

Curriculum Vitae of Cary A. Mitchell, Ph.D.

Business Address

Department of Horticulture
& Landscape Architecture
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West Lafayette, Indiana 47906
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Education

Ph.D. in Plant Physiology	University of California at Davis	1972
M.S. in Horticulture	Cornell University	1968
B.S. in Agricultural Science	University of Illinois	1965

Scientific, Professional, Honorary Membership

American Society for Horticultural Science
American Society of Plant Biologists
American Society for Gravitational and Space Biology
American Society for the Advancement of Science
American Society of Photobiology
American Institute of Biological Sciences
Hydroponic Society of America
Sigma Xi
Pi Alpha Xi
Alpha Zeta
Gamma Sigma Delta
Gamma Alpha
Phi Eta Sigma
E Clampus Vitus
NCR-101

Professional Appointments

Program Scientist	NASA	1997-1999
Professor of Plant Physiology	Purdue University	1984-present
Associate Professor of Plant Physiology	Purdue University	1978-1984
Assistant Professor of Plant Physiology	Purdue University	1972-1978

Research Involvement at Purdue

- Controlled-environment agriculture
- Space advanced life-support systems
- Controlled ecological life-support systems
- Mechanical stress physiology of plants
- Gravitational and space biology
- Flood-stress physiology of plants
- Seed dormancy and germination

Teaching Involvement at Purdue

- Plant Responses to the Environment (dual-level mini-course)
- Controlled Environment Agriculture (dual-level mini-course)
- Bioregenerative Life-Support Systems (graduate, multi-disciplinary)
- Plant Growth and Development (graduate initially, dual-level later)
- Planning and Presenting Research (beginning graduate)
- Environmental Plant Physiology (upper-division undergraduate)
- Photobiology (graduate mini-course)
- Seed Germination and Dormancy (graduate mini-course)
- Nursery Management (upper-division undergraduate)

Administrative & Leadership Involvement

Director, NASA Specialized Center of Research and Training in Advanced Life Support (2002-present)

- Budget authority for 17 research projects at 3 partner universities and outreach
- Responsibility for direction and conduct of research program
- Direct Center Operations Manager and Education & Outreach Manager
- Convener, Executive Committee, Research Committee
- Represent Center with External Advisory Committee, agency sponsors
- Responsibility for annual reports, task reports
- Represent Center at monthly NASA Project Manager telecoms
- Lead, Biomass Production focus area

Program Scientist, NASA Gravitational Biology & Ecology Program (1997-1999)

- Program-plan development
- Oversight, NASA centers of excellence and interagency research networks
- Website development advising
- Technical monitoring of extramural research projects
- Proposal review and pre-selection for grants program
- Responsible for broad science issues in program
- Represent program at national life sciences society meetings

Director, NSCORT in Bioregenerative Life Support (1990-1996)

- Convener, Executive Committee
- Budget preparation and distribution
- Coordinator, graduate course in Bioregenerative Life-Support Systems
- Strategic planning for the Center (projects, personnel, funding)
- Guide outreach coordinator and administrative assistant
- Represent Center: invited presentations, national meetings, committees, media
- Outreach and development planning
- Liaison between Center, External Advisory Committee, and agency sponsors
- Guide organization of annual reports, annual symposia, and seminar series

Chair, Purdue University Plant Physiology (PUPP) Program (6 years)

- Budget preparation for program
- Convener, Executive Committee, annual faculty meetings
- liaison with Policy (Department Heads) Committee, PUPP Graduate Student Association
- guide administrative assistant
- final decisions on acceptance/rejection of Ph.D. applicants
- manage advertising campaigns for program
- fellowship applications, recruitment, interview of promising candidates
- initial advisor of new PUPP fellows (during rotations)
- coordinated curriculum reform: team teaching, course renovations, core streamlining

External Service Involvement

American Society for Horticultural Science (ASHS)

- President (2004-2005)
- Organizer and convener, colloquium on “Bio-derived Energy Sources for Protected Horticulture” (2003)
- Chair, Science Priorities (Research Priorities and Issues) Committee
- Chair, Congressional Fellow Selection Committee
- Venture Fund Committee
- Publications Committee
- Controlled Environments and Stress Physiology Working Groups
- Technical sessions Committee
- Reviewer of manuscripts for JASHS, Hort Science, and HortTechnology

