

Shuyu Liu
 Small Grain Genetics
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Education

Ph.D., Plant Breeding and Genetics, University of Missouri-Columbia, Columbia, MO, USA. 2003.
 M.S., Plant Breeding and Genetics, Colorado State University, Fort Collins, CO, USA. 1998.
 B.S., Crop Science, Shandong Agricultural University, Taian, Shandong, China. 1988.
 M.S. Candidate, Bioinformatics, completed courses, University of Missouri-Columbia, MO, USA. 2003.

Professional Experience

Assistant Professor

Small Grain Genetics

Texas AgriLife Research, Texas A & M University, Amarillo, TX, USA (Aug. 2010 – Present)

Genetic and genomic studies of important traits of wheat in Great Plains. Traits include drought and heat tolerance, resistance to diseases (leaf, stem and stripe rust, wheat streak mosaic virus), and insects (greenbug, Russian wheat aphid, and Hessian fly) as well as good end-use quality. Both traditional and molecular breeding techniques are used to develop germplasm lines with one or more target traits. Genomic techniques including gene/QTL mapping, target molecular marker identification, validation and utilization, gene cloning, gene functional analysis will be used to understand and improve those target traits.

- 1) Cloning of Gb3, identification of candidate genes through Affymatrix DNA microarray and genetic mapping of other greenbug resistant genes.
- 2) Study drought tolerance through transcriptomics of water stressed wheat plants; Genetic mapping and genomics studies of QTL in adapted cultivars.
- 3) Developing germplasm lines with multiple favorable alleles with drought tolerance, insect and wheat streak mosaic virus resistances.

Adjunct Professor, Dept of Agricultural Sciences, West Texas A&M University, Dec 1, 2012 – Nov 30, 2015.

Research Scientist, Small Grain Breeding and Genomics

Department of Crop and Soil Environmental Sciences

Virginia Tech, Blacksburg, VA, USA. (Aug. 2007 – July 2010)

Breeding and genetic studies for resistance to Fusarium head blight (FHB, also called scab), powdery mildew, rust, and net blotch using conventional and genomics technologies in wheat and barley.

- 1) Develop wheat varieties with high yield, multiple disease resistances and good end use quality with traditional and molecular techniques.
- 2) Transfer disease resistances for FHB, powdery mildew, and rusts into regionally adapted varieties.
- 3) Map FHB resistance in native sources and saturate FHB resistance quantitative trait loci (QTL) in U.S. wheat cultivar Ernie and Massey.
- 4) Arrange field plots and design field planting maps of FHB nursery tests for wheat and barley.
- 5) Supervise and train technicians and students on project required techniques.
- 6) Collaborate with pathologists, molecular geneticists, extension specialist, and breeders at Virginia Tech and other universities to conduct projects funded by USDA and Virginia Small Grain Board in variety

tests, fungicide management and toxin evaluation studies.

- 7) Association mapping of important traits of barley using barley SNPs from barley coordinated agricultural projects.
- 8) Apply funding from USDA, Virginia Small Grain Board and Virginia Tech.
- 9) Present the cultivar performance combined with fungicide management to reduce yield loss from scab in the field day.

Biologist (Jan. – Aug. 2007) and Visiting Fellow (Jan. 2004 – Dec. 2006)

Greenhouse Processing Crops Research Center

Agriculture and Agri-Food Canada (AAFC), Harrow, ON, Canada

Saturation mapping and map-based cloning of a major QTL for common bacterial blight (CBB) resistance.

Marker-assisted selection (MAS) to breed bean varieties resistant to CBB, bean common mosaic virus and anthracnose simultaneously (AAFC projects, Collaborated with scientists at two other AAFC research stations, Morden, MB and Lethbridge, AB).

- 1) Developed sequence tagged site (STS) markers from tightly linked amplified fragment length polymorphic (AFLP) markers and saturately mapped a major CBB resistance QTL using AFLP, simple sequence repeat (SSR), sequence characterized amplified region (SCAR) and STS markers.
- 2) Identified positive bacterial artificial chromosome (BAC) clones and assembled contigs.
- 3) Studied candidate gene using complementary DNA (cDNA) and BAC clones by northern and southern blots.
- 4) Improved the efficiency of MAS by new markers from BAC ends and cDNA sequences.
- 5) Used adapted varieties from different market classes as recurrent parents to transfer all three disease resistances through backcrossing.
- 6) Conducted target markers screening for MAS in each generation for all three AAFC collaborators.
- 7) Planted advanced lines in the field to test both disease resistance and agronomic traits. Selected lines or bulked plants with at least two disease resistances for further breeding evaluations.
- 8) Worked with soybean breeding and molecular study group for genetic mapping and QTL analyses for cadmium uptake, soybean root rot, and white mold.

Research Assistant

University of Missouri-Columbia, Columbia, MO, USA (Aug. 1998 – Dec. 2003)

Conducted research in wheat Fusarium Head Blight (FHB) resistance using conventional and molecular genetics.

- 1) Estimated genetic effects of FHB resistance in wheat cultivar 'Ernie' using generation means analyses.
- 2) Developed recombinant inbred lines (RILs) using single seed decent (SSD) from the cross Ernie/MO94-317. Tested RIL plants in a randomized complete block design in greenhouse.
- 3) Genotyped RILs using AFLP and SSR markers. Mapped four QTL on chromosomes associated with resistance to FHB in Ernie.
- 4) Worked with breeder to make crosses to incorporate different types of FHB resistances. Screened breeding materials using spray and single floret inoculation in the greenhouse and field.

