-173.
- Stasinopoulos, T. and R.P. Hangarter. 1990. Preventing photochemistry in culture media by long-pass light filters alters growth of cultured tissues. *Plant Physiol.* 93:1365-1369.
- Liscum, E. and R.P. Hangarter. 1991. Manipulation of ploidy level in cultured haploid *Petunia* tissue by phytohormone treatments. *J. Plant Physiol.* 138:33-38.
- Hangarter, R.P. and T. Stasinopoulos. 1991. Effect of Fe-catalyzed photooxidation of EDTA on root growth in plant culture media. *Plant Physiol.* 96:843-847.
- Liscum, E. and R.P. Hangarter. 1991. *Arabidopsis* mutants lacking blue light-dependent inhibition of hypocotyl elongation. *Plant Cell* 3:685-694.
- Hangarter, R.P. and T. Stasinopoulos. 1991. Repression of plant tissue culture growth by light is caused by photochemical change in the culture medium. *Plant Sci.* 79:253-257.
- Magnus, V., B. Nigovic, R.P. Hangarter and N.E. Good. 1992. N-(Indoleyl-3-acetyl) amino acids as sources of auxin in plant tissue culture. *J. Plant Growth Regul.* 11:19-28.
- Magnus, V., R.P. Hangarter and N.E. Good. 1992. Interaction of free indole-3-acetic acid and its amino acid conjugates in tomato hypocotyl cultures. *J. Plant Growth Regul.* 11:67-75.
- Young, J.C., E. Liscum and R.P. Hangarter. 1992. Spectral-dependence of light-inhibited hypocotyl elongation in photomorphogenic mutants of *Arabidopsis*: Evidence for a UV-A photosensor. *Planta* 188:106-114.
- Liscum, E., J.C. Young, K.L. Poff and R.P. Hangarter. 1992. Genetic separation of phototropism from blue-light inhibition of stem elongation in *Arabidopsis*. *Plant Physiol.* 100:267-271.
- Liscum, E. and R.P. Hangarter. 1993. Light-stimulated apical hook opening in wild-type *Arabidopsis thaliana* seedlings. *Plant Physiol.* 101:567-572.

- Cha, M.-R., M.E. Evans and R.P. Hangarter. 1993. Novel use of positively charged nylon transfer membranes for trapping indoleacetic acid or other small anions during efflux from plant tissues. *Plant Physiol. Biochem.* 31:263-269.
- Liscum, E. and R.P. Hangarter. 1993. Photomorphogenic mutants of *Arabidopsis thaliana* reveal activities of multiple photosensory systems during light-stimulated apical hook opening. *Planta* 191:214-221.
- Liscum, E. and R.P. Hangarter. 1993. Genetic evidence that the Pr form of phytochrome B plays a role in *Arabidopsis thaliana* gravitropism. *Plant Physiol.* 103:15-19.
- Zhong, H.H., J.C. Young, E.A. Pease, R.P. Hangarter and C.R. McClung. 1994. Interactions between light and the circadian clock in the regulation of CAT2 expression in *Arabidopsis*. *Plant Physiol.* 104:889-898.
- Liscum, E. and R.P. Hangarter. 1994. Mutational analysis of blue light sensing in *Arabidopsis*. *Plant, Cell and Env.* 17:639-648. (Invited)
- Parks, B.M., P.H. Quail and R.P. Hangarter. 1996. Phytochrome A regulates the induction of phototropic enhancement in *Arabidopsis thaliana*. *Plant Physiol.* 110: 155-162.
- Poppe, C., R.P. Hangarter, R.A. Sharrock, F. Nagy, E. Schäfer. 1996. The light-induced reduction of the gravitropic growth-orientation of seedlings of *Arabidopsis thaliana* (L.) Heynh is a photomorphogenic response mediated synergistically by the P_r-forms of phytochrome A and B. *Planta.* 199: 511-514.
- Knee, E.M. and Hangarter, R.P. 1996. Differential IAA dose response relations of the *axr1* and *axr2* mutants of *Arabidopsis*. *Physiol. Plant.* 98: 320-324
- Bagnall, D.J., R.W. King, R.P. Hangarter. 1996. *hy4* mutants of *Arabidopsis* lacking a blue light photoresponse are late to flower. *Planta.* 200: 278-280.
- Zagotta, M.T., K.A. Hicks, C.I. Jacobs, J.C. Young, R.P. Hangarter and D.R. Meeks-Wagner. 1996. The *Arabidopsis* *ELF3* gene regulates vegetative photomorphogenesis and the photoperiodic induction of flowering. *Plant Journal.* 10: 691-702.
- Young, J.C. and R.P. Hangarter. 1996. Comparative analysis of light response mutants by subtractive response spectra. In, "Regulation of Plant Growth and Development by Light", W.R. Briggs, R.L. Heath, E.M. Tobin, eds. American Society of Plant Physiologists, pp 127-133.
- Jensen, P.J., R.P. Hangarter and M.A. Estelle. 1998 Auxin transport is required for hypocotyl elongation in light-grown but not in dark-grown *Arabidopsis*. *Plant Physiol.* 116: 455-462.
- Knee, E.M., R.P. Hangarter, M. Knee. 2000. Interactions of light and ethylene in hypocotyl hook maintenance in *Arabidopsis thaliana* seedlings. *Physiol. Plant* 108: 208-215.
- Ruppel, N.J., R.P. Hangarter, J.Z. Kiss. 2001. Red-light-induced positive phototropism in *Arabidopsis* roots. *Planta.* 212: 424-430.
- Kiss J.Z., N.J. Ruppel, R.P. Hangarter. 2001. Phototropism in *Arabidopsis* is mediated by two sensory systems. *Adv Space Res.* 27:877-885.
- Mullen, J.L., Wolverton, C., Ishikawa, H., Hangarter, R.P., Evans, M.L. 2002 Spatial separation of light perception and growth response in maize root phototropism. *Plant, Cell and Environ.* 95:1191-1196.
- Kiss, J.Z., Mullen, J.L., Correll, M.J., Hangarter, R.P. 2003 Phytochrome A and B mediate red-light-induced positive phototropism in roots. *Plant Physiol.* 131: 1411-1417.