American Society for Gravitational and Space Biology (ASGSB)

- President (1994-1995)
- Board of Governors
- Program Chair, national conference
- Chair, Public Policy and Legislative Affairs Committee
- Long-range planning committee

American Society of Plant Physiologists (ASPP)/American Society of Plant Biologists (ASPB)

- Chair, Committee on the status of women in plant physiology
- Lead, national gender-survey committee & publication

AIBS, USRA, IDI, BARD, NASA

- Chair, panelist, external reviewer of grant proposals

United States Department of Agriculture (USDA)

- Chair, Horticulture and Field Crops Panel, Binational Agricultural Research and Development (BARD) Fund, 3 years
- Chair, vice chair, secretary, local arrangements host, Purdue representative, NCR-101 Committee on Controlled Environment Technology and Use, 25 years
- External reviewer, NRI, SBIR proposals

National Aeronautics and Space Administration (NASA)

- Space Station Utilization Advisory Subcommittee, 7 years
- Science Working Group, Biological Research Project for Space Station Utilization
- Science and Technology Working Group, CELSS Test Facility for Space Station
- CELSS Discipline Working Group

National Academy of Sciences

- Panelist, review strategic plan of NASA's Advanced Life-Support Program
- Panelist, recommendations for the future of Biosphere-2

International Conference on Environmental Systems (ICES)

- Organizer, peer-review coordinator, acceptance decisions, convener, "Biomass Production" sessions at 4 international conferences

Habitation (formerly Life Support & Biosphere Sciences) Journal

- Senior Editor for Advanced Human Support Technology-assign associate editors to conduct reviews on submitted manuscripts, final acceptance/rejection decisions

Internal (Purdue) Service Involvement

- Chair, Floriculture Search Committee, HLA Department
- Co-I, NSF MRI grant for campus-wide controlled-environment facilities
- Chair, HLA Department Head Review Committee
- HLA Representative, Agriculture Area Promotions Committee
- HLA Representative, University Senate (3 terms)
- University Graduate Council
- Chair, Executive Committee, Purdue University Plant Physiology Program, 6 years
- Dean's Agenda & Policy Committee
- Chair, Departmental Graduate Committee, 7 years

- Department Head's Advisory Committee
- Departmental Research Committee
- School Grievance Committee
- Greenhouse Replacement Planning Committee
- Minority Student Recruitment & Retention Committee, Ag School
- Chair, Plant-Growth Facilities Committee, HLA Department
- College of Agriculture Administrative Professional Promotion Committee, 3 years
- Undergraduate curriculum advising, course registration in HORT and HLA, 35 years
- Advisory committees of graduate students in departments/programs throughout Purdue and external examiner for students at other universities and countries

Training Involvement within research program

- 24 graduate students
- 12 post docs
- 7 technicians
- >100 undergraduates

External Funding

>\$16M in competitive funding from NASA, NSF, USDA

Honors and Awards

- Orr E. Reynolds Distinguished Service Award from ASGSB, 2006
- Seeds-for-Success Research-Funding Award from Purdue University, 2005
- Distinguished Service Award from NCR-101, 2005
- Distinguished Service Award from ASHS, 2004
- Fellow, American Society for Horticultural Science, 1993
- Presidential Service Award from ASGSB, 1993
- ASHS Cross-commodity publications award, 1985.

Publications

More than 325 total publications, including abstracts, reports, popular articles, and refereed publications

Refereed Publications

Russell JF, Massa GD, Mitchell CA 2006. Water and energy transport of crops under different lighting conditions. *ICES* 01-2028.

Massa GD, Emmerich JC, Morrow RC, Bourget CM and CA Mitchell 2006. Plant-growth lighting for space life support: A review. *Gravit. Space. Biol.* 19(2): 19-29.

Massa GD, Mick ME, Mitchell CA 2006. Strawberry cultivar analysis: temperature and pollination studies. *ICES* 01-2030.

Massa GD, Emmerich JC, Morrow RC and CA Mitchell 2005. Development of a Reconfigurable LED Plant-growth Lighting System for Equivalent System Mass Reduction in an ALS. *ICES* 01-2955.