Visiting Scholar and Research Assistant

Colorado State University, Fort Collins, CO, USA (Sep. 1996 – Aug. 1998)

Genetic studies and breeding for Russian wheat aphid (RWA) resistance in wheat.

- 1) Located the resistance genes of three major resistance sources on chromosomes using Chinese spring monosomics.
- 2) Applied immature embryo culture and/or Gamma ray irradiation to accelerate the breeding of pure lines for RWA resistance.
- 3) Collaborated with entomologist for RWA resistance screening.

Wheat breeder

Shandong Academy of Agricultural Sciences, Jinan, Shandong, China (1988 – 1996) Conducted wheat genetics and breeding studies on high yield, disease resistance, drought tolerance, and good quality.

- 1) Applied Gamma ray irradiation on wheat pollen, ovary, head, and whole plant to develop mutant lines with good agronomic traits.

- 2) Applied immature embryo and spike culture integrated with Gamma ray irradiation and crossing to create genetic variations.
- 3) Screened breeding lines for powdery mildew, rust resistance and drought tolerance in the field
- 4) Used pedigree and bulk selection to breed varieties with superior agronomic traits.
- 5) Release and extension of variety beneficial to farmers.

Research Projects

- Rudd, J.C., D. Malinowski, C. Neely, A. Ibrahim, **S.Y. Liu**, Q. Xue, D. Drake. 2013-2015. Developing Winter Small Grain – Cool-Season Perennial Grass Forage Cropping Systems for Texas. **Texas AgriLife Research Cropping System Program**. 2012 – 2014. \$300,000. Funded. Liu portion: \$33,000.
- Liu, S.Y.**, A.M. Ibrahim, J.C. Rudd, Q. Xue, C. Johnson, P. Njau. 2013 – 2016. Identification of SNP Markers for Drought Tolerance and Developing Drought Tolerant Spring Wheat Germplasm Using Marker-Assisted Breeding. Monsanto Beachell-Borlaug Scholars Program. Total: \$180,000.
- Ibrahim, A., J.C. Rudd, C. Johnson, **S.Y. Liu**, D. Hays. 2013. Developing Hybrid Wheat for Texas and the Broader US Great Plains. **Texas A&M AgriLife Research Monocot Program**. FY 2013 – FY 2015. US\$ \$80,000. Funded.
- Marker-assisted Pre-breeding to Improve Wheat Germplasm Lines with Multiple Stress Tolerances and Good End-use Quality in TX” funded by **Texas Wheat Producer Board**, PI, US\$25,000 (Sep 2013 – Aug 2014).
- “Marker-assisted Pre-breeding to Improve Wheat Germplasm Lines with Multiple Stress Tolerances and Good End-use Quality in TX” funded by **Texas Wheat Producer Board**, PI, US\$25,500 (Sep 2012 – Aug 2013).
- “Impact of Deficit Irrigation on Host Resistance, Disease Incidence and Water Use Efficiency of Wheat”. Ogallala Aquifer – **USDA-ARS Research Initiative**. Collaborator, US\$96,000 (Sep 2012 – August 2013).
- “Identification of molecular markers linked to water use efficiency in a drought tolerant wheat cultivar”. **USDA-NIFA-CSREES funded Trticeae Coordinated Agricultural Project**, University of Minnesota. US\$20,000 (July 2011 – June 2013).
- “Marker-assisted Pre-breeding to Improve Wheat Germplasm Lines with Multiple Stress Tolerances and Good End-use Quality in TX” funded by **Texas Wheat Producer Board**, PI, US\$15,000 (Sep 2011 – Aug 2012).
- “Marker-assisted Development of Wheat Germplasm with Multiple Insect and Pathogen resistance for Texas Wheat Improvement” Funded by **Texas Wheat Producer Board**, PI, US\$7,500. (Sep 2010 – Aug 2011)
- “Improving FHB resistance in SRW wheat via Integrated Mapping, Phenotypic and MAS” Funded by **USDA through US Wheat and Barley Scab initiative, Co-PI**. US\$ 127,496 (May 2010 – April 2011).
- “Development of Winter Barley Cultivars with Enhanced Resistance to FHB and DON” Funded by **USDA through US Wheat and Barley Scab initiative, Co-PI**. US\$ 30,000 (Many 2010 – April 2011).
- “Breeding and genomics of Fusarium head blight resistance in wheat and barley” Funded by **USDA through US Wheat and Barley Scab initiative, Co-PI**. US\$ 127,428 (May 2008 – April 2009) and US\$ 123,450. May 2009 – April 2010).
- “Accelerated Breeding for Scab Resistance in Soft Red Winter Wheat” Funded by **Virginia Small Grain Board, Co-PI**. US\$12,000. July 1, 2009 – June 30, 2010.
- “Phenotypic and marker-assisted selection for scab resistance in wheat breeding”. Funded by **College of Agriculture and Life Science, Virginia Tech** through Mini-Tech Grant. US\$ 2,500 PI (January – May, 2009).
- “Breeding scab resistance in soft red winter wheat”_Funded by **Virginia Small Grain Board, Co-PI**. US\$12,000. July 1, 2008 – June 30, 2009.
- “Development of cultivars with scab resistance in soft red winter wheat” Funded by **Virginia Small Grain Board, Co-PI**. US\$12,000. July 1, 2007 – June 30, 2008.
- “Mapping Fusarium head blight resistance QTL in Virginia Wheat Variety Massey” and “Sequence analyses of Fusarium head blight QTL from different resistant sources”. Funded by **College of Agriculture and Life Science, Virginia Tech**, Mini-Teaching Grant to let undergraduate student join research. \$5,000. PI. (January – June 2008)
- “Accelerated breeding for scab resistance in soft red winter wheat and barley”. Funded by **USDA through US Wheat and Barley Scab initiative, Co-PI**. US\$ 67,000. May 2007 – April 2008.