- Kiss J.Z., M.J. Correll, J.L. Mullen, R.P. Hangarter, R.E. Edelman. 2003 Root phototropism: how light and gravity interact in shaping plant form. *Gravitational and Space Biology Bulletin* 16: 55-60.
- Whippo, C.W. and Hangarter, R.P. 2003 Second Positive Phototropism Results from Coordinated Co-action of the Phototropins and Cryptochromes. *Plant Physiol.* 132: 1499-1507.
- Mullen, J.L. and Hangarter, R.P. 2003 Genetic analysis of the gravitropic set-point angle in lateral roots of *Arabidopsis*. *Adv Space Res.* 31:2229-2236.
- Correll, M.J., Coveney, K.M., Raines, S.V., Mullen, J.L., Hangarter, R.P., Kiss, J.Z. 2003 Phytochromes play a role in phototropism and gravitropism in *Arabidopsis* roots. *Adv Space Res.* 31:2203-2210.
- DeBlasio, S.L., Mullen, J.L., Luesse, D.L. and Hangarter, R.P. 2003 Phytochrome Modulation of Blue-Light-Induced Chloroplast Movements in *Arabidopsis*. *Plant Physiol.* 133: 1471-1479.
- Hangarter, R.P. and Gest, H. 2004 Pictorial demonstrations of photosynthesis. *Photosyn Res.* 80: 421-425.
- Whippo, C.W. and Hangarter, R.P. 2004 Phytochrome Modulation of Blue-light-Induced Phototropism. *Plant, Cell Environ.* 27: 1223-1228
- Yang, X., Lee, S., So, J., Dharmasiri, S., Dharmasiri, N., Ge, L., Jensen, C., Hangarter, R., Hobbie, L., Estelle, M. 2004 The IAA1 Protein is encoded by AXR5 and is a substrate of SCF^{TIR1}. *Plant J.* 40: 772-782.
- Correll, M.J., Edelman, R.E. Hangarter, R.P., Mullen, J.L., Kiss, J.Z. 2005 Ground-Based Studies of Tropisms in Hardware Developed for the European Modular Cultivation System (EMCS). *Adv Space Res.* 36: 1203-1210.
- Mullen, J.L., Wolverton, C., Hangarter, R.P. 2005 Apical Control, Gravitropic Signaling, and the Growth of Lateral Roots in *Arabidopsis*. *Adv Space Res.* 36: 1211-1217.
- DeBlasio, S.L., Luesse, D.L. and Hangarter, R.P. 2005 A Plant Specific Protein Essential for Blue-Light-Induced Chloroplast Movements. *Plant Physiol.* 139: 101-114.
- Whippo, C.W. and Hangarter, R.P. 2005 A Brassinosteroid-Hypersensitive mutant of BAK1 Indicates that a Convergence of Photomorphogenic and Hormonal Signaling Modulates Phototropism. *Plant Physiol.* 139: 448-457.
- Mullen, J.L., Weinig C., Hangarter, R.P. 2006 Shade avoidance and the regulation of leaf inclination in *Arabidopsis*. *Plant, Cell & Environ.* 29:1099-1106.
- Whippo, C.W. and Hangarter, R.P. 2006 Phototropism: Bending Towards Enlightenment. *Plant Cell.* 18: 1110-1119.
- Luesse, D.L., DeBlasio, S.L. and Hangarter, R.P. 2006 Plastid Movement Impaired 2, a new gene involved in normal blue-light-induced chloroplast movements in *Arabidopsis thaliana*. *Plant Physiol.* 141: 1328-1337.
- Hangarter, R.P. 2006 sLowlife: Communicating an Awareness of Plants Through Science and Art. *Public Garden* 21: 23-24.
- Yoder, D.W., Kadirjan-Kalbach, D., Olson, B.J.S.C., Miyagishima, S., DeBlasio, S.L., Hangarter, R.P., Osteryoung, K.W. 2007 Effects of mutations in *Arabidopsis* FtsZ1 on plastid division, FtsZ ring formation and positioning, and FtsZ filament morphology in vivo. *Plant Cell Physiol.* 48: 775-791.

- Ruppel, N.J. and Hangarter, R.P. 2007 Mutations in a plastid-localized elongation factor G alter early stages of plastid development in *Arabidopsis thaliana*. BMC Plant Biol. 7:37 doi:10.1186/1471-2229-7-37.
- Whippo, C.W. and Hangarter, R.P. 2009 The *sensational* power of movement in plants: a Darwinian system for studying the evolution of behavior. Am J Bot. 96: 2115-2127.
- Millar, K.D.L., Kumar, P., Correll, M.J., Mullen, J.L., Hangarter, R.P., Edelman, R.E., Kiss, J.Z. 2010 A novel phototropic response to red light is revealed in microgravity. New Phytol. 186: 648–656.
- Carbonnel, M., Davis, P., Roelfsema, M.R.G., Inoue, S., Schepens, I., Lariguet, P., Geisler, M., Shimazaki, K., Hangarter, R., Fankhauser, C. 2010 The Arabidopsis PHYTOCHROME KINASE SUBSTRATE 2 protein is a phototropin signaling element that regulates leaf flattening and leaf positioning. Plant Physiol. 152: 1391–1405.
- Luesse, D.L., DeBlasio, S.L. and Hangarter, R.P. 2010 Integration of phot1, phot2 and PhyB signaling in light-induced chloroplast movements. J Exp Bot. 61: 4387–4397.
- Ruppel, N.J., Logsdon, C.A., Whippo, C.W., Inoue, K. and Hangarter, R.P. 2011 A mutation in *Arabidopsis thaliana* SEEDLING PLASTID DEVELOPMENT 1 affects plastid differentiation in embryo-derived tissues during seedling growth. Plant Physiol. 155: 342-353.
- Whippo, C.W., Khurana, P., Davis, P.A., DeBlasio, S.L., DeSloover, D., Staiger, C.J., Hangarter, R.P. 2011 THRUMIN1 is a light-regulated actin-bundling protein involved in chloroplast motility. Current Biol. 21: 59-64.
- Kerney, R., Kim, E., Hangarter, R.P., Heiss, A.A., Bishop, C., Hall, B.K. 2011 Intracellular invasion of green algae in a salamander host. PNAS 108: 6497–6502.
- Davis, P.A., Caylor, S., Whippo, C.W., Hangarter, R.P. 2011 Changes in leaf optical properties associated with light-dependent chloroplast movements. Plant Cell Environ. 34: 2047–2059.
- Tseng, T.S., Whippo, C., Hangarter, R.P., Briggs, W.R. 2012 The Role of a 14-3-3 Protein in Stomatal Opening mediated by PHOT2 in Arabidopsis. Plant Cell: 24: 1114–1126.
- Davis, P.A., Hangarter, R.P. 2012 Chloroplast movement provides photoprotection to plants by redistributing PSII damage within leaves. Photosyn Res. 112: 153-161.
- Ahlers, S., Willige, B.C., Zourelidou, M., Barbosa, I.C.R., Demarsy, E., Trevisan, M., Davis, P., Roelfsema, R., Hangarter, R., Fankhauser, C., Schwechheimer, C. 2013 D6PK AGCVIII Kinases Are Required For Auxin Transport And Phototropic Hypocotyl Bending. Plant Cell: 25: 1674–1688.
- Ruppel, N.J., Kropp, K.N., Davis, P.A., Martin, A.E., Luesse, D.R., Hangarter, R.P. 2013 Mutations in *GERANYLGERANYL DIPHOSPHATE SYNTHASE 1* Affect Chloroplast Development in *Arabidopsis thaliana*. Am J Bot. 100: 2074-2084.
- Muir, C.R., Hangarter, R.P., Moyle, L.C., Davis, P.A. 2014 Morphological and anatomical determinants of mesophyll conductance in wild relatives of tomato (*Solanum* sect. *Lycopersicon*, sect. *Lycopersicoides*; Solanaceae). Plant Cell Environ. 37: 1415–1426
- Rojas-Pierce, M., Whippo, C.W., Davis, P.A., Hangarter, R.P., Springer, P.S. 2014 PLASTID MOVEMENT IMPAIRED1 mediates ABA sensitivity during germination and implicates ABA in light-mediated Chloroplast movements. Plant Physiol Biochem, 83: 185-193
- Nesbit, A.D., Whippo, C., Hangarter, R.P., Kehoe, D.M. 2015 Translation initiation factor 3 families: what are their roles in regulating cyanobacterial and chloroplast gene expression? Photosyn Res. DOI: 10.1007/s11120-015-0074-4

- Dolinsky, M. and Hangarter, R.P. 2016 The Living Canvas: Interactive Chloroplasts. Leonardo, DOI: 10.1162/LEON_a_01231.
- Dwyer, M.E., Hangarter, R.P. 2021 Light-dependent phosphorylation of THRUMIN1 regulates its association with actin filaments and 14-3-3 proteins. *Plant Physiol.* 187: 1445–1461, <https://doi.org/10.1093/plphys/kiab374>.
- Dwyer, M.E., Hangarter, R.P. Phototropin-dependent repulsion of PMI1 from the plasma membrane initiates light-dependent chloroplast movement 2022. *Plant Physiol.* 189: 1866–1880, <https://doi.org/10.1093/plphys/kiac193>

