

# SUSHAN RU

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## EDUCATION

- Ph.D. Horticulture, Washington State University 2011–2016  
*Dissertation: Theoretical and empirical evaluation of marker-assisted seedling selection in Rosaceae tree fruit breeding*
- M.S. Horticulture, Washington State University 2009–2011  
*Thesis: A mechanistic view of shoot vigor in grapevines: xylem anatomy, hydraulics, and reproductive growth*
- B.S. Horticulture, Southwest University, China 2005–2009  
*Thesis: A research of homologous and non-homologous somatic pairing in citrus ichangensis*

## PROFESSIONAL EXPERIENCE

- Auburn University 2021–Present  
*Assistant Professor of Small Fruit Breeding & Genetics*
- Developing superb blueberry cultivars for Alabama and nearby regions using a combination of traditional and modern breeding technologies
  - Better understanding small fruit genetics and innovating efficient breeding methods using interdisciplinary tools such as quantitative genetics and bioinformatics
  - Mentoring and training young scientists in small fruit breeding and genetics
- University of Minnesota 2017–2021  
*Postdoctoral Research Associate*
- Examining potential gains from targeted recombination in self-pollinated species
  - Developing strategies to efficiently introgress chromosome segments from wild to elite germplasm
  - Enabling seamless application of genomic selection in public soybean breeding programs through the development of a genomic selection pipeline
- University of Wisconsin-Madison 2017–2018  
*Postdoctoral Research Associate*
- Validating and improving the accuracy of a bioinformatics pipeline for genotyping-by-sequencing in autotetraploid potato
- Washington State University 2016–2017  
*Postdoctoral Research Associate*
- Developing the Breeding Information Management System to enable secure and efficient breeding data management for individual breeding programs
- Washington State University 2011–2016  
*Graduate Research Assistant*
- Establishing a framework for optimizing genetic gain from marker-assisted seedling selection in tree fruit through analytic derivation and stochastic simulation
  - Developing a software tool to estimate the cost of applying marker-assisted seedling selection in tree fruit breeding

- Empirically validating the effectiveness of a multi-trait DNA test for apple acidity, crispness, and firmness in the Washington State University apple breeding program

## PUBLICATIONS (\* corresponding author)

### In preparation:

- **Ru S**, Amondu A. Review of causal pathogens, natural resistance, and potential solutions to blueberry stem blight
- **Ru S**, Lorenz A, Bernardo R. Optimizing strategies for targeted introgression in soybean
- **Ru S**, Endelman J. Optimizing the accuracy of genotyping-by-sequencing in autotetraploid potato

### Submitted:

da Silva ALBR, de Resende J, **Ru S**. Multivariate analysis methods to improve the selection of strawberry genotypes with low cold requirement (*submitted to Scientific Reports*)

### Published:

- James T, Johnson A, Schaller A, Peace C, Luo F, Sandefur P, **Ru S**. As it stands: the Palouse Wild Cider Apple Breeding Program. *Plants*, 2022, 11, 517 <https://doi.org/10.3390/plants11040517>
- Jung S, Lee T, Gasic K, Campbell T, Yu J, Humann J, **Ru S**, Edge-Garza D, Hough H, Main D (2021) The Breeding Information Management System (BIMS): An online resource for crop breeding. Database, 2021, baab054. <https://doi.org/10.1093/database/baab054>
- Ru S**, Hardner C, Carter PA, Evans K, Main D, Harshman J, Sandefur P, Edge-Garza D, Peace C. (2021) Empirical evaluation of multi-trait DNA testing in an apple seedling population. *Tree Genetics & Genomes* 17:13. <https://doi.org/10.1007/s11295-021-01494-y>
- Ru S\***, Bernardo R (2020) Predicted genetic gains from introgressing chromosome segments from exotic germplasm into an elite soybean cultivar. *Theoretical and Applied Genetics* 133:605-614. <https://doi.org/10.1007/s00122-019-03490-2>
- Ru S**, Bernardo R (2018) Targeted recombination to increase genetic gain in self-pollinated species. *Theoretical and Applied Genetics* 132:289–300. <https://doi.org/10.1007/s00122-018-3216-1>  
*Impact factor* in 2018: **3.93**
- Jung S, Lee T, Cheng C, Buble K, Zheng P, Yu J, Humann J, Ficklin SP, Gasic K, Scott K, Frank M, **Ru S**, Hough H, Evans K, Peace C, DeVetter L, McFerson J, Coe M, Kahn M, Wegrzyn J, Staton M, Main D (2018) 15 years of GDR: New data and functionality in the Genome Database for Rosaceae. *Nucleic Acids Research* 47:D1137–D1145. <https://doi.org/10.1093/nar/gky1000>  
*Impact factor* in 2018: **11.56**
- Ru S**, Hardner C, Carter PA, Evans K, Main D, Peace C (2016) Modeling of genetic gain for single traits from marker-assisted seedling selection in clonally propagated crops. *Horticulture Research* 3:16015.  
*Impact factor* in 2016: **4.6**
- Ru S\***, Main D, Evan K, Peace C (2015) Current applications, challenges and perspectives of marker-assisted seedling selection in Rosaceae tree fruit breeding. *Tree Genetics & Genomes* 11: 8.  
*Impact factor* in 2015: **2.1**
- Jung S, Ficklin SP, Lee T, Cheng C, Blenda A, Zheng P, Yu J, Bombarely A, Cho I, **Ru S**, Evans K, Peace C, Abbott AG, Mueller LA, Olmstead MA, Main D (2014) The Genome Database for Rosaceae (GDR): year 10 update. *Nucleic Acids Research* 42: D1237–1244.  
*Impact factor* in 2013: **8.8**