Massa GD, Mick ME, Weiss I, Montgomery JA, Mortley DG, Mauer LJ and C A Mitchell 2005. Effects of root-zone volume, vine pruning, and season on yield, proximate composition, and antioxidant capacity of sweetpotato (*Ipomea batatas* (Lam.) L. TU-82-155). *ICES* 01-2816.

Massa GD, Emmerich JC, Mick ME, Kennedy RJ, Morrow RC and CA Mitchell 2005. "Development and testing of an efficient LED intracanopy lighting design for minimizing equivalent system mass in an advanced life-support system." *Gravitational and Space Biology Bulletin* 18(2): 87-88.

Montgomery JA, RA Bressan, CA Mitchell. 2004. Optimizing environmental conditions for application of mechano-dwarfing stimuli to *Arabidopsis*. *J. Amer. Soc. Hort. Sci.* 129(3): 339-343.

Orcun, S., G. Blau, J. F. Pekny, C. A. Mitchell. 2003. An Advanced Scheduling Model for Crop Production in Bio-Regenerative Advanced Life Support (ALS) Systems. *ICES* 01-2358.

Montgomery, JA, RA Beressan, CA Mitchell. 2003. Application of mechano-dwarfing stimuli to *Arabidopsis* for mutant-screen analysis. *Acta Horticulturae* 618: 85-93.

Frantz, J., R. Joly, and C. Mitchell. 2001. Intracanopy lighting reduces electrical energy utilization by closed cowpea stands. *Life Support & Biosphere Sci.* 7: 283-290.

Frantz, J., R. Joly, and C. Mitchell. 2000. Intracanopy lighting influences radiation capture, productivity, and leaf senescence in cowpea canopies. *J. Amer. Soc. Hort. Sci.* 125:694-701.

Frantz, J., J. Frick, and C Mitchell. 1999. A liquid/solid-matrix hydroponic system for establishment of small-seeded crop species. *HortTechnology* 9: 668-671.

Goldman, K. and C. Mitchell. 1999. Effects of long-to-short photoperiod shifts on productivity of a day-neutral rice cultivar. *HortScience* 34: 875-877.

- Myers, P., and C. Mitchell. 1998. Optimizing the calcium content of a copolymer acrylamide gel matrix for dark-grown seedlings. *J. Amer. Soc. Hort. Sci.* 123: 1107-1111.
- Frick, J., C. Precetti, and C. Mitchell. 1998. Predicting lettuce canopy photosynthesis with statistical and neural network models. *J. Amer. Soc. Hort. Sci.* 123: 1076-1080.
- Frantz, J., C. Chun, R. Joly, and C. Mitchell. 1998. Intracanalopy lighting of cowpea canopies in controlled environments. *Life Support Biosphere Sci.* 5: 183-189.
- Chun, C. and C. Mitchell, 1997. Dynamic optimization of CELSS crop photosynthetic rate by computer-assisted feedback control. *Adv. Space Res.* 20: 1855-1860.
- Nickel, K., S. Nielsen, D. Smart, C. Mitchell, and M. Belury. 1997. Calcium bioavailability of vegetarian diets in rats: potential application in a bioregenerative life-support system. *J. Food Sci.* 62: 619-631.
- Mitchell, C., C. Chun, W. Brandt, and S. Nielsen. 1997. Environmental modification of yield and proximate composition of 'Waldmann's Green' leaf lettuce. *J. Food Quality* 20:73-80.
- Nielsen, S., M. Belury, K. Nichel, and C. Mitchell. 1996. Plant nutrient composition altered with controlled environments for future space life-support systems. *Adv. In New Crops*, J. Janick and J. Simon, eds. *Proceedings of the Third International Symposium*, ASHS Press, Alexandria, VA, pp. 624-632.
- Mitchell, C., T. Dougher, S. Nielsen, M. Belury, and R. Wheeler. 1996. Costs of providing edible biomass for a balanced vegetarian diet in a controlled ecological life-support system. *Plants in Space Biology*, H. Suge, ed. Tohoku University Press, Sendai, Japan, pp. 245-254.
- Chun, C. and C. Mitchell. 1996. Dynamic control of photosynthetic photon flux for lettuce production for CELSS. *Proc. Int'l. Symp. Plant Prod. in Closed Ecosystems*. T. Kozai, Ed. *Acta Hort.* 440:7-12.
- Mitchell, C., L. Sherman, S. Nielsen, P. Nelson, P. Trumbo, T. Hodges, P. Hasegawa, R. Bressan, M. Ladisch, and D. Auslander. 1996. Earth benefits of interdisciplinary CELSS-related research by the NSCORT in bioregenerative life support. *Adv. Space Res.* 18(4/5):23-31.
- McKeehen, J., C. Mitchell, R. Wheeler, B. Bugbee, and S. Nielsen. 1996. Excess nutrients in hydroponic solutions alter nutrient content of rice, wheat, and potato. *Adv. Space Res.* 18(4/5):73-83.