- “Marker-assisted selection for improved FHB resistance in adapted SRW wheat backgrounds”. Funded by **USDA through US wheat and Barley Scab Initiative, Co-PI**. US\$ 40,000. May 2007 – April 2008.
- “Marker-assisted selection to breed multiple resistant variety in common bean” Funded by **Improving Farming System Practice Initiative for pesticide reduction strategy in Agriculture Agri-food Canada**. Collaborated with AAFC Morden and Lethbridge Research Centers. CA\$200,000 per year. **Majorly involved**. January 2004 – August 2007.
- “Development of bean varieties for disease resistance including CBB, bean mosaic virus, anthracnose, root rot and white mold with good cooking quality and high yield”. Awarded by **Ontario White Bean Producers’ Marketing Board and Ontario Colored Bean Growers’ Association** with CA\$15,000 per year. **Majorly involved**. January 2004 – August 2007.

Skills

- 1) Develop crop varieties and elite lines by traditional and molecular techniques such as gamma ray irradiation and interspecific hybridization, immature embryo, spike, or pollen culture, marker – assisted selection.
- 2) Optimize PCR conditions and analyze AFLP, SSR, STS, SCAR and SNP markers.
- 3) Design primers to amplify specific target bands using Primer 3 and GENERUNER 3.0.
- 4) Target band cloning and DNA sequencing. Compare sequences using BLAST, Vector NTI or other software.
- 5) Screen positive clones using BAC pooling and PCR. Physical mapping of target QTL. Analyze restriction enzyme digestion patterns of BAC clones using Image 3.10b and assemble contigs using FPC 4.7.
- 6) Construct genetic maps of important traits using MapMaker 3.0 and JoinMap3.0. Map QTL using QTL Cartographer 2.5.
- 7) Extract and purify RNA and study gene expression. Northern and southern blot analyses of target band or cDNA clones.
- 8) Association mapping to verify known QTL and identify new genes or QTL using STRUCTURE and TASSEL.
- 9) Set up and work with software under DOS, Windows, Unix (linux).
- 10) Supervise personnel working on projects to ensure the progress.
- 11) Organize and participate regional field day trips to present data on agronomic performance of crop varieties with farmers and researchers.
- 12) Design experiments in the greenhouse and field to test breeding lines and statistically analyze data using SAS and Excel.
- 13) Manage experiments in the field, greenhouse, growth chamber, and laboratory.
- 14) Write proposals to apply extramural funding and conduct collaborative projects with scientists in other expertise.

Awards

- 1) Mini Teaching Grant, College of Agriculture and Life Science, Virginia Tech, 2008 and 2009.
- 2) Visiting Fellowship from Agriculture and Agri-Food Canada awarded by Natural Sciences and Engineering Research Council of Canada from 2004 to 2006.
- 3) Tak Tsuchiya Graduate Student Achievement Award from 1997 to 1998 at Colorado State University.
- 4) Awarded 3rd progress prize by Evaluation Committee for Progress Prize of Science and Technology of Shandong Province as one of the major researchers for “Seed Selection and application of late-sowed and super early-maturing wheat variety LM20” in 1997.
- 5) Awarded the 3rd progress prize by the Chinese Ministry of Agriculture for participation in the study “The Study of Comprehensive Technology and Application of Improving Crops through Radiation” in 1992.

Manuscripts in Review or Preparation

1. Reddy, S.K, S.Y. Liu*, J.C. Rudd, Q. Xue, P. Payton*, S.A. Finlayson, J. Mahan, A. Akhunova, S.V. Holalu, N. Lu. 2013. Physiology and transcriptomics of water-deficit stress responses in wheat cultivars,

- TAM 111 and TAM 112. *Plant Sci.* *Corresponding authors. (Submitted).
2. Zhang, Y., Q. Xue, K.E. Jessup, **S.Y. Liu** and J. C. Rudd. Genotypic variation in seedling vigor and water use efficiency in Southern Great Plains. (About to submit).
 3. O'Boyle, P.D., W.S. Brooks, M. D. Hall, B.J. Steffenson, E.L. Stromberg, M.A. Saghai Maroof, **S.Y. Liu**, C.A. Griffey. Mapping net blotch resistance in 'nomini' and ciho 2291 barley. (Submitted?).
 4. Pradhan, G., **Q. Xue**, S. Liu, J. C. Rudd, and K. E. Jessup. 2013. Effective use of soil water contributed to high yield in wheat in the U.S. Southern High Plains. *J. Arid Land Studies*.
 5. Pradhan, G., **Q. Xue**, S. Liu, J. C. Rudd, K. E. Jessup, and J. R. Mahan. 2013. Cooler canopy temperature contributed to higher yield in new drought tolerant cultivars. *Crop Sci.* (Submitted)