## GRANTS & FELLOWSHIPS

### Funded

- **Title:** Distribution of Botryosphaeria stem blight in blueberry production of Alabama. Southern Region Small Fruit Consortium, \$5,000 (2022-2023)  
**PIs:** Sushan Ru. Co-PI: Elina Coneva, Kathy Lawrence, Ebrahiem Babiker, Jonathan Oliver, Melba Salazar-Gutierrez. **Role:** PI
- **Title:** Enabling high-throughput yield prediction for efficient blueberry production. Southern Region Small Fruit Consortium, \$5,000 (2022-2023)  
**PIs:** Sushan Ru, Yin Bao, James Spiers, Elina Coneva, Patricio Munoz, Hamid Ashrafi, Paul Bartley. **Role:** PI
- **Title:** Extension Education on Newly Released Blueberry Cultivars with Improved Fruit Quality Characteristics. Southern Region Small Fruit Consortium, \$5,000 (2022-2023)  
**PIs:** Elina Coneva, Sushan Ru, Melba Salazar-Gutierrez, Edgar Vinson, Camila Rodrigues, Harli Willis. **Role:** Co-PI
- **Title:** Enabling high-throughput yield prediction in blueberry production. California Blueberry Commission, \$31,008 (2021-2022)  
**PIs:** Sushan Ru, Yin Bao, James Spiers, Elina Coneva, Paul Bartley. **Role:** PI
- **Title:** Expanding blueberry production via high tunnels. USDA Specialty Crop Block Grant Program, \$40,000 (2021-2023)  
**PIs:** James Spiers, Melba Salazar-Gutierrez, Sushan Ru. **Role:** Co-PI.
- **Title:** Blueberry cultivars with enhanced quality for Alabama family farms. USDA Specialty Crop Block Grant Program, \$40,000 (2022-2024).  
**PIs:** Elina Coneva, Edgar Vinson, Melba Salazar-Gutierrez, Sushan Ru. **Role:** Co-PI.
- **Title:** After RosBREED: Developing and deploying new apple DNA tests. Washington Tree Fruit Research Commission Grant, \$269,000 (2014–2016). **PI:** Cameron Peace. **Role:** cooperator.
- **Title:** After RosBREED: Developing and deploying new sweet cherry DNA tests. Washington Tree Fruit Research Commission Grant, \$115,356 (2014–2016). **PI:** Cameron Peace. **Role:** cooperator.
- Scientific Teaching Fellowship, University of Wisconsin-Madison, spring 2018
- Travel grant for the University of Minnesota Plant Sciences Symposium, 2018
- Graduate Student Travel Grant of the Graduate & Professional Student Association, Washington State University, 2013
- Registration grant of the Graduate & Professional Student Association, Washington State University, 2013

### Pending

- **Title:** Enabling genomics-assisted crop breeding and research through advanced database resources. USDA National Institute of Food and Agriculture–Specialty Crop Research Initiative, \$4.8M (2023-2025).  
**PIs:** Dorrie Main, Sook Jung, Fred Gmitter, Jr., Ksenija Gasic, Rebecca McGee, Sushan Ru, Trevor Rife, Nahla Bassil, Craig Hardner, Yu Wang, Elizabeth Ross, James McFerson, Michael Coe. **Role:** Co-PI.
- **Title:** Development of high-throughput phenotyping to identify novel QTL/alleles for improvement of peanut leaf spot resistance in breeding programs. The Peanut Foundation, \$91,834 (2022-2023)  
**PIs:** Charles Chen, Yin Bao, Ming Li Wang, Phat Dang, Amanda Strayer-Scherer, Sushan Ru.  
**Role:** Co-PI