- Ohler, T. and C. Mitchell. 1996. Identification of yield-optimizing environments for two cowpea breeding lines by manipulating photoperiod and harvest scenario. *J. Amer. Soc. Hort. Sci.* 121:576-581.
- Mitchell, C. 1996. Recent advances in plant response to mechanical stress: theory and application. *HortScience* 31:31-35.
- Ohler, T., S. Nielsen, and C. Mitchell. 1996. Varying plant density and harvest time to optimize cowpea leaf yield and nutrient content. *HortScience* 31:193-197.
- Ohler, T. and C. Mitchell. 1995. Effects of carbon dioxide level and plant density on cowpea canopy productivity for a bioregenerative life-support system. *J. Life Support & Biosphere Sci.* 2:3-9.
- Fu, B., P. Nelson, and C. Mitchell. 1995. The food-process subsystem for CELSS: a conceptual analysis. *Life Support & Biosphere Sci.* 2:59-70.
- Volk, G. and C. Mitchell. 1995. Photoperiod shift effects on yield characteristics of rice. *Crop Sci.* 35:1631-1635.
- Mitchell, C. and P. Myers. 1995. Mechanical stress regulation of plant growth and development. *Horticultural Reviews*. Vol. 17, pp. 1-42, Wiley, NY.
- Mitchell, C. 1994. Bioregenerative life-support systems. *Am. J. Clin. Nut.* 60:820S-824S.
- Frick, J., S. Nielsen, and C. Mitchell. 1994. Yield and seed oil content response of dwarf, rapid-cycling brassica to nitrogen treatments, planting density, and CO₂ enrichment. *J. Amer. Soc. Hort. Sci.* 119:1137-1143.
- Frick, J. and C. Mitchell. 1993. Stabilization of pH in solid-matrix hydroponic systems. *HortScience* 28:981-984.
- Mitchell, C. 1993. The role of bioregenerative life-support systems in a manned future in space. *Trans. Kans. Acad. Sci.* 97(1-2):87-92.
- Mitchell, C. 1992. Measurement of photosynthetic gas exchange in controlled environments. *HortScience* 27:764-767.
- Mitchell, C. 1992. Modification of plant growth and development by acceleration and vibration: concerns and opportunities for plant experimentation in orbiting spacecraft. *Adv. Space Res.* 12:219-225.
- Jones, R. and C. Mitchell. 1992. Effects of physical agitation on yield of greenhouse-grown soybean. *Crop Science* 32:404-408.
- Mitchell, C., T. Leakakos, and T. Ford. 1991. Modification of yield and chlorophyll content in 'Black-Seeded Simpson' lettuce by HPS radiation and nitrogen supplementation. *HortScience* 26:1371-1374.