Publications in Refereed Journals

1. Liu, S.Y.*, J.C. Rudd, G. Bai, S. Haley, A. Ibrahim, Q. Xue, D. Hays, R. Devokota, R. Graybosch, P.S. Amand. 2013. Validation and application of molecular markers linked to genes important for hard winter wheat production and marketing in the U.S. Great Plains. *Crop Sci.* *Corresponding authors. In press.
2. Basnet, B.R., A.M.H. Ibrahim, X. Chen, R.P. Singh, E.R. Mason, **S.Y. Liu**, R.N. Devkota, N.K. Subramanian, and J.C. Rudd. 2013. Molecular Mapping of Stripe Rust Resistance in Hard Red Winter Wheat TAM 111 Adapted to the US High Plains. *Crop Sci.* In press.
3. Berger, G., A. Green, P. Khatibi, W.S. Brooks, L. Rosso, **S.Y. Liu**, C.A. Griffey, D. Schmale III. 2013. Characterization of Fusarium Head Blight (FHB) Resistance and Deoxynivalenol Accumulation in Hulled and Hulless Winter Barley. *Plant Dis.* 2048/10.1094/PDIS-05-13-0479-RE.
4. Xue, Q., J.C. Rudd, **S.Y. Liu**, K.E. Jessup, R.N. Devkota, and J.R. Mahan. 2013. Yield determination and water use efficiency of wheat under water-limited conditions in the U.S. Southern High Plains. **Crop Sci.** doi: 10.2135/cropsci2013.02.0108.
5. Reddy, S.K., Y., Weng*, J.C. Rudd, A. Akhunova, **S.Y. Liu***. 2013. Transcriptomics of induced defense responses to greenbug aphid feeding in near isogenic wheat lines. *Plant Sci.* 212:26–36. *Corresponding authors. DOI: 10.1016/j.plantsci.2013.08.002
6. **Liu, S.Y.***, C.A. Griffey*, M.D. Hall, A.L. McKendry, J. Chen, W.S. Brooks, G. Brown-Guedira, D. Van Sanford, and D.G. Schmale. 2013. Molecular characterization of field resistance to Fusarium head blight in two U.S. soft red winter wheat cultivars. **Theor. Appl. Genet.** 126:2485–2498. *Corresponding authors. DOI: 10.1007/s00122-013-2149-y
7. Brooks, W.S., M.E. Vaughn, G.L. Berger, C.A. Griffey, W.E. Thomason, J.J. Paling, R.M. Pitman, D.W. Dunaway, R.A. Corbin, J.C. Kenner, E.G. Hokanson, H.D. Behl, B.R. Beahm, **S.Y. Liu** et al. 2013. Registration of 'Eve' Winter Hulless Barley. 2013. **J. Plant Reg.** 7:5–11.
8. Christopher, M.D., **S.Y. Liu**, M.D. Hall, D.S. Marshall, M.O. Fountain, J.W. Johnson, E.A. Milus, K.A. Garland-Campbell, X. Chen, and C.A. Griffey. 2013. Identification and mapping of adult plant stripe rust resistance in soft red winter wheat VA00W-38. **Crop Sci.** 52:1-9. doi: 10.2135/cropsci2012.02.0086.
9. Christopher, M.D., **S.Y. Liu**, M.D. Hall, D.S. Marshall, M.O. Fountain, J.W. Johnson, E.A. Milus, K.A. Garland-Campbell, X. Chen, and C.A. Griffey. 2013. Identification and mapping of adult-plant stripe rust resistance in soft red winter wheat cultivar USG 3555. **Plant Breed.** 132:53–60. Doi:10.1111/pbr.12015.
10. Berger, G.L. **S.Y. Liu**, M.D. Hall, W.S. Brooks, S. Chao, G.J. Muehlbauer, B-K Baik, B. Steffenson, C.A. Griffey. 2013. Marker-trait associations in Virginia Tech winter barley identified using genome-wide mapping. **Theor. Appl. Genet.** 126:693–710.
11. **Liu, S.Y.**, C.A. Griffey, M.D. Hall, J. Chen, S. Liu, D. Tucker, W.S. Brooks. 2012. Registration of Becker/Massey Wheat Recombinant Inbred Line Mapping Population. *J. Plant Reg.* 3:358–362.
12. **Liu S.Y.**, M.D. Christopher, C.A. Griffey, M.D. Hall, P.G. Gundrum, and W.S. Brooks. 2012. Molecular characterization of resistance to Fusarium head blight in U.S. soft red winter wheat breeding line VA00W-38. **Crop Sci.** 52: 2283–2292.
13. Chen, J., C.A. Griffey, S. Liu, M. A. Saghai-Maroof. 2012. Release of scab resistance wheat germplasm VA04W-433, VA04W-474. *J. of Plant Reg.* 6:111–116.
14. Khatibi, P.A., G. Berger, **S. Liu**, W.S. Brooks, C.A. Griffey, D.G. Schmale III. 2011. Resistance to Fusarium head blight and deoxynivalenol accumulation in Virginia barley. **Plant Dis.** 96:279–284.
15. Brooks, W.S., M.E. Vaughn, C.A. Griffey, W.E. Thomason, J.J. Paling, R.M. Pitman, D.W. Dunaway,

