

Shuyang Zhen

Assistant Professor

Department of Horticultural Sciences

2133 TAMU, Texas A&M University, College Station, TX 77843

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Education

Ph.D. July 2017

Horticulture
University of Georgia

M.S. August 2013

Horticulture
University of Maine

B.S. July 2011

Landscape Gardening
Huazhong Agricultural University

Professional Experience

Assistant professor

August 2020 – Present

Research area: controlled environment horticulture

Department of Horticultural Sciences, Texas A&M University, College Station, Texas

Research Scientist

March 2019 – August 2020

Advisor: Bruce Bugbee, email: bruce.bugbee@usu.edu

Department of Plants, Soils, & Climate, Utah State University, Logan, Utah

- Research focus: food production in controlled environments and on Mars; Photobiology

Post-doctoral Fellow

August 2017 – March 2019

Advisor: Bruce Bugbee, email: bruce.bugbee@usu.edu

Department of Plants, Soils, & Climate, Utah State University, Logan, Utah

- Research focus: Canopy photosynthesis; lighting for food crop production in controlled environment agriculture

Graduate Research Assistant

August 2013 – July 2017

Advisor: Marc van Iersel, email: mvanier@uga.edu

Department of Horticulture, University of Georgia, Athens, GA

- Dissertation title: Improving photosynthetic lighting efficiency in controlled environment agriculture: the importance of light acclimation and far-red light
- Research focus: supplemental lighting, photosynthesis, and chlorophyll fluorescence

Graduate Research Assistant

August 2011 – August 2013

Advisor: Stephanie Burnett, email: sburnett@maine.edu

School of Food and Agriculture, The University of Maine, Orono, ME

- Thesis title: Production of rosemary, Canadian columbine, cheddar pink, and English lavender
- Research focus: sensor-automated irrigation in greenhouses

Refereed Publications

Zhen, S. and B. Bugbee. 2020. Substituting far-red for traditionally defined photosynthetic photons results in equal canopy quantum yield for CO₂ fixation and increased photon capture during long-term studies: Implications for re-defining PAR. *Frontiers in Plant Science* (in press).

Zhen, S. and B. Bugbee. 2020. Far-red photons have equivalent efficiency to traditional photosynthetic photons: implications for re-defining photosynthetically active radiation. *Plant, Cell & Environment* <https://doi.org/10.1111/pce.13730>

Soundararajan M., R. Ledbetter, P. Kusuma, **S. Zhen**, P. Ludden, B. Bugbee, S.A. Ensign, and L.C. Seefeldt. 2019. Phototrophic N₂ and CO₂ fixation using a *Rhodospseudomonas palustris*-H₂ mediated electrochemical system with infrared photons. *Frontiers in Microbiology*. doi.org/10.3389/fmicb.2019.01817

Zhen, S., M. Haidekker, and M.W. van Iersel. 2018. Far-red light enhances photochemical efficiency in a wavelength-dependent manner. *Physiologia Plantarum*. doi: 10.1111/ppl.12834

Zhen, S. and M.W. van Iersel. 2017. Far-red light is needed for efficient photochemistry and photosynthesis. *Journal of Plant Physiology* 209:115-122.

Zhen, S. and M.W. van Iersel. 2017. Photochemical acclimation of three contrasting species to different light levels: implications for optimizing supplemental lighting. *Journal of American Society for Horticultural Science* 142: 346-354.

Zhen, S. and S.E. Burnett. 2015. Effects of substrate volumetric water content on English lavender morphology and photosynthesis. *HortScience* 50:909-915.

Zhen, S., S.E. Burnett, M.E. Day, and M.W. van Iersel. 2014. Effects of substrate water content on morphology and physiology of rosemary, Canadian columbine, and cheddar pink. *HortScience* 49:486-492.

Conference Proceedings

Zhen, S. and M.W. van Iersel. 2016. Modeling daily water use of bedding plants based on environmental factors and normalized difference vegetation index. *Southern Nursery Association Research Conference Proceedings* 61:165-170.

Trade Publications

Burnett, S.E. and **S. Zhen**. 2016. Manage soil moisture for proper irrigation of English lavender. *Greenhouse Grower* 34:43, 44, 46.

Burnett, S.E., **S. Zhen**, and M. van Iersel. 2012. Water requirements of herbaceous perennial plants. *American Floral Endowment Special Research Report #533*.

Teaching Experience

- Spring 2020 Teaching Assistant/Guest Lecturer for Dr. Bruce Bugbee
Utah State University
Topic: Environmental Plant Physiology (PSC 5270/6270)
- Fall 2019 Teaching Assistant/Guest Lecturer for Dr. Bruce Bugbee
Utah State University
Topic: Environmental Instrumentation (PSC 5000/6000)
Responsibilities: Teaching laboratory and working with students on class projects.
- Spring 2019 Teaching Assistant/Guest Lecturer for Dr. Bruce Bugbee
Utah State University
Topic: Environmental Plant Physiology (PSC 5270/6270)
Responsibilities: Lecturing on plant-water-relations, photosynthesis, carbon use efficiency and partitioning (3 lectures); grading.
- Fall 2018 Teaching Assistant/Guest Lecturer for Dr. Bruce Bugbee
Utah State University
Topic: Plant Nutrition (PSC 6430)
Responsibilities: Lecturing on functions of mineral nutrients, nitrogen uptake and assimilation, nutrient deficiency and toxicity (3 lectures); assisted graduate students in developing and setting up laboratory projects.
- Spring 2016, 2015 & 2014 Graduate Teaching Assistant
For Dr. Savithri Nambesan (2016 & 2015) and Dr. Marc van Iersel (2014)
University of Georgia
Topic: Environmental Physiology (Horticulture 4440(L)/6440(L))
Responsibilities: Lecturing on plant physiological responses to light (one lecture/semester); assisted in developing laboratory projects; preparing and setting up lab projects; training students (undergraduate and graduate) on laboratory instruments and irrigation control systems; grading.
- Spring 2012 Graduate Teaching Assistant
For Dr. Stephanie Burnett, University of Maine
Topic: Herbaceous Landscape Plants (PSE 219)