- McNamara, S. and C. Mitchell. 1991. Roles of auxin and ethylene in adventitious root formation by a flood-resistant tomato genotype. *HortScience* 26:57-58.
- Bubenheim, D., C. Mitchell, and S. Nielsen. 1990. Utility of cowpea foliage in a crop production system for space. In J. Janick and J. Simon, eds. *Advances in New Crops*, Timber Press, Portland, OR, pp. 535-538.
- Mitchell, C. 1990. Crucial issues facing horticulture: present and future. *HortScience* 25:598-602.
- Jones, R., L. Coe, L. Montgomery, and C. Mitchell. 1990. Seismic stress responses of soybean to different photosynthetic photon flux. *Annals of Botany* 66:617-622.
- McNamara, S. and C. Mitchell. 1990. Adaptive stem and adventitious root responses of two tomato genotypes to flooding. *HortScience* 25:100-103.
- McNamara, S. and C. Mitchell. 1989. Differential flood stress resistance of two tomato genotypes. *J. Amer. Soc. Hort. Sci.* 114:976-980.
- Jones, R. and C. Mitchell. 1989. Calcium involvement in growth inhibition of mechanically stressed soybean seedlings. *Physiol. Plant.* 76:598-602.
- Jones, R. and C. Mitchell. 1988. A marking device for the identification and measurement of growth zones in seedlings with minimum mechanical stress. *Ann. Appl. Biol.* 113:437-441.
- Brooks, C., and C. Mitchell. 1988. Effects of salicylhydroxamic acid on endosperm strength and embryo growth of *Lactuca sativa* L. cv. Waldmann's Green. *Plant Physiol.* 86:826-829.
- Knight, S. and C. Mitchell. 1988. Growth and yield characteristics of 'Waldmann's Green' leaf lettuce under different photon fluxes from metal halide or incandescent + fluorescent radiation. *Scientia Horticulturae* 35:51-61.
- Knight, S. and C. Mitchell. 1988. Effects of incandescent radiation on photosynthesis, growth rate, and yield of 'Waldmann's Green' leaf lettuce. *Scientia Horticulturae* 35:37-39.
- Knight, S. and C. Mitchell. 1988. Effects of CO₂ and photosynthetic photon flux on yield, gas exchange, and growth rate of 'Waldmann's Green' leaf lettuce. *J. Exp. Bot.* 39:317-328.
- Knight, S., C. Akers, S. Akers, and C. Mitchell. 1988. The Minitron II system for precise control of the plant growth environment. *Photosynthetica* 22:90-98.

- Latimer, J. and C. Mitchell. 1988. Effects of mechanical stress or abscisic acid on growth, water status, and leaf abscisic acid content of eggplant seedlings. *Scientia Horticulturae* 36:37-46.
- Knight, S. and C. Mitchell. 1987. Stimulating productivity of hydroponic lettuce by foliar application of triacontanol. *HortScience* 22:1307-1309.
- Latimer, J. and C. Mitchell. 1987. Influence of UV-B radiation and photosynthetic photon flux on acclimation of eggplant to outdoor exposure. *HortScience* 22:426-429.
- Latimer, J., T. Pappas, and C. Mitchell. 1986. Growth responses of eggplant and soybean seedlings to mechanical stress in greenhouse and outdoor environments. *J. Amer. Soc. Hort. Sci.* 111:694-698.
- Akers, S.W. and C.A. Mitchell. 1985. Seismic stress effects on reproductive structures of tomato, potato, and marigold. *HortScience* 20:684-686.
- Pappas, T. and C. Mitchell. 1985. Influence of seismic stress on photosynthetic productivity, gas exchange, and leaf diffusive resistance of *Glycine max* (L.) Merrill cv. Wells II. *Plant Physiol.* 79:285-289.
- Brooks, C., K.S. Yu, and C. Mitchell. 1985. Salicylhydroxamic acid potentiates germination of 'Waldmann's Green' lettuce seed. *Plant Physiol.* 79:386-388.
- Pappas, T. and C.A. Mitchell. 1985. Effects of seismic stress on the vegetative growth of (*Glycine max* (L.) Merr. cv. Wells II. *Plant, Cell & Environ.* 8:143-148.
- Akers, C.P., S.W. Akers, and C.A. Mitchell. 1985. The minitron system for growth of small plants under controlled environment conditions. *J. Amer. Soc. Hort. Sci.* 110:353-357.
- Tripepi, R.R. and C.A. Mitchell. 1984. Stem hypoxia and root respiration of flooded maple and birch seedlings. *Physiol. Plant.* 60:567-571.
- Tripepi, R.R. and C.A. Mitchell. 1984. Metabolic response of river birch and European birch roots to hypoxia. *Plant Physiol.* 76:31-35.
- Akers, S.W. and C.A. Mitchell. 1984. Seismic stress effects on vegetative and reproductive development of 'Alaska' pea. *Can. J. Bot.* 62:2011-2015.
- Heuchert, J. and C. Mitchell. 1983. Inhibition of shoot growth in greenhouse-grown tomato by periodic gyratory shaking. *J. Amer. Soc. Hort. Sci.* 108:795-800.
- Heuchert, J., J. Marks, and C. Mitchell. 1983. Strengthening of tomato shoots by gyratory shaking. *J. Amer. Soc. Hort. Sci.* 108:801-805.