- R.A. Corbin, J.C. Kenner, E.G. Hokanson, H.D. Behl, B.R. Beahm, **S.Y. Liu**, P.G. Gundrum, A.M. Price, D.E. Brann, D.L. Whitt, J.T. Custis, D.E. Starner, S.A. Gulick, S.R. Ashburn, E.H. Jones, D.S. Marshall, M.O. Fountain, T.D. Tuong, D.P. Livingston, R. Premakumar, M.J. Kurantz, F. Taylor, R.A. Moreau, and K.B. Hicks, 2011: Registration of 'Dan' Winter Hulless Barley. **J. Plant Reg.** 5:1-4.
16. Griffey, C.A., W.E. Thomason, R.M. Pitman, B.R. Beahm, J.J. Paling, J. Chen, P.G. Gundrum, J.K. Fanelli, D.W. Dunaway, W.S. Brooks, M.E. Vaughn, E.G. Hokanson, H.D. Behl, R.A. Corbin, J.E. Seago, B.C. Will, M.D. Hall, **S.Y. Liu**, J.T. Custis, D.E. Starner, S.A. Gulick, S.R. Ashburn, E.H. Jones, D.L. Whitt, H.E. Bockelman, E.J. Souza, G.L. Brown-Guedira, J.A. Kolmer, D.L. Long, Y. Jin, X. Chen, and S.E. Cambron, 2011a: Registration of 'Merl' Wheat. **J. Plant Reg.** 5: 68–74.
 17. Griffey, C.A., W.E. Thomason, R.M. Pitman, B.R. Beahm, P.G. Gundrum, **S.Y. Liu**, J. Chen, J.J. Paling, D.W. Dunaway, W.S. Brooks, M.E. Vaughn, J.E. Seago, B.C. Will, E.G. Hokanson, H.D. Behl, R.A. Corbin, T.R. Lewis, M.D. Hall, J.T. Custis, D.E. Starner, S.A. Gulick, S.R. Ashburn, D.L. Whitt, H.E. Bockelman, J.P. Murphy, R.A. Navarro, E.J. Souza, G.L. Brown-Guedira, J.A. Kolmer, D.L. Long, Y. Jin, X. Chen, and S.E. Cambron, 2011b: Registration of 'SW049029104' Wheat. **J. Plant Reg.** 5:91–97.
 18. Hall, M.D., C.A. Griffey, A. Green, **S. Liu**, P. Gundrum, G. Berger, W.S. Brooks, W.E. Thomason, E.G. Hokanson, H.D. Behl, R.M. Pitman, D.W. Dunaway, M.E. Vaughn, T. Lewis, J.T. Custis, B. Seabourn, R. Chen, M. Fountain, D. Marshall, B.R. Beahm, D.L. Whitt, C.J. Lin, and D.L. Mennel, 2011a: Registration of 'Vision 30' Wheat. **J. Plant Reg.** 5:353–359.
 19. Hall, M.D., C.A. Griffey, A. Green, **S. Liu**, P. Gundrum, G. Berger, W.S. Brooks, W.E. Thomason, E.G. Hokanson, H.D. Behl, R.M. Pitman, D.W. Dunaway, M.E. Vaughn, T. Lewis, J.T. Custis, B. Seabourn, R. Chen, M. Fountain, D. Marshall, B.R. Beahm, D.L. Whitt, C.J. Lin, and D.L. Mennel, 2011b: Registration of 'Vision 40' Wheat. **J. Plant Reg.** 5:360–366.
 20. Hall, M.D., W. Rohrer-Perkins, C.A. Griffey, **S.Y. Liu**, W.E. Thomason, A.O. Abaye, A. Bullard-Schilling, P.G. Gundrum, J.K. Fanelli, J. Chen, W.S. Brooks, J.E. Seago, B.C. Will, E.G. Hokanson, H.D. Behl, R.M. Pitman, J.C. Kenner, M.E. Vaughn, R.A. Corbin, D.W. Dunaway, T.R. Lewis, D.E. Starner, S.A. Gulick, B.R. Beahm, D.L. Whitt, J.B. Lafferty, and G.A. Hareland, 2011c: Registration of 'Snowglenn' Winter Durum Wheat. **J. Plant Reg.** 5:81–86.
 21. **Liu S.Y.**, K. Yu, M. Haffner, S.J. Park, M. Banik, P.K. Pauls, and W. Crosby. 2010. Construction of a BAC library and a physical map of the major QTL for CBB resistance in common bean. **Genetica** 138:709–716.
 22. Hall, M.D., C. A. Griffey, D. Tucker, S. Liu, C. Sneller, M. Guttieri, D. Van Sanford, J. Costa, D. Marshall, and G. L. Brown-Guedira. 2010. Registration of USG 3209/Jaypee Wheat Recombinant Inbred Line Mapping Population. *J. of Plant Registration.* 4:159–162.
 23. Griffey, C.A., W.E. Thomason, R.M. Pitman, B.R. Beahm, J.J. Paling, J. Chen, J.K. Fanelli, J.C. Kenner, D.W. Dunaway, W.S. Brooks, M.E. Vaughn, E.G. Hokanson, H.D. Behl, R.A. Corbin, M.D. Hall, S. Liu, J. T. Custis, C.M. Waldenmaier, D.E. Starner, S.A. Gulick, S.R. Ashburn, D.L. Whitt, H.E. Bockelman, E.J. Souza, G.L. Brown-Guedira, J.A. Kolmer, D.L. Long, Y. Jin, X. Chen, and S.E. Cambron. 2010. Registration of 'Jamestown' Wheat. *J. of Plant Registrations.* 4:28–33.
 24. Griffey, C.A. et al. 2010. Registration of 'Shirley' Wheat. *J. of Plant Registrations.* 4:38–43.
 25. Griffey, C.A. et al. 2010. Registration of '3434' Wheat. *J. of Plant Registrations.* 4:44–49.
 26. Griffey, C.A. et al. 2009. Registration of 'USG3555' Wheat. *J. of Plant Registrations.* 3: 273–278.
 27. Griffey, C.A. et al. 2009. Registration of '5205' Wheat. *J. of Plant Registrations.* 3:283–288.
 28. **Liu S.**, M.D. Hall, C.A. Griffey, A.L. McKendry. 2009. Meta-analyses of Fusarium head blight resistance QTL in wheat. **Crop Science** 49:1955–1968.
 29. **Liu S.**, K. Yu, S.J. Park. 2008. Development of STS markers and QTL validation for common bacterial blight resistance in common bean. **Plant Breeding.** 127: 62–68.
 30. Abate Z., **S. Liu**, A. L. McKendry. 2008. QTL associated with resistance to Deoxynivalenol and Fusarium damaged kernel in a soft red winter wheat Ernie. **Crop Science** 48:1408–1418.
 31. **Liu S.**, Z. Abate, H. Lu, T. Musket, G. Davis, A. L. McKendry. 2007. QTL associated with Fusarium head blight resistance in soft red winter wheat 'Ernie'. **Theor. Appl. Genet.** 115:417–427.
 32. **Liu S.**, M. Banik, K. Yu, S.J. Park, V. Poysa, Y. Guan. 2007. Marker-assisted selection in major cereal and legume crops – current progress and future direction. **International Journal of Plant Breeding** 1:74–88.
 33. Banik, M., **S.Y. Liu**, K. Yu, V. Poysa, S.J. Park. 2007. Molecular TILLING and EcoTILLING: Effect tools for mutant gene detection in plants. **In Genes, Genomes and Genomics**, 1:123–132.