REVIEWS AND BOOK CHAPTERS

- Ries, S.K., H. Bittenbender, R. Hangarter, L. Kolker, G. Morris and V. Wert. 1977. Improved growth and yield from organic supplements. In, "Energy and Agriculture," W. Lokevets, ed. Academic Press, NY, pp. 377-384.
- Hangarter, R.P. 1992. Book review: "Tracking Phytochrome. *Pigment of the Imagination. A History of Phytochrome Research.*" *Science* 257:1292.
- Parks, B.M. and R.P. Hangarter. 1994. Blue light sensory systems in plants. *Seminars in Cell Biology.* 5:357-353. (Invited)
- Hangarter, R.P. 1997 Gravity, light and plant form. *Plant, Cell Environ* 20:796-800

COMMENTARIES

- Hangarter, R.P. and D.R. Ort. 1992. Obituary: "Norman E. Good. (1917-1992)." Published in *Photosynthesis Res.*, Newsletter of The American Society of Plant Physiologists, and Proceedings of the 1992 International Congress on Photosynthesis.
- Hangarter, R.P. 1992. Letter: Manipulation of ploidy levels. *Rice Biotechnology Quarterly* 10:28.
- Quail, P.H., Briggs, W.R., Chory, J., Hangarter, R.P., Harberd, N.P., Kendrick, R.E., Koornneef, M., Parks, B., Sharrock, R.A., Schäfer, E., Thompson, W.F., Whitelam, G.C. (1994) Letter to the Editor: Spotlight on phytochrome nomenclature. *Plant Cell* 6:468-471.
- Hangarter, R.P. 2005. Letter to the Editor on Open Access Publishing. *Wall Street Journal*, June 21, 2005

OTHER SCHOLARLY AND CREATIVE WORKS

- Plants-In-Motion*: Educational web-based resource for plant biology education. The web site contains over 50 movies of plants that are freely available for use by educators. This award-winning site is widely used all around the world and has been favorably reviewed by numerous sources (e.g., Science, Natural History, Trends in Plant Science). The Plants-In-Motion site receives on average about 1.2 million page views per year.
- sLowlife*: Art installation created in collaboration with artist Dennis DeHart. The installation included several video pieces, live plants, inkjet prints, and pieces created from dead plants and fungi. The exhibit ran from Oct 24 to Nov 21, 2003 in the School of Fine Arts Gallery, Indiana University and received more than 1800 visitors.

- Undercurrents*: A 15 min movie I created to accompany a dance performance entitled, “Rooted, Grounded and Manifested” by the Indiana University African American Dance Company. Performed at Buskirk-Chumley Theater, April 9, 2005.
- Return of the 17-year Cicadas*: This 5-minute film documenting the 17-year cicada emergence in 2004 won the 2005 Science & Engineering Visualization Award from NSF and the journal *Science*. This film was based on my 17 min version, Brood X, 2004 which was reported on in the journal *Science* (<http://www.sciencemag.org/sciext/vis2005/>), Science for kids, National Geographic for Kids, and was exhibited at The Field Museum in Chicago.
- Return of the 17-year Cicadas*: This 14 minute cicada film was selected for screening at the SILVERDOCS: AFI / Discovery Channel Documentary Festival, June 13-18 and at the CINEviews Film Festival in Lynchburg, VA, Nov, 2006.
- Brood X, 2004*: This art film about the 17-year cicadas was an invited work shown in *Human Nature I: The Natural World*, an art exhibit at the School of Fine Arts Gallery, Indiana University, Oct 20-Nov 18, 2006.
- Inflorescence*: Plant movies exhibited by invitation, in art show with 4 artists at “The David Weinberg Collection”, a Chicago art gallery. March 2 – May 5, 2007.
- Arts Botanica*: Art exhibit of plant time-lapse movies at the Loyola University Art Museum (LUMA), Chicago, IL June 1-8, 2007.
- Unseen Acts and Altering Perceptions*: Art exhibit of plant time-lapse movies at Illinois Institute of Technology: Institute of Design, Chicago, IL Oct-Nov, 2008.
- The Natural Heritage of Indiana*. Contributed multiple time-lapse and video segments to two episodes of this four-part PBS Documentary. Won regional Emmy Award. 2008.
- The Living Canvas: Painting with Chloroplasts*, (collaboration with Margaret Dolinsky). Part of *Imag(in)ing Science* group exhibition at the Grunwald Gallery of Art, Indiana University, IN. 2013
- sLowlife*: Traveling exhibit based on the IU *sLowlife* exhibit. Installations: US Botanic Garden, Washington DC, Oct 26, 2005 to March 26, 2006; Museum of the Earth, Ithaca, NY, Dec 23, 2006 – April 1, 2007; Chicago Botanic Garden June 23-Oct 21, 2007; Chemical Heritage Foundation Clifford C. Hach Gallery, Philadelphia, PA, Feb 2009-Jan 2010; Montshire Science Museum, Norwich, VT, Sept-Nov, 2012; The North Carolina Arboretum, Asheville, NC, Jan 25-May 10, 2015. [Since its first installation in 2005, the exhibit has been seen by over 3 million visitors.]
- PONDerings: Art in pond leaves* (collaboration with Margaret Dolinsky). [RE]Imagining Science. Group exhibition at the Grunwald Gallery of Art, Indiana University, IN. Oct 14-Nov 16, 2016
- Photochemical Leaf Prints*. Part of group exhibit *Living Proof: flora, fauna, & fossil fuels*. Space 151, San Francisco, CA. Jan 13-Feb 26, 2018.

Other Science/Art Exhibitions:

- Moving Plants*, 2000, WonderLab Museum, Bloomington, IN.
- Plant Dance*, 2002, Interactive exhibit, Science Museum of Minnesota in St. Paul, MN.
- Fast Plants*, 2003, Indianapolis Children’s Museum, IN.
- Moving Plants*, 2004, Science Center Singapore, Indonesia,
- Moving Plants*, 2005, Museum.BL in Liestal, Switzerland,

Moving Plants, 2005, Turku Arts Academy, Finland,
Moving Plants, 2005, Natural History Museum of the Adirondacks, Tupper Lake, NY,
Moving Plants, 2005, McWane Science Center, Birmingham, AL.
Moving Plants, 2005, Massachusetts Horticultural Society, Wellesley, MA.
Brood X, 2007, The Field Museum, Chicago, IL.
Moving Plants, 2009, St. Louis Science Center, St. Louis, MO.
Moving Plants, 2011, Museum of Science and Technology, Santiago, Chile.
The Living Canvas, 2014, Center of Excellence for Women in Technology Showcase, Indiana University, IN.
Color of Life, 2015, Part of Group Exhibit, California Academy of Sciences, San Francisco, CA.

PUBLIC OUTREACH ACTIVITIES

- 2001 Conducted two plant biology activities for Wonderlab.
- 2001-02 Developed more of the “Plants-In-Motion” website, a unique collection of time-lapse movies illustrating the dynamic nature of plants. Plants-In-Motion is widely used by teachers all around the world and has been cited in numerous journals and articles, including *Science* (2002 Jan 18; 295:411).
- 2001-02 Completed “Plant Dance”, an interactive traveling exhibit about plants for children in collaboration with the Science Museum of Minnesota in St. Paul. Video clip is available on Plants-in-Motion web site.
 Edited several scripts for WTIU Radio program, “A Moment of Science”.
- 2002 Lecturer in the “Grow Organic Educator Series” for Bloomington Parks & Recreation, Hilltop Garden & Nature Center, and the Center for Sustainable Living.
 Led a “Fall Colors” nature walk at the IU Nature Preserve (Oct. 12).
 Lecturer in “Arabidopsis Molecular Genetics Course”, Cold Spring Harbor Summer Course series. July
 Edited several scripts for WTIU Radio program, “A Moment of Science”.
- 2003 Developed *sLowlife*, an educational art installation in collaboration with artist Dennis DeHart. The installation ran Oct 24 to Nov 21 at the SoFA Gallery, Indiana University and was viewed by more than 1800 visitors.
 Panel member for “Interviewing skills for Scientists”, a workshop organized by Science, Next Wave and AAAS to help students and postdocs prepare for their next career steps. Indiana Memorial Union, Nov 12.
 Lecturer in the “Grow Organic Educator Series” for Bloomington Parks & Recreation, Hilltop Garden & Nature Center, and the Center for Sustainable Living. Sept
 Lecturer in “Arabidopsis Molecular Genetics Course”, Cold Spring Harbor Summer Course series. July
 Edited several scripts for WTIU Radio program, “A Moment of Science”.