### **Not funded:**

- **Title:** Enabling genomics-assisted specialty crop breeding and research through advanced database resources. USDA National Institute of Food and Agriculture–Specialty Crop Research Initiative, \$4M (2021-2024).  
**PIs:** Dorrie Main, Sook Jung, Fred Gmitter, Jr., Ksenija Gasic, Rebecca McGee, Sushan Ru, Trevor Rife, Nahla Bassil, Craig Hardner, Yu Wang, Elizabeth Ross, James McFerson, Michael Coe. **Role:** Co-PI.
- **Title:** Enabling high-throughput yield prediction for more efficient blueberry breeding, research, and production. Alabama Agricultural Experiment Station AgRSEED Program, \$50,000 (2022-2023).  
**PIs:** Sushan Ru, Yin Bao, James Spiers, Elina Coneva. **Role:** PI.
- **Title:** An alternative production system for blueberries. Alabama Agricultural Experiment Station AgRSEED Program, \$150,000 (2022-2023).  
**PIs:** Melba R. Salazar-Gutierrez, James Spiers, Sushan Ru, Courtney Leisner, Geoffrey Williams. **Role:** Co-PI

### **SELECTED AWARDS**

- People’s Choice Award for Three Minute Thesis Competition, College of Agricultural, Human, and Natural Sciences, Washington State University, 2015
- Student Award for Best Oral Presentation, 7<sup>th</sup> International Rosaceae Genomics Conference, 2015
- President’s Award for Leadership, Washington State University, 2014
- Harold W. and Joanne N. Vaughn Scholarship, Washington State University, 2014–2015
- Department of Horticulture Scholarship, Washington State University, 2014–2015
- Scholarship for 17th Summer Institute in Statistical Genetics, University of Washington, 2012

### **INVITED TALKS**

- Southeast Regional Fruit & Vegetable Conference. January 6-9, 2022. Savannah, GA.  
**Title:** Small fruit breeding at Auburn University- current goals, ongoing projects, and future work.
- HudsonAlpha- Auburn University Collaboration Meeting. December 14, 2021, Auburn, AL  
**Title:** Developing elite blueberry cultivars for Alabama and beyond.
- California Blueberry Commission Research Committee Meeting. September 7, 2021. Virtual  
**Title:** High-throughput yield prediction for efficient blueberry production.
- Horticulture Seminar Series, Department of Horticulture. October 10, 2018. University of Minnesota. Twin-cities, MN.  
**Title:** Optimizing the bioinformatics for genotyping-by-sequencing in autotetraploid potato
- BIT’S 9<sup>th</sup> Annual World DNA and Genome Day. April 25-27, 2018. Dalian, China.  
**Title:** Optimizing genotyping-by-sequencing in autotetraploid potato
- Henan Institute of Science and Technology, Xinxiang, China. August 1, 2017.  
**Title:** Applications of quantitative genetics in modern plant breeding
- Allium, Beta, Cucumis, Daucus, Solanum Seminar Series. October 21, 2015. University of Wisconsin, Madison, WI.  
**Title:** Facilitating efficient tree fruit breeding through the modeling of marker-assisted seedling selection

### **TEACHING & MENTORING**

Spring 2021 University reader. Student: Bo Bi, Degree: Doctor of Philosophy. Dissertation: Target Site Resistance Mechanism of Protoporphyrinogen Oxidase Inhibiting Herbicides in *Eleusine indica*. Defense date: June 17, 2021

Spring 2021 Co-instructor, TASSEL Workshop, University of Minnesota Plant Breeding Center

Spring 2021 Guest lecturer for *Plant Breeding Principles* (AGRO 5021), University of Minnesota

Spring 2020 Teaching assistant, *Machine Learning Applied to Plant Science* (APSC 8280-002), University of Minnesota

Spring 2020 Guest lecturer for *Breeding for Quantitative Traits in Plants* (AGRO 8202), University of Minnesota

Fall 2019 Guest lecturer for *Plant Breeding Principles* (AGRO 5021), University of Minnesota

Spring 2019 Guest lecturer for *Professional Skills for Scientists* (CFANS 8101), University of Minnesota

Spring 2018 Scientific teaching fellow, Wisconsin Institute for Science and Community Engagement

Fall 2014 Teaching assistant, *Introduction to Vines and Wines* (VE/HORT 113), Washington State University

Spring 2011 Teaching assistant, *Introductory Microbiology Laboratory* (MBioS 101), Washington State University

2019-present Graduate student mentor through the National Association of Plant Breeders (NAPB)

2018-present Graduate student mentor through the College of Food, Agricultural and Natural Research Sciences Mentor Program, University of Minnesota

## SERVICE

2022 spring Judge for the Southern Region American Society for Horticultural Science

2021-present Secretary of the American Society for Horticultural Science (ASHS) Fruit Breeding Interest Group