34. **Liu S.**, Z. A. Abate, A. L. McKendry. 2005. Inheritance of Fusarium head blight resistance in the soft red winter wheat Ernie. **Theor. Appl. Genet.** 110:454–461.
35. Zhang Y., J. S. Quick, **S. Liu**, 1998. Genetic Variation in PI 294994 wheat for resistance to Russian Wheat Aphid. **Crop Sci.** 38:527–530.

Authorized or co-authorized 12 papers in Chinese peer-reviewed journals.

Book Chapter

- Liu S.**, K. Yu, S. J. Park. 2009. Marker-assisted breeding for resistance to common bacterial blight of common bean. In: Chapter 6 of Plant Breeding. Ed. By N. Huttunen and T. Sinisalo. ISBN: 978-1-60741-624-1. **Nova Science Publishers, Inc.**

Publications in Magazines

1. **Liu. S.**, C. A. Griffey, and A.L. McKendry. 2009. Diagnostic markers for scab resistance in soft red winter wheat cultivar Ernie. *Fusarium Focus*. U.S. Wheat and Barley Scab Initiative. Spring, 2009. Volume 9, Issue 1, pp5.
2. Balasubramanian P., F.A. Kiehn, R.L. Conner, H.H. Mündel, H.C. Huang, S.J. Park, K. Yu and **S. Liu**. Dry Bean Breeding Program at AAFC Morden – Research Update. **Pulse Beat**, Winter 2007.
3. **Liu S.**, S.J. Park, K. Yu, R.L. Corner, P. Balasubramanian, H.H. Mundel, and F.A. Kiehn. Application of molecular markers to breed disease resistant cultivars in Dry bean. **Pulse Beat**, Winter 2005 page 26-27.
4. Yu K., S.J. Park and **S. Liu**. Pyramiding disease resistance genes into white bean cultivar through multiple molecular markers: an efficient and economic approach. **The Emerging bean**, Spring 2004 page 6-7.

Oral Presentations

1. Liu, S.Y. Detection of epistasis and QTL by environmental interactions using QTLNetwork 2.0. 2013. Triticeae Coordinated Agricultural Project-webinar. PBTN. Sep. 25.
2. Liu, S.Y. et al. The wheat research progress at Amarillo Center. 2013. Texas Small Grain Workers Meeting. Aug. 6-7. Amarillo, TX.
3. Liu, S.Y. The wheat research progress at Amarillo Center. 2012. Texas Small Grain Workers Meeting. Aug. 1-2. College Station, TX.
4. **Liu, S.Y.** The U.S. wheat production and research progress. 2011. Presented at Shandong Agricultural University on Nov. 2, Tan'an, Shandong, and Shandong Academy of Agricultural Sciences on Nov 4, Ji'nan, Shandong.
5. **Liu, S.Y.** and S. Krishna Reddy. 2011. The research progress in wheat genetics at Amarillo Center. Texas Small Grain Workers Meeting. Aug. 2-3. Vernon, TX.
6. Liu, S.Y., C.A. Griffey, M.D. Hall, A.L. McKendry, J. Chen, W.S. Brooks, G. Brown-Guedira, D. Van Sanford. 2010. Linkage between scab resistance and morphological traits in soft red winter cultivar in the U.S. International ASA-CSSA-SSA Annual Meeting, Plant Breeding and Pest resistance Workshop. Oct. 31-Nov. 3., Long Beach, CA USA.
7. Liu, S.Y. 2010. Research plan of wheat genetics at Amarillo Research Center. Small Grain Workers Meeting. Aug 2-3. Commerce, TX.
8. **Liu S.**, M.D. Hall, C.A. Griffey, A.L. McKendry, J. Chen, G. Brown-Guedira, J.P. Murphy and D. Van Sanford. 2009. Identification of diagnostic markers for scab resistance in US wheat cultivars. **International Annual Meeting of ASA-CSSA-SSA**. Pittsburg, PA. November, 1-5, 2009.
9. **Liu S.**, C.A. Griffey, A.L. McKendry, J. Chen, M.D. Hall, G. Brown-Gudeara, D. Van Sanford. Marker saturation of QTL for scab resistance in native sources and its application in marker-assisted breeding. **The International Plant and Animal Genome Conference**. San Diego, CA USA. January 10-14, 2009.
10. **Liu S.** Molecular characterization of a major QTL for common bacterial blight resistance in common bean. **Virginia Tech** at Blacksburg, VA USA. April, 2008.
11. **Liu S.** Update on marker-assisted breeding for multiple resistances in bean. **Agriculture Agri-Food Canada**, Harrow, ON CA. May, 2007.