- 2004
- Developed collaboration with the United States Botanic Garden, Washington DC and the Chicago Botanic Garden to turn *sLowlife* into traveling exhibit.
 - Collaborated with ScratchCat LLC, an educational development company in Alpharetta, GA to develop an educational DVD about plant biology for elementary schools. The DVD features a number of my time-lapse movies.
 - Lectured in “Advanced Techniques in Plant Science”, part of the Cold Spring Harbor Summer Course series. July
 - Lectured on “The Secret Lives of Plants” in the IU Mini University, Bloomington Continuing Studies, June
 - Lectured in the “Grow Organic Educator Series” for Bloomington Parks & Recreation, Hilltop Garden & Nature Center, and the Center for Sustainable Living. August
 - Provided for display at WonderLab, documentary movie I made about the 2004 emergence of the 17-year cicadas (Brood X) that took place in Bloomington.
 - Edited several scripts for WTIU Radio program, “A Moment of Science”.
- 2005
- Lectured on “Plant Growth Revealed Using Time-lapse Imaging” in the IU Mini University, Bloomington Continuing Studies, June 22
 - Lectured in the “Grow Organic Educator Series” for Bloomington Parks & Recreation, Hilltop Garden & Nature Center, and the Center for Sustainable Living. Sept 13
 - Created *Undercurrents*, a 15 min movie for a performance by the Indiana University African American Dance Company. Performed at Buskirk-Chumley Theater, April 9.
 - sLowlife* exhibition installed from Oct 26, 2005 to March 26, 2006 at the United States Botanic Garden, Washington DC.
 - Created *Return of the 17-year Cicadas*, a short film documenting the 17-year cicada emergence in 2004. This film won the Science & Engineering Visualization Award from NSF and the journal Science.
 - Presented “Plants as solar collectors” in a Workshop for middle school teachers, WonderLab, Nov 17
 - Contributed plant time-lapse movies to Massachusetts Horticulture Society for Public Service Announcements aired in New England.
 - Contributed plant time-lapse movies to Texas Education Agency for use in state-wide science test for 8th grade students.
 - Contributed plant time-lapse movies to Prentice Hall for use on CD-ROM teachers supplement for their popular introductory text, “Biological Science” by Scott Freeman.
 - Contributed plant time-lapse movies to Museum.BL in Liestal, Switzerland – movies shown in exhibit entitled “Springtime Awakening”, 2005
 - Contributed plant time-lapse movies for an exhibit at Turku Arts Academy, Finland, 2005
 - Edited several scripts for WTIU Radio program, “A Moment of Science”.

- 2006
- Lecture on “Plant Growth Revealed Using Time-lapse Imaging” for Bloomington Garden Club, Hilltop Garden & Nature Center, Jan 23
 - Presented “Plants as a means of teaching concepts in biology” in a Teacher Workshop for the WonderLab Summer Science Institute 2006, June 13
 - Lectured in the “Grow Organic Educator Series” for Bloomington Parks & Recreation, Hilltop Garden & Nature Center, and the Center for Sustainable Living. Sept 14
 - Public presentation “Revealing Plant Awareness”. Science Cabaret. Ithaca, NY, Nov 14.
 - Plants-In-Motion website updated. Site receives over 40,000 hits a month during academic year.
 - Exhibited 2 time-lapse movies at Natural History Museum of the Adirondacks (Tupper Lake, NY), the McWane Science Center (Birmingham, AL), and the Singapore Science Center.
 - Contributed time-lapse movies to the “Teachers Domain” website, which is developed, with NSF funding, by WGBH, Boston's Public Television station for K-12 teachers. (www.teachersdomain.org).
 - Contributed time-lapse movies for Zoo Olympics, a special event at the North Carolina Zoo.
 - Edited several scripts for WTIU Radio program, “A Moment of Science”.
- 2007
- Contributed time-lapse movies for *Exploring Time*, an NSF funded co-production with Twin Cities Public Television. Aired on the Discovery Science Channel in March.
 - Collaborated with the Field Museum in Chicago on an exhibit about periodical cicadas. On display May 18 – Aug 31, 2007.
 - Contributed time-lapse movies for *Secrets of Plant Genomes Revealed*, an NSF-commissioned movie about plant genomics research for high schools. (http://nsf.gov/news/mmg/mmg_disp.cfm?med_id=61504&from=vid).
 - Contributed time-lapse movies for use in an exhibit at the Indianapolis Children’s Museum.
 - Contributed time-lapse movies for use in PBS program, *The Natural Heritage of Indiana*, WTYI
 - Lectured in the “Grow Organic Educator Series” for Bloomington Parks & Recreation, Hilltop Garden & Nature Center, and the Center for Sustainable Living. Sept 14
 - Plants-In-Motion website received over 550,000 hits during the year
 - Wrote & Edited scripts for WTIU Radio program, “A Moment of Science”.
- 2008
- Contributed time-lapse and video for inclusion in *The Natural Heritage of Indiana- Episode 1*, a PBS series produced by WFYI.
 - Lectured on “Plant Responses to Environmental Stimuli” in the IU Mini University, Bloomington Continuing Studies, June.
 - Lectured in the “Grow Organic Educator Series” for Bloomington Parks & Recreation, Hilltop Garden & Nature Center, and the Center for Sustainable Living. Sept 17.

- Plants-In-Motion website received over 600,000 hits during the year.
Wrote & Edited scripts for WTIU Radio program, “A Moment of Science”.
- 2009 Contributed time-lapse and video for inclusion in *The Natural Heritage of Indiana- Episodes 2 & 3*, a PBS documentary produced by WFYI.
Lectured in the “Grow Organic Educator Series” for Bloomington Parks & Recreation, Hilltop Garden & Nature Center, and the Center for Sustainable Living. Sept 17.
Plants-In-Motion website received over 600,000 hits during the year.
Wrote & Edited scripts for WTIU Radio program, “A Moment of Science”.
- 2010 Contributed several plant time-lapse movies for inclusion in *Vegetalista Exhibit*, a permanent exhibit about plants at the Museum of Science and Technology Chile, Santiago. Exhibit opened in Dec 2010.
- 2011 Teacher Workshop Presentation “Plants as a means of teaching concepts in biology” for the WonderLab Summer Science Institute, June
Lectured on “The Un-still Life of Plants” in the IU Mini University, Bloomington Continuing Studies, June.
Teacher Workshop Presentation “Plants as a means of teaching concepts in biology” for the TRAINED Ideation Workshop, Arabidopsis Biological Resource Center, Columbus, OH, Dec.
- 2012 Contributed plant time-lapse movies for education program on Japanese television (TBS Television, Inc., Jan).
Gave presentation about plant responses to the environment to the Sassafras Audubon Society. March 29.
Gave presentation about plant responses to the environment at the Schuylerville Lilac Festival, Schuylerville, NY. May 12.
Interviewed by NPR Science Friday for episode about plant movements. Aired Aug 31. (<http://www.sciencefriday.com/video/08/31/2012/unwinding-the-cucumber-tendrils-mystery.html>)
Gave presentation about plant responses to the environment to high school teachers in the Advanced College Project run in association with L100 and L112. Oct 8
- 2013 Teacher Workshop. Teaching concepts in biology using plants. WonderLab Summer Science Institute, June
Collaborated with multiple artists for the Imag(in)ing Science exhibition at the Grunwald Gallery of Art, Indiana University, IN.
Public lecture on Science/Art collaborations. Grunwald Gallery of Art, Indiana University, IN.
- 2014 Contributed plant time-lapse movies to BBC Brazil & Australian National Elementary Education Program for use in education programs.
- 2015 Developed photography exhibit on “Biodiversity of Indiana”. Currently installed in Jordan Hall.
Represented Biology in the Science Fest Science Slam and won.