- Knight, S. and C. Mitchell. 1983. Enhancement of lettuce yield by manipulation of light and nitrogen nutrition. *J. Amer. Soc. Hort. Sci.* 108:750-754.
- Knight, S. and C. Mitchell. 1983. Stimulation of lettuce productivity by manipulation of diurnal temperature and light. *HortScience* 18:462-463.
- Beyl, C. and C. Mitchell. 1983. Alteration of growth, exudation rate, and endogenous hormone profiles in mechanically-dwarfed sunflower. *J. Amer. Soc. Hort. Sci.* 108:257-262.
- Beyl, C. and C. Mitchell. 1982. *In vitro* protection of indoleacetic acid during thin layer chromatography. *HortScience* 17:187-188.
- Carpenter, J. and C. Mitchell. 1980. Root respiration characteristics of flood tolerant and intolerant tree species. *J. Amer. Soc. Hort. Sci.* 105:684-687.
- Carpenter, J. and C. Mitchell. 1980. Flood-induced shift of electron flow between cyanide-sensitive and alternative respiratory pathways in roots of tolerant and intolerant tree species. *J. Amer. Soc. Hort. Sci.* 105:688-690.
- Yu, K., C. Mitchell, and H. Robitaille. 1980. Re-evaluation of the cyanide resistance of seed germination. *Plant Physiol.* 68:509-511.
- Yu, K., C. Mitchell, S. Yentur, and H. Robitaille. 1979. CN-insensitive, SHAM-sensitive processes in potentiation of light-dependent lettuce seeds. *Plant Physiol.* 63:121-125.
- Beyl, C. and C. Mitchell. 1977. Automated mechanical stress application for height control of greenhouse chrysanthemum. *HortScience* 12:575-577.
- Beyl, C. and C. Mitchell. 1977. Characterization of mechanical stress dwarfing in chrysanthemum. *J. Amer. Soc. Hort. Sci.* 102:591-594.
- Mitchell, C. 1977. Influence of mechanical stress on auxin-stimulated growth of excised pea stem sections. *Physiol. Plant.* 41:129-134.
- Mitchell, C., H. Dostal, and T. Seipel. 1977. Dry weight reduction in mechanically-dwarfed tomato plants. *J. Amer. Soc. Hort. Sci.* 102:605-608.
- Mitchell, C. and J. Hoff. 1977. Influence of ambient humidity and root zone shielding on tomato seedling growth. *J. Amer. Soc. Hort. Sci.* 102:587-590.
- Wilcox, G., C. Mitchell, and J. Hoff. 1977. Influence of nitrogen form on exudation rate and ammonium, amide, and cation composition of xylem exudate in tomato. *J. Amer. Soc. Hort. Sci.* 102:192-196.

Mitchell, C., C. Severson, J. Wott, and P. Hammer. 1975. Seismomorphogenic regulation of plant growth. *J. Amer. Soc. Hort. Sci.* 100:161-165.

Mitchell, C. and C. Stocking. 1975. Kinetics and energetics of light-driven chloroplast glutamine synthesis. *Plant Physiol.* 55:59-63.

Hammer, P., C. Mitchell, and T. Weiler. 1974. Height control in greenhouse chrysanthemum by mechanical stress. *HortScience* 9:474-475.

Extracurricular Service Involvement

Church

- President, Foundation Board
- Chair, Finance Committee
- Chair, Building Finance Committee
- Growth Committee
- Property Acquisition Committee
- Chancel Choir member, soloist
- Pastor-Parish Committee
- Administrative Board
- Focus-on-the-Future Task Force
- Adult Sunday school teaching

Community

- American Heart Association, American Diabetes Association, American Cancer Society, volunteer work
- Lafayette Urban Ministries, volunteer
- Little League baseball / soccer, coaching
- Cub/Boy Scouts / Webelos /YMCA Trail Guides, Troop committee, Pack leader
- Greater Lafayette Freedom Singers, Stars & Stripes concerts