12. **Liu S.**, K. Yu, M. Haffner, and S.J. Park. Physical mapping of a major QTL for common bacterial blight resistance in common bean. **ASA-CSSA-SSA International Annual Meeting** at Indianapolis, IN USA . Nov. 12-16, 2006.
13. **Liu S.**, K. Yu, S.J. Park, R.L. Conner, P. Balasubramanian, H-H. Mündel and F.A. Kiehn. Development of common bean varieties with multiple disease resistances using MAS. **ASA-CSSA-SSA International Annual Meeting** at Indianapolis, IN USA . Nov. 12-16, 2006.
14. **Liu S.**, K. Yu, M. Haffner, and S.J. Park. Toward the cloning of a major QTL conditioning common bacterial blight resistance in common bean. **The International Plant and Animal Genome Conference**. San Diego, CA USA. January 14-16, 2006.
15. **Liu S.**, K. Yu, S.J. Park, R.L. Conner, P. Balasubramanian, H-H. Mündel and F.A. Kiehn. Breed multiple disease resistant common beans by marker assisted selection and backcrossing. **The International Plant and Animal Genome Conference**. San Diego, CA USA. January 14-16, 2006.
16. **Liu S.**, K. Yu, S.J. Park, R.L. Conner, P. Balasubramanian, H-H Mündel and F.A. Kiehn. 'Pyramiding three disease resistance into common bean cultivars by marker assisted selection' and 'Fine mapping of a major QTL for common bacterial blight resistance' (by Liu, Yu and Park). Reported to **Ontario White Bean Producers' Marketing Board and Colored Bean Growers' Association**. London, Ontario. February of 2005, 2006, 2007.
17. **Liu S.**, K. Yu, S.J. Park, R.L. Conner, P. Balasubramanian, H-H Mündel and F.A. Kiehn. 2004. Pyramiding three disease resistances into common bean cultivars by marker-assisted selection. **5th Canadian Pulse Research Workshop**. November 28 – 31. London, Ontario.
18. **Liu S.**, H. Lu, T. Musket, A.L. McKendry, G.L. Davis. 2003. QTL associated with scab resistance in soft red winter wheat Ernie. **American Society of Agronomy**. November 2003. Denver, CO.

Proceedings and Poster Abstracts

1. Pradhan, G.P., Q. Xue, **S.Y. Liu**, J.C. Rudd and K.E. Jessup. 2013. Effective use of soil water contributed to high yield in wheat in the U.S. Southern High Plains. *J. of Arid Land Studies*. Proceed. of the Desert Technology XI. Nov. 19-22. San Antonio, TX, USA.
2. **Liu, S.Y.**, C.A. Griffey, G. Brown-Guedira. 2013. Molecular characterization of Fusarium head blight resistance in U.S. soft red winter wheat germplasm and cultivars. ASA-CSSA-SSSA International Annual Meetings. Nov. 3-6, Tampa, FL, USA.
3. **Liu, S.Y.***, J.C. Rudd, G. Bai, S. Haley, A. Ibrahim, Q. Xue, D. Hays, R. Devokota, R. Graybosch, P.S. Stamand. 2013. Validation and application of molecular markers linked to genes important for hard winter wheat production and marketing in the U.S. Great Plains. ASA-CSSA-SSSA International Annual Meetings. Nov. 3-6, Tampa, FL, USA.
4. Ocheya, S.A., **S.Y. Liu***, J.C. Rudd, A. Ibrahim, Q. Xue, D. Hays, R. Devokota, G. Zhang, J. Chen. 2013. Identification of SNP markers for drought tolerance and resistance to wheat streak mosaic virus. ASA-CSSA-SSSA International Annual Meetings. Nov. 3-6, Tampa, FL, USA.
5. Pradhan, G.P., Q. Xue, K.E. Jessup, **S.Y. Liu**, J.C. Rudd and J.R. Mahan. 2013. Identifying drought tolerant wheat genotypes using wireless infrared thermometers in the US Southern High Plains. ASA-CSSA-SSSA International Annual Meetings. Nov. 3-6, Tampa, FL, USA
6. Reddy, B., A. Ibrahim, J.C. Rudd, **S.Y. Liu**. 2013. Breeding for durable rust resistant in Texas hard red winter wheat using synthetic derived wheat lines and Ug99 resistant genes. Borlaug Global Rust Initiative Workshop, Aug 19-22, New Delhi, India
7. Krishnareddy, S., **S.Y. Liu**, A. Akhunova, J. Mahan, Y. Weng, Q.Xue, J.C. Rudd, P. Payton. 2013. Comparative transcriptomics involving greenbug and water-deficit stress responses in hard-red winter wheat. *Plant and Animal Genome XXI*. January 12-16, San Diego, CA.
8. **Liu, S.Y.**, Q. Xue, A.M. Ibrahim, S. Krishnareddy and J.C. Rudd. 2012. Genetic and physiological evaluation of yield and other important traits of hard red winter wheat in the Texas High Plains. ASA-CSSA-SSSA International Annual Meetings. Oct. 21-24, Cincinnati, OH.
9. Krishnareddy, S., S.Y. Liu, Q. Xue, J.C. Rudd, M. Fuentealba, K. Jessup, P. Payton and J. Mahan. 2012. Mechanisms of adaptation to water-stress conditions in widely planted hard red winter wheat cultivars. ASA-CSSA-SSSA International Annual Meetings. Oct. 21-24, Cincinnati, OH.
10. Reddy, B. A.M. Ibrahim, J.C. Rudd and **S.Y. Liu**. 2012. Enhancing yield potential of hard red winter wheat via use of synthetic backcrosses. ASA-CSSA-SSSA International Annual Meetings. Oct. 21-24,