- 2016 Installed “Biodiversity of Indiana” photography exhibit at WonderLab.
Presented “Plants: they whisper, talk, and even move” at the 2016 Science Fest.
Presented 4 public lectures on biodiversity as part of the 2016 Themester on Beauty. College of Arts and Sciences
- 2017 Presented “Plants: they whisper, talk, and even move” to James Holland Research Initiative in STEM Education Program (June 26) and the Jim Holland Summer Enrichment Program (July 17).
Contributed plant time-lapse videos to non-profit group (Science Buddies) for K-12 science curriculum development.
Presented 2 public lectures on biodiversity as part of the 2017 Themester on Diversity, Differences, Otherness. College of Arts and Sciences.
Updated *Plants-In-Motion* website and added several new time-lapse movies.
- 2018 Presented “The Un-still life of plants” at Bloomington Rotary Lunch, IU, April.
Radio interview on biodiversity with WFHB EcoReport:
Part 1: <http://wfhb.org/public-affairs/ecoreport/eco-report-feature-roger-hangarter-on-biodiversity/>; Part 2: <http://wfhb.org/uncategorized/eco-report-feature-roger-hangarter-on-biodiversity-part-2/>
Presented “The Un-still life of plants” at St. Mark’s Church, May.
Keynote Speaker at Science Night Out, WonderLab Science Museum Fundraiser.

INVITED MEETING PRESENTATIONS

- 1986 Annual Meeting of the Ohio Valley Tissue Culture Association, Ohio State University
- Midwest Photosynthesis Conference
- 1987 Gordon Research Conference on Biochemical Aspects of Photosynthetic Membranes
- Midwest Photosynthesis Conference
- 1991 Gordon Research Conference on Plant Molecular Biology
Beltsville Symposium XVI with European Photomorphogenesis Symposium on Photomorphogenesis in Plants: Emerging Strategies for Crop Improvement
- 1992 World Congress on Cell and Tissue Culture, Washington, DC
- 1993 World Congress on Cell and Tissue Culture, San Diego, CA
American Society for Photobiology, Chicago, IL
Gordon Research Conference on Plant Molecular Biology, Proctor Academy, Andover, NH
Photoregulation in Plants: Frontier Research Program Forum, Tokyo Metropolitan University, Japan
- International Botanical Congress, Yokohama, Japan
- 1994 Light effects on gravitropism in *Arabidopsis*, Gordon Research Conference on Gravitational Effects on Living Systems, Colby-Sawyer College, New London, NH, July.
- 1995 Overview of plant response to environmental stimuli, 6th International Meeting on *Arabidopsis* Research, Madison, WI, June

- Interaction between the phytochromes and gravity sensory-response systems in *Arabidopsis*, International Conference on Plant Growth Substances, Minneapolis, MN, July
- Interaction between the phytochrome and gravity sensory-response systems in *Arabidopsis*, Signaling in Plant Development, Cold Spring Harbor Laboratory, NY, September
- 1996 Comparative analysis of light response mutants by subtractive response spectra: interactions of environmental sensory systems, 18th Annual Symposium in Plant Physiology, University of California, Riverside. January
- Interactions of phytochrome, gravitropism and phototropism in *Arabidopsis*, Gordon Research Conference on Gravitational Effects on Living Systems, Colby-Sawyer College, New London, NH, July.
- Interactions between blue light, phytochrome and gravity response systems in *Arabidopsis*, International Meeting on UV/Blue light Perception and Responses in Plants and Microorganisms. Philipps-Universität, Marburg, Germany, August
- Phytochrome regulation of gravitropism: Integration of environmental sensory systems. NSCORT Symposium on Calcium and Gravitational Biology, North Carolina State University, November
- 1998 Gravity, Light and Plant Form. Gordon Research Conference on Gravitational Effects on Living Systems, Colby-Sawyer College, New London, NH, July.
- 2001 Characterization of Blue-Light Induced Chloroplast Movements in Wild-Type and *pmi* *Arabidopsis* mutants. Annual Meeting of the American Society of Plant Biologists. Authors: DeBlasio S.L., Luesse, D.R., Mullen, J., Hangarter, R.P. Presented by DeBlasio, graduate student.
- 2002 Light-induced chloroplast movements in *Arabidopsis*. Gordon Research Conference on Plant and Fungal Cytoskeleton.
- Keynote address: Light-induced chloroplast movements in *Arabidopsis*. Midwest meeting of the American Society of Plant Biologists. Miami University, Oxford, OH. March
- Genetic dissection of the gravitational set point of lateral organs in plants. World Space Congress. Houston, TX. Nov
- 2003 Shape shifting in plants: The influence of light and gravity on plant form. Gordon Research Conference on Mechanotransduction and Gravity Signaling in Biological Systems. Connecticut College, New London, CT. July
- Gravity response mechanisms of lateral organs and the control of plant architecture. XI National Conference of Biochemistry and Molecular Biology of Plants, Acapulco, Mexico. Nov
- 2004 Shape shifting in plants: gravitropism and plant form. Plant Biology 2004, Annual Meeting of the American Society of Plant Biologists. Orlando, FL, July
- Genes required for light-induced chloroplast movements in *Arabidopsis*. Gordon Research Conference on Plant and Fungal Cytoskeleton. Aug
- 2005 Light-induced chloroplast movements in leaves. Banquet speaker. Meeting of the Mid Atlantic section of the American Society of Plant Biologists. Univ of Maryland, Feb 25
- Light-induced chloroplast movements in leaves. Genomics & Beyond: Frontiers in Plant Biology. 22nd Annual Missouri Symposium. April

- sLowlife*: Development of a traveling exhibit combining plant science and art.
Annual Meeting of the American Society of Plant Biologists. Seattle, WA, July
- The slow life of plants: art and science. Banquet Presentation, 26th Annual Crown Gall Conference, Indiana University, Aug.
- 2006 Keynote address: Communicating an awareness of plants through science and art. Annual Meeting of the Botanical Society of America, Education Forum, California State University – Chico, CA, July
- 2007 Genetics of the gravitropic set-point in *Arabidopsis*. Gordon Research Conference on Mechanosensory Transduction. July
- 2008 Light-induced chloroplast movements in leaf cells. Gordon Research Conference on Mitochondria and Chloroplasts. Aug
- 2009 Symposium presentation, Gravitropism and the development of plant form, Annual Meeting of the Botanical Society of America.
- 2010 THRUMIN1 is a light-regulated actin-bundling protein involved in chloroplast motility. Annual Meeting of the American Society of Plant Biologists, Montreal, CA, Aug. (presented by Craig Whippo)
- 2011 Symposium presentation, Light-regulated chloroplast movements in leaves, International Meeting on *Arabidopsis* Research, Madison, WI, June
- Symposium presentation, Communicating an Awareness of Plants Through Science and Art, Annual Meeting of the Botanical Society of America, St. Louis, MN, July
- Symposium presentation, Light-regulated chloroplast movements in leaves, Annual Meeting of the American Society of Plant Biologists, Minneapolis, MN, July
- 2012 Keynote address: Light-regulated chloroplast movements in leaves. Annual Meeting of the Northeastern Section of the American Society of Plant Biologists, Worcester Polytechnic Inst. May
- Light-regulated chloroplast movements in leaves. Gordon Research Conference on Plant and Fungal Cytoskeleton. Aug.
- 2013 The Un-still Life of Plants. Natural Discourse Symposium on Culture & Cultivation, Berkeley, CA. Oct
- 2014 Seeing Photosynthesis. Natural Discourse Symposium on Light & Image, Los Angeles, CA. Oct
- 2017 Keynote address: Plants: they whisper, talk, and even move. Canadian Botanical Association Annual Meeting, Waterloo, Canada.
- Symposium presentation: Function and mechanisms of light-dependent chloroplast movements in leaf cells. Canadian Botanical Association Annual Meeting, Waterloo, Canada.
- Symposium presentation: BioDiversity is Essential: Development of exhibits about fundamentals of nature. Indiana Academy of Science, Indianapolis.
- 2018 Keynote address: Science + Art = Symbiotic Learning. Indiana Academy of Science, Indianapolis. Feb.
- Keynote address: Function and mechanisms of light-dependent chloroplast movements in leaf cells. Microscopy Society of the Ohio River Valley. Ohio. May.