2021-present Review editor of *Frontiers in Plant Science*

2019-present Reviewer Board member of *Forests*

2017-present Reviewer of *G3: Genes|Genomes|Genetics*, *Scientific Reports*, *Genetics Selection Evolution, Sustainability, Forests, Agronomy, Plants, Plant Genome*

2018-2019 Secretary of the Early Career Working Group of the National Association of Plant Breeders

2018-present Officer of the College of Food, Agricultural and Natural Resource Sciences Postdoc Board

2011-2015 Senator of the Washington State University Graduate and Professional Student Association

2012-2015 GPSA Liaison of the Horticulture Graduate Student Organization, Washington State University

2012-2013 President of the Chinese Students and Scholars Association at Washington State University

## TRAINING

- Machine learning by Stanford University, Coursera, 2019
- Oligo-FISH workshop, Michigan State University, East Lansing, MI, November 4-9, 2018
- Scientific Teaching Fellow of the Wisconsin Institute for Science and Community Engagement, University of Wisconsin-Madison, January-December 2018
- Next Generation Sequencing Workshop, University of Wisconsin-Madison, December 2017
- Software Carpentry Workshop, University of Wisconsin-Madison, June 2017
- Graduate Teaching Assistant Workshop “The A Game: Guiding Student Success”, Washington State University, August 2014
- Proposal Writing Workshop, Washington State University, November 2013

- Leadership workshop, Washington State University, September 2012
- 17th Summer Institute in Statistical Genetics, Seattle, WA, July 09–27, 2012

### SELECTED ABSTRACTS & PRESENTATIONS

- Ru S**, Hardner C, Carter PA, Evans K, Main D, Harshman J, Sandefur P, Edge-Garza D, Peace C. (2022) Empirical evaluation of multi-trait DNA testing in an apple seedling population. Poster presentation at the 2022 Southern Region American Society for Horticultural Sciences (SRASHS), February 11-13, 2022, New Orleans, Louisiana
- Ru S**, Hardner C, Carter PA, Evans K, Main D, Harshman J, Sandefur P, Edge-Garza D, Peace C. (2022) Empirical evaluation of multi-trait DNA testing in an apple seedling population. Poster presentation at the 2022 Plant and Animal Genome XXVI Conference. January 8-12, 2022, San Diego, CA, USA
- Ru S**, Bernardo R (2019) Predicted genetic gains from introgressing chromosome segments from exotic germplasm into an elite soybean cultivar. Poster presentation at the 2019 National Association of Plant Breeders Annual Meeting. August 25-29, 2019, Pine Mountain, GA, USA
- Ru S**, Bernardo R (2018) Targeted recombination to increase genetic gain in self-pollinated crops. Poster presentation at the 2018 National Association of Plant Breeders (NAPB) Annual Meeting. August 25-29, 2018, Guelph, Ontario, Canada
- Ru S**, Bernardo R (2018) Targeted recombination to increase genetic gain in self-pollinated crops. Oral presentation at the 2018 University of Minnesota Plant Sciences Symposium. March 23, 2018, Saint Paul, MN, USA
- Ru S**, Bernardo R (2018) Targeted recombination to increase genetic gain in self-pollinated crops. Poster presentation at the Plant and Animal Genome XXVI Conference. January 13-17, 2018, San Diego, CA, USA
- Ru S**, Endelman J (2018) Optimizing strategies for genotyping-by-sequencing in autotetraploid potato. Poster presentation at the Plant and Animal Genome XXVI Conference. January 13-17, 2018, San Diego, CA, USA
- Ru S**, Endelman J (2017) Applying genotyping-by-sequencing in autotetraploid potato. Oral presentation at the 2017 Potato Breeding and Genetics Meeting. December 4-5, 2017, Chicago, IL, USA
- Bernardo R, **Ru S** (2017) Beyond genomewide selection in plants. Presentation at the 2017 International Annual Meeting, “Managing Global Resources for a Secure Future”. October 22-25, 2017, Tampa, FL, USA
- Peace C, Sandefur P, **Ru S**, Main D, Iezzoni I, Bliss F, Edge-Garza D, Oraguzie N (2016). After RosBREED: Developing and deploying new sweet cherry DNA tests – Final Report. Washington Tree Fruit Research Commission NW Cherry Research Review
- Main D, Jung S, Cheng C-H, Lee T, Ficklin SP, Blenda A, Yu J, Scott, K, Byrd M, **Ru S**, Zheng P, Humann JL, DeVetter L, Peace C, Evans KM, Gasic K, Olmstead M, Coe M, Abbott AG (2016) Introduction to RGC8 GDR Workshop. Abstracts of the 8<sup>th</sup> International Rosaceae Genomics Conference, June 21-24, 2016, Angers, France

### MEMBERSHIPS

- 2021-present American Society for Horticultural Science  
 2018-present National Association of Plant Breeders  
 2018-2021 AAAS/Science sponsored membership