Guest Lectures

- Spring 2019 Guest Lecturer for Dr. Larry Rupp in Greenhouse Management (PSC 4050)
Utah State University
Topic: Greenhouse supplemental lighting
- Fall 2018 Guest Lecturer for Dr. Youping Sun in Plant Stress Physiology (PSC 6900)
Utah State University
Topic: Light stress

Fall 2017 Short course on the principles of photosynthetic gas exchange and using of LI-COR 6800, Utah State University

Extension Training

e-Gro Graduate Student Plant Diagnostic Training. Charlotte, NC. March 5-7, 2014

e-Gro Graduate Student Plant Diagnostic Training. Long Island, NY. April 11-13, 2016

Presentations

Friesen, P., Sellaro, R., Zhen, S. and van Iersel, M. 2020. Blue, Green, Red, and Far-red: Making sense of light quality and plant growth ([invited speaker](#)). ASPB Plant Biology 2020 Worldwide Summit.

Zhen, S. and Bugbee, B. 2019. Far-red photons are necessary for efficient photosynthesis: whole-canopy photosynthesis and radiation capture ([oral](#)). 2019 Annual Conference of the American Society for Horticultural Science, Las Vegas, NV.

Zhen, S. and Bugbee, B. 2019. Far-red photons, photosynthesis, and yield ([oral](#)). 2019 NCERA-101 'USDA committee on Controlled Environment Technology and Use', Montreal, Canada.

Zhen, S. and Bugbee, B. 2018. Far-red photons and whole-plant photosynthesis ([oral](#)). 2018 NCERA-101 'USDA committee on Controlled Environment Technology and Use', Raleigh, NC.

Zhen, S. and M.W. van Iersel. 2017. Identifying the spectral range of far-red light that enhances photochemistry under red/blue light ([oral](#)). 2017 NCERA-101 'USDA committee on Controlled Environment Technology and Use', Monterey, CA.

Zhen, S. and M.W. van Iersel. 2016. Enhancing photosynthesis with far-red light at different intensities of red/blue or warm white LED light ([oral](#)). 2016 Annual Conference of the American Society for Horticultural Science, Atlanta, GA.

Zhen, S. and M.W. van Iersel. 2016. Emerson's enhancement effect revisited: increasing photosynthetic rate and quantum yield of photosystem II with far-red LEDs ([poster](#)). 2016 8th International Symposium on Light in Horticulture, East Lansing, MI.

Zhen, S. 2016. Improving the efficiency of photosynthetic lighting for crop production with far-red LEDs ([oral](#)). E. Broadus Browne Research Awards for Outstanding Graduate Student Research Competition, The University of Georgia, Athens, GA.

Zhen, S. and M.W. van Iersel. 2016. Modeling daily water use of bedding plants based on environmental factors and normalized difference vegetation index ([oral](#)). 2016 Southern Nursery Association Research Conference, Athens, GA.

Zhen, S. and M.W. van Iersel. 2015. Using normalized difference vegetation index (NDVI) as a proxy for plant size in water use models to facilitate precision irrigation ([oral](#)). 2015 Annual Conference of the American Society for Horticultural Science, New Orleans, LA.

Zhen, S. and M.W. van Iersel. 2015. Using normalized difference vegetation index (NDVI) as a proxy for plant size in predictive water use models to facilitate precision irrigation ([poster](#)). 2015 Joint meeting of NCERA-101 'USDA committee on Controlled Environment Technology and Use' and Association of Education and Research Greenhouse Curators, Columbus, OH.

Zhen, S., R. S. Ferrarezi, and M. W. van Iersel. 2014. Chlorophyll fluorescence of three species with different light requirements: A tool to optimize supplemental lighting efficiency? ([oral](#)). 2014 Annual Conference of the American Society for Horticultural Science, Orlando, FL.

Zhen, S. and S.E. Burnett. 2013. Water use and cold hardiness of English Lavender ([oral](#)). 2013 National Floriculture Forum, Portsmouth, NH.

Zhen, S. and S.E. Burnett. 2013. Water use and cold hardiness of English lavender ([poster](#)). 2013 Annual Conference of the American Society for Horticultural Science, Palm Desert, CA.

Zhen, S. and S.E. Burnett. 2012. Effects of substrate water content on morphology, physiology and water use efficiency of four perennial plants ([poster](#)). 2012 Annual Conference of the American Society for Horticultural Science, Miami, FL.

Awards

1st Place (Ph.D.) Student Research Oral Competition. Southern Nursery Association Research Conference. 2016.

2nd Place Controlled Environment Working Group Oral Competition. American Society for Horticultural Science, 2016.

1st Place Student Poster Competition. 8th International Symposium on Light in Horticulture. 2016

2nd Place Ph.D. Recipient of the E. Broadus Browne Research Awards for Outstanding Graduate Student Research Competition. The University of Georgia. 24 March 2016.

2015 Grant A. Harris Research Instrumentation Fellowship (\$5000 worth of research instruments). Decagon Devices/Meter Environment

1st Place Controlled Environment Working Group Oral Competition. American Society for Horticultural Science, 2014.

American Society for Horticultural Science Student Travel Grant, 2012, 2014, 2015

University of Georgia Graduate Student Travel Grant, 2015, 2017

NCERA-101 Student Travel Grant, 2015, 2017

National Floriculture Forum Student Travel Grant, 2013