OTHER MEETING PRESENTATIONS

- 1979 10th International Conference on Plant Growth Substances, Madison, WI, 1 paper presented
- 1981 11th Harry Steenbock Symposium, University of Wisconsin, 1 paper presented
Gordon Research Conference on Photosynthesis, 1 paper presented
- 1982 Midwest Photosynthesis Conference, Argonne National Laboratory, 1 paper presented
- 1983 Gordon Research Conference on Photosynthesis, 1 paper presented
Midwest Photosynthesis Conference, 1 paper presented
- 1984 The Beltsville Symposia on Agricultural Research, 1 paper presented
Gordon Research Conference on Photosynthesis, 1 paper presented
- 1985 Gordon Research Conference on Protons and Membrane Reactions, 1 paper presented
Gordon Research Conference on Photosynthesis, 1 paper presented
Midwest Photosynthesis Conference, paper presented
- 1986 VII International Congress on Photosynthesis, 1 paper presented
- 1987 Gordon Research Conference on Plant Cell and Tissue Culture, 1 paper presented
Ohio State Biotechnology Conference, 1 paper presented
- 1989 Gordon Research Conference on Plant Cell and Tissue Culture, 1 paper presented
American Society of Plant Physiologists, 3 papers presented
- 1990 American Society of Plant Physiologists, 2 papers presented
- 1991 Gordon Research Conference on Plant Cell and Tissue Culture, 1 paper presented
Beltsville Symposium XVI and European Photomorphogenesis Symposium on
Photomorphogenesis in Plants: Emerging Strategies for Crop
Involvement, 2 papers presented
American Society of Plant Physiologists, 4 papers presented
- 1992 Gordon Research Conference on Plant Molecular Biology, 3 papers presented
Midwest Developmental Biology Meeting, 2 papers presented
American Society of Plant Physiologists, 3 papers presented
- 1993 FASEB Meeting on Plant Signal Transduction, 1 paper presented
American Society of Plant Physiologists, 4 papers presented
Fifth International Congress on *Arabidopsis* Research, Columbus, OH, 3 papers presented
- 1994 American Society of Plant Physiologists Annual Meeting, 3 papers presented
- 1995 Keystone Meeting on Signal Transduction Systems in Plants, Hilton Head, SC. 1 paper presented
6th International Meeting on *Arabidopsis* Research, Madison, WI. 4 papers presented
Frontier Research Forum, RIKEN Institute of Physical and Chemical Research, Wako-shi, Japan, October. 1 invited paper and 1 other paper presented
- 1996 International Meeting on UV/Blue light Perception and Responses in Plants and Microorganisms. Philipps-Universität, Marburg, Germany, August. 1 invited paper presented and 1 other paper presented
Gordon Research Conference on Gravitational Effects on Living Systems, Colby-Sawyer College, New London, NH, July. Invited paper presented and 1 other paper presented

- 1997 8th International Meeting on *Arabidopsis* Research, Madison, WI. 4 papers presented
American Society of Plant Physiologists Annual Meeting, Vancouver, BC. 2 papers presented
European Symposium on Photomorphogenesis, Univ. of Leicester, 2 papers presented
- 1998 Gordon Research Conference on Gravitational Effects on Living Systems, Colby-Sawyer College, New London, NH, July. Invited paper presented and 1 other paper presented
9th International Meeting on *Arabidopsis* Research, Madison, WI. 1 paper presented
American Society of Plant Physiologists Annual Meeting, Madison, WI. 1 paper presented. Also presented daily demonstrations of time-lapse imaging system for the education section of the meeting
- 1999 American Society of Plant Physiologists Annual Meeting, Madison, WI.
Presented demonstrations of time-lapse imaging system for the education section of the meeting.
- 2000 American Society of Plant Physiologists Annual Meeting, San Diego, CA. 2 papers presented.
- 2000 International Committee on Space Research (COSPAR) Meeting in Warsaw, Poland. 1 paper presented
- 2000 American Society for Gravitational and Space Biology, Montreal, Canada. 1 paper presented.
- 2000 Midwest Meeting of the American Society of Plant Physiologists, West Lafayette, IN. 1 paper presented.
- 2001 American Society of Plant Physiologists Annual Meeting, Providence, RI. 1 student talk (S. DeBlasio) and 1 poster presented
Gordon Research Conference on Gravitational Effects on Living Systems. Connecticut College, New London, CT. 1 poster presented.
Sixth Symposium of the International Society of Root Research, Nagoya, Japan. 1 paper presented
- 2002 American Society of Plant Biologists Annual Meeting, Denver, CO.
4 poster presentations.
Annual Meeting of the Committee on Space Research (COSPAR), Houston, TX. 2 oral presentations.
Annual Meeting of the American Society of Gravitational and Space Biology, Cape Canaveral. 2 oral presentations.
- 2003 American Society of Plant Biologists Annual Meeting, Honolulu, HI.
4 poster presentations.
- 2004 American Society of Plant Biologists Annual Meeting, Orlando, FL. 5 poster presentations and 2 graduate student oral presentations (Craig Whippo & Darron Luesse).
Annual Meeting of the Committee on Space Research (COSPAR), Paris, France. 2 oral presentations.
Annual Meeting of the American Society of Gravitational and Space Biology, New York, NY. 1 oral presentation.
- 2005 American Society of Plant Biologists Annual Meeting, Seattle, WA. 2 poster presentations.

- 2006 International Meeting on *Arabidopsis* Research, Madison, WI. 1 poster. Presented by Nick Ruppel, grad student.
Midwest American Society of Plant Biologists Meeting. Chicago, IL. 1 paper. Presented by Nick Ruppel, grad student.
- 2007 American Society of Plant Biologists Annual Meeting, Chicago, IL. 5 poster presentations.
- 2008 International Meeting of Plant Photobiologists, Univ of Missouri, 1 poster presentation
Arabidopsis Meeting, Montreal, Canada. 1 poster presentation
- 2009 Botanical Society of America. 1 symposium presentation by postdoc Craig Whippo.
- 2010 American Society of Plant Biologists Annual Meeting, Montreal, CA. 2 poster presentations
- 2011 American Society of Plant Biologists Annual Meeting, Minneapolis, MN. 2 poster presentations
- 2013 Society for Literature, Science, and the Arts (SLSA), Notre Dame, IN. 1 oral presentation (*The Living Canvas*). Presenter: Dolinsky.
IEEE Cluster 13, Indianapolis, IN. 1 oral presentation and showing of *Living Canvas* exhibit. Presenter: Dolinsky.
Supercomputing 13, Dallas, TX. 1 oral presentation and showing of *Living Canvas* exhibit. Presenter: Dolinsky.
- 2014 IEEE VIS 2014 Arts Program, Paris, France. 1 oral presentation (Dolinsky) on *The Living Canvas: Interactive Chloroplasts*.
- 2015 International Symposium on Electronic Art 2015, Vancouver. 1 poster. Presenter: Dolinsky
- 2015 Supercomputing15. "The Living Canvas" Austin TX Nov. Exhibit of art works and oral presentation (Dolinsky).
- 2017 International Conference on Arabidopsis Research. 1 poster presentation: The mechanistic role of THRUMIN-1 in blue light-dependent chloroplast movement.

INVITED SEMINARS

- 1982 University of Pennsylvania, Department of Biology
1983 USDA Agricultural Research Center, Beltsville
1985 University of Illinois, Department of Botany
Ohio State University, Department of Botany
Northeastern University, Biology Department
Michigan State University, Department of Botany and Plant Pathology
- 1986 University of Dayton, Department of Biology
Ohio State University, Biochemistry Program
- 1987 University of Kentucky, Plant Physiology Program
- 1989 Cornell University Plant Science Center
- 1990 Ohio State University, Department of Horticulture Seminar Program
- 1991 University of Illinois, Plant Physiology Program
Agronomy Seminar, Wooster, Ohio
Dartmouth College, Biology Department

- 1992 Cornell University, Plant Physiology Program
Plant Research Lab, Michigan State University, Biology Department
The Rockefeller University, NY
- 1993 University of Cincinnati, Department of Biology
Ohio University, Department of Plant Biology
Plant Biology Division of The Samuel Roberts Nobel Foundation, Ardmore, OK
Salk Institute for Biological Studies
Plant Gene Expression Center, Berkeley, CA
Yale University, Department of Biology
- 1994 Genetic and physiological analyses of light perception/response networks in
Arabidopsis, Indiana University, Bloomington, February
Regulation of plant development by blue light sensory systems, Department of
Botany, University of Toronto, Toronto, Canada, February.
Blue light sensory systems *Arabidopsis*, Institute of Molecular Biology,
University of Oregon, Eugene, March.
Genetic analysis of photomorphogenesis in *Arabidopsis*, Carnegie Institute of
Washington, Stanford, CA, March.
Genetic and physiological analyses of light perception/response networks in
Arabidopsis, Arabidopsis Training Grant Program, University of
Wisconsin - Madison, May.
Blue light response systems in plants, Plant Biochemistry 1994, Michigan State
University, E. Lansing, MI, July.
Light regulation of plant development. Woods Hole Laboratories, Cape Cod,
MA, July.
- 1995 Photosensory systems regulating plant development, University of Dayton,
Dayton, OH, January.
Photosensory systems regulating plant development, Miami University, Oxford,
OH, March
Interaction between the phytochrome and gravity sensory-response systems in
Arabidopsis, Frontier Research Forum, RIKEN Institute of Physical and
Chemical Research, Wako-shi, Japan
Photosensory systems regulating plant development, Yonsei University, Seoul,
Korea, October
Photosensory systems regulating plant development, Ewha Womens University,
Seoul, Korea, October
- 1996 Interactions of phytochrome, gravitropism and phototropism in *Arabidopsis*,
Purdue University, West Lafayette, IN, February
Sensory-response pathways for light and gravity in plants, University of Hanover,
Hanover, Germany, September
Sensory-response pathways for light and gravity in plants, University of Tromso,
Tromso, Norway, September
- 1997 Interactions between blue light, phytochrome and gravity response systems in
Arabidopsis, IUPUI, Indianapolis, IN
- 1998 Shape shifting in plants: Interaction of light and gravity in plant development,
Merck/AAAS Lecture Series, Departments of Chemistry and Biology,
Franklin & Marshall College, Lancaster, PA

- Interactions between phytochromes and gravitropic response systems in *Arabidopsis*, Gordon Research Conference on Gravitational Effects on Living Systems, Colby-Sawyer College, New London, NH, July.
- 2000 Light-induced chloroplast movements in *Arabidopsis*, Plant Physiology & Biotechnology Program, University of Illinois, Urbana, IL, Nov.
- 2001 Light-induced chloroplast movements in *Arabidopsis*, Plant Physiology Program, Purdue Univ, March 20.
- 2002 Shape shifting in plants: The influence of light and gravity on plant form. Myers Hall Dedication. Indiana University. April 12
- Light-induced chloroplast movements. Department of Plant Biology, Ohio State University. May 16
- Light regulation of plant development. Arabidopsis Molecular Genetics Course. Cold Spring Harbor Laboratory. July 16
- Light-induction of chloroplast movements in Arabidopsis. Arabidopsis Molecular Genetics Course. Cold Spring Harbor Laboratory. July 16
- Shape shifting in plants: The influence of light and gravity on plant form. University of Louisiana. Oct 17
- Chloroplast motility in plants: seeking enlightenment. IGERT. Indiana University, Nov 18
- 2003 Light-induced chloroplast movements in leaves. Dept of Molecular Biosciences and Bioengineering, University of Hawaii, Honolulu, HI. Feb.
- Light-induced chloroplast movements in leaves. Dept of Molecular Biosciences and Bioengineering, University of Hawaii, Honolulu, HI. March.
- Light-induced chloroplast movements in leaves. Seoul National University, Seoul, Korea. March.
- Light-induced chloroplast movements in leaves. Pohang University of Science and Technology, Pohang, Korea. March.
- Shape shifting in plants: The influence of light and gravity on plant form. Department of Biology, University of Missouri, Columbia. April.
- Light responses in plants. Arabidopsis Molecular Genetics Course. Cold Spring Harbor Laboratory. July.
- The roles of light and gravity in establishing plant architecture. Arabidopsis Molecular Genetics Course. Cold Spring Harbor Laboratory. July.
- 2004 Light-induced chloroplast movements in leaves. Ohio University, Athens, OH, April.
- Light responses in plants. Advanced Techniques in Plant Science. Cold Spring Harbor Laboratory. July.
- Light-induced chloroplast movements in leaf cells. Advanced Techniques in Plant Science. Cold Spring Harbor Laboratory. July.
- Light, gravity and the regulation of plant architecture. Pioneer Hi-Bred International, Inc., Sept.
- Taking the Excitement of Discovery to the Classroom and Beyond. Indiana University Scholarship of Teaching and Learning Program, Bloomington. Sept.
- Light-induced chloroplast movements in leaf cells. Pennsylvania State University, Oct.
- Light and gravity as key regulators of plant architecture. Pennsylvania State University, Oct.

- Light-induced chloroplast movements in leaf cells. University of Arizona, Tucson, AZ. Nov.
- 2005 Light responses in plants. Advanced Techniques in Plant Science. Cold Spring Harbor Laboratory. July.
- Light-induced chloroplast movements in leaf cells. Advanced Techniques in Plant Science. Cold Spring Harbor Laboratory. July.
- sLowlife*: Communicating an awareness of plants through science and art. Dept of Plant Biology, Carnegie Institution of Washington, Stanford, CA, Sept.
- Light-induced chloroplast movements in leaves. Dept of Plant Biology, Carnegie Institution of Washington, Stanford, CA, Sept.
- Gravity responses of lateral organs in shaping plant architecture. Dept of Plant Biology, UC Berkeley, Oct.
- Light-induced chloroplast movements in leaves. UC San Francisco, Oct.
- NSF criterion 2 broader impact concerns for grant writers. Indiana University Research Symposium, Dec.
- sLowlife*: a successful educational outreach activity. Indiana University Research Symposium, Dec.
- 2006 Light-induced chloroplast movements in leaves. Howard University, Washington DC. Jan.
- Environmental Sensory-response systems and plant development. The United States Botanic Garden (co-sponsored by the National Museum of Natural History), Washington DC, Jan.
- sLowlife*: Communicating an Awareness of Plants Through Science and Art. The United States Botanic Garden, Washington DC, Jan.
- Light-induced chloroplast movements in leaves. Washington University, St. Louis, April.
- Light-induced chloroplast movements in leaves. Colorado State University, Ft. Collins, April .
- Shape Shifting in Plants: Gravitropism and the Control of Plant Architecture. Perspectives in Biology Symposium, Wake Forest University, Nov.
- Mechanisms and Functions of Light-Induced Chloroplast Movements in Leaf Cells. Perspectives in Biology Symposium, Wake Forest University, Nov.
- Mechanism and Functions of Light-Induced Chloroplast Movements in Leaf Cells. Boyce Thompson Institute, Ithaca, NY, Nov.
- Revealing Plant *Awareness*, Science Cabaret. Ithaca, NY, Nov.
- The Intersection of Art & Science, School of Fine Arts Gallery, Indiana University, Nov.
- Mechanism and Functions of Light-Induced Chloroplast Movements in Leaf Cells. Wabash College, Crawfordsville, IN, Nov.
- 2007 Light-Induced Chloroplast Movements in Leaf Cells. Univ of Minnesota, Feb.
- Communicating Science to Public Audiences. University of Minnesota, Feb.
- Mechanism and Functions of Light-Induced Chloroplast Movements in Leaf Cells. IUPUI, March.
- Plant Science as Art. David Weinberg Gallery, Chicago, IL March
- Communicating an Awareness of Plants Through Science and Art. Banquet Speaker - Central Michigan Chapter of Sigma Xi. April.
- sLowlife*: Communicating an Awareness of Plants Through Science and Art. Chicago Botanic Garden, Sept.

- Plants-In-Motion: Ents, Plants and Environmental Awareness. Chicago Humanities Festival, Chicago, IL, Nov
- Open Access Publishing: A Scholarly Society Perspective. Indiana University Library. Dec
- 2008 Keynote Presentation: The Biology of Ents and Plants: Masters of Slow Living. Univ of Calgary, CA Feb (Canceled*)
- Light-Induced Chloroplast Movements in Leaf Cells, Univ of Calgary, Feb (Canceled *)
- Light-Induced Chloroplast Movements in Leaf Cells, Univ of California - Riverside, Feb (Cancelled*)
- Light-Induced Chloroplast Movements in Leaf Cells, Clemson Univ, Feb (Canceled*)
- Keynote Presentation: Plants-In-Motion: Ents, Plants and Environmental Awareness. United States Botanic Garden. March (Canceled*)
- Light-Induced Chloroplast Movements in Leaf Cells, NC State Univ, April (Canceled*)
- Keynote Presentation: Plants-In-Motion: Ents, Plants and Environmental Awareness. Univ of Minn. April (Canceled*)
- Light-Induced Chloroplast Movements in Leaf Cells, Univ of Illinois, April (Canceled*)
- * Canceled due wife's illness
- 2009 All invitations declined due to wife's illness and death
- 2010 Light-Induced Chloroplast Movements in Leaf Cells, Purdue, Feb
- The Un-still Life of Plants, Kermit Olsen Lecture, Univ of Minn. April
- 2011 The mechanism and function of light-regulated chloroplast movements. Dept of Biology, Indiana University, Jan
- Regulation of light-dependent chloroplast movements in leaves. Washington State University, Pullman, April
- The Un-still Life of Plants. Washington State University, Pullman, April
- The Un-still Life of Plants, Buffalo Botanical Gardens, Oct
- The physiology of plant movements, Medaille College, Buffalo, NY, Oct
- Biology and the Moving Image, Indiana University, History and Philosophy of Science, Nov
- 2012 Plants: they whisper, talk, and even move. Hiram College, OH, Jan
- Regulation of light-dependent chloroplast movements in leaves. Hiram College, OH, Jan
- Regulation of light-dependent chloroplast movements in leaves. Dept of Plant Biology, Univ of Georgia, March
- Communicating an Awareness of Plants Through Science and Art. Lamar Dodd School of Art, University of Georgia, March
- Regulation of light-dependent chloroplast movements in leaves. University of Calgary, Canada, March
- Banquet Presentation: Plants: they whisper, talk, and even move. University of Calgary, CA, March
- Regulation of light-dependent chloroplast movements in leaves. UNAM Av Universidad, Mexico, March
- Plants: they whisper, talk, and even move. UNAM Av Universidad, Mexico, March

- Regulation of light-dependent chloroplast movements in leaves. Clemson Univ, April
- Regulation of light-dependent chloroplast movements in leaves. Texas State Univ, San Marcos, April
- Regulation of light-dependent chloroplast movements in leaves. Univ of Illinois, Chicago, April
- Regulation of light-dependent chloroplast movements in leaves. Univ of Kentucky, Lexington, Oct
- 2013 Regulation of light-dependent chloroplast movements in leaves. Univ of Illinois, Urbana, Jan
- Regulation of light-dependent chloroplast movements in leaves. Univ of Massachusetts, Amherst, Feb
- Plants: they whisper, talk, and even move. Masters Gardeners of Erie County, Buffalo, NY, March
- Regulation of light-dependent chloroplast movements in leaves. UC Riverside, CA, March
- Regulation of light-dependent chloroplast movements in leaves. Brown University, Providence, RI, April
- Plants: they whisper, talk, and even move. Brown University, Providence, RI, April
- Regulation of light-dependent chloroplast movements in leaves. Dartmouth College, Lebanon, NH, April
- Regulation of light-dependent chloroplast movements in leaves. Michigan State University, E. Lansing MI, Oct
- Regulation of light-dependent chloroplast movements in leaves. Earlham College, Richmond, IN. Oct
- 2014 Regulation of light-dependent chloroplast movements in leaves. College of New Jersey, Ewing, NJ, Feb
- Plants: they whisper, talk, and even move. College of New Jersey, Ewing, NJ, Feb
- Regulation and function of light-dependent chloroplast movements in leaves. Randolph-Macon College, VA. Sept.
- 2015 Function and Regulation of light-dependent chloroplast movements in leaves. IUPUI, IN, Feb.
- Plants Reproduce Too. CISAB Training Grant. IU. April
- Function and Regulation of light-dependent chloroplast movements in leaves. DePauw Univ, IN, April.
- Function and Regulation of light-dependent chloroplast movements in leaves. IU Kokomo, IN, Sept.
- 2016 The use of living images for transmitting scientific understanding of photosynthetic processes. History and Philosophy of Science Colloquium. Indiana Univ. Jan.
- Function and Regulation of light-dependent chloroplast movements in leaves. Carnegie Institution of Washington, Stanford Univ, CA, Feb.
- Noodling with Science and Making Art: Science/Art Collaborations of Vic Munez. Eskenazi Museum of Art, Indiana University, Feb.
- Function and Regulation of light-dependent chloroplast movements in leaves. Butler University, IN. Oct.

- Photographing the Biodiversity of Indiana. Center for Integrative Photographic Studies, Indiana Univ., Nov.
- 2018 Function and Regulation of light-dependent chloroplast movements in leaves. Miami Univ, OH. May.
- 2019 Plants: they whisper, talk, and even move. Indiana University Emeriti House, Jan.

MEETING ORGANIZATION

- 1993 Symposium Chair for 1993 Gordon Research Conference on Plant Molecular Biology, Proctor Academy, Andover, NH
Symposium Organizer, 1993 Congress on Cell and Tissue Culture, San Diego, CA
Chairman of the 5th International Congress on *Arabidopsis* Research, August 19-22, 1993
- 1995 Symposium Chair for 6th International Meeting on Arabidopsis Research, Madison, WI, June
Session Chair for Cold Spring Harbor Conference on Signaling in Plant Development, Cold Spring Harbor, September
- 1996 Symposium chair, 18th Annual Symposium in Plant Physiology, University of California, Riverside. January
- 1996-00 Program Committee Member, Annual Meeting of American Society of Plant Physiologists
- 2001 Symposium Chair for Gordon Research Conference on Gravitational Effects on Living Systems. Connecticut College, New London, CT.
- 2001-03 Program Committee Chair, American Society of Plant Biologists
- 2004 Symposium Chair, Annual Meeting of American Society of Plant Physiologists, Orlando, FL, July
- 2005 Symposium Chair, Annual Meeting of American Society of Plant Physiologists, Seattle, WA, July
Discussion Leader. Gordon Research Conference on Mechanotransduction and Gravity Signaling in Biological Systems. Univ of New England, July