- Cincinnati, OH.
11. Ajayi S., S. Krishnareddy, **S.Y. Liu**, P.Gowda, Q. Xue, T. Marek, J.C. Rudd. 2012. Reflectance based characterization of wheat cultivars for identifying drought tolerance. ASA-CSSA-SSSA International Annual Meetings. Oct. 21-24, Cincinnati, OH.
 12. Krishnareddy S, **Liu S.Y.**, Rudd JC, Devkota R, Xue Q, Payton P, Mahan J, Akhunova A. 2012. Gene expression profiling of water deficit stress responses in widely adapted wheat cultivars TAM 111 and TAM 112. American Society of Plant Biologist. July Austin, TX.
 13. Krishnareddy, S., Y. Weng, J. C. Rudd, A. Akhunova, S.Y. Liu. 2012. Transcriptome profiling of defense responses to greenbug feeding in wheat. Plant and Animal Genome XX. January 14-18, San Diego, CA.
 14. **Liu, S.Y.**, C.A. Griffey, M.D. Hall, A.L. McKendry, J.Chen, G. Brown-Guedira, D. Van Sanford and D. Schmale. 2011. Mapping Fusarium head blight resistance in wheat cultivars Ernie and Massey. 2011 National Fusarium Head Blight Forum. Dec 4 – 6, St. Louis, MO, USA.
 15. **Liu, S.Y.**, M. D. Christopher, C. A. Griffey, M. D. Hall, P.G. Gundrum, and W.S. Brooks. 2011. Characterization of Fusarium head blight resistance in soft red winter wheat line VA00w-38. 2011 National Fusarium Head Blight Forum. Dec 4 – 6, St. Louis, MO, USA.
 16. Berger, G., P. Khatibi, W. Brooks, **S.Y. Liu**, M.D. Hall, A. Green, C.A. Griffey, and D. Schmale III. 2011. Fusarium Head Blight Resistance and Deoxynivalenol Accumulation in Hulled and Hulless Winter Barley and Dried Distiller’s Grain. 2011 National Fusarium Head Blight Forum. Dec 4 – 6, St. Louis, MO, USA.
 17. Krishna Reddy, S., Y. Weng, J.C. Rudd, A. Akhunova, **S.Y. Liu***. 2011. Transcriptome profiling of defense responses to greenbug feeding in wheat. The 6th International Conference on Genome. Nov. 12 – 15, Shenzhen, China. *Corresponding author.
 18. **Liu, S.Y.**, C.A. Griffey, M. Hall, A. McKendry, J. Chen, G. Brown-Guedira, D. Van Sanford and D. Schmale. 2011. Are there common QTL for scab resistance in soft red winter wheat cultivars. **ASA-CSSA-SSSA International Annual Meetings**. Oct. 16-19, San Antonio, TX, USA.
 19. Berger, G., **S.Y. Liu**, M.D. Hall, W. Brooks, S. Chao, C.A. Griffey and G. Muehlbauer. 2011. Identification of marker-trait associations in the Virginia Tech winter barley program using genome-wide mapping. **ASA-CSSA-SSSA International Annual Meetings**. Oct. 16-19, San Antonio, TX, USA.
 20. Xue, Q., K. Jessup, J.C. Rudd, **S.Y. Liu**, S. Baker, R. Devkota and J. Mahan. 2011. Different mechanisms of adaptation to drought stress in two wheat cultivars? **ASA-CSSA-SSSA International Annual Meetings**. Oct. 16-19, San Antonio, TX, USA.
 21. Azhaugvel, P., Y. Weng, Y. Ma, M.-C. Luo, H. Simkova, J. Safar, J. Dolezel, T. Wicker, M. Saha, H. Rammna, R. Nelson, C. Zhou, T. Ray, Y. Tang, **S.Y. Liu**, J.C. Rudd. 2011. Cloning and function validation of a NB-ARC-LRR-type candidate gene for the greenbug aphid resistance locus Gb3 in wheat. **Plant and Animal Genome XIX Conference**. January 15-19, Sandiego, CA, USA.
 22. **Liu, S.Y.**, J. C. Rudd, A.M. Ibrahim, S.D. Haley, G. Bai, C.A. Griffey, and G. Brown-Guedira. 2011. Development and validation of diagnostic markers for wheat stress traits in of Great Plains of North America. **Plant and Animal Genome XIX Conference**. Jan 15-19, San Diego, CA, USA.
 23. Burger, G.L., **S.Y. Liu**, M.D. Hall, W.S. Brooks, S. Chao, C.A. Griffey, G. L. Muehlbauer. 2010. Association mapping of molecular markers linked to key traits in the Virginia winter barley. **The 4th Annual Meeting of National association of Plant Breeders**. Johnston, Iowa, USA.
 24. Green, A.J., G.L. Berger, R.M. Pitman, M. Balota, C.A. Griffey, M. Dm. Hall, S.Y. Liu, W. E. Thomason, W. S. Brooks. 2010. Yield components, agronomic, and morphological traits associated with soft red winter wheat yield. **The 4th Annual Meeting of National association of Plant Breeders**. Johnston, Iowa, USA.
 25. Christopher, M.D., C. A. Griffey, S.Y. Liu. 2010. Identification and molecular mapping of adult plant stripe rust resistance in soft red winter wheat. **The 4th Annual Meeting of National association of Plant Breeders**. Johnston, Iowa, USA. (Poster and abstracts).
 26. Berger, G.L., **S. Liu**, M.D. Hall, W.S. Brooks, S. Chao, C.A. Griffey, G.J. Muehlbauer. 2010. Identification of molecular markers for important traits in winter barley using association mapping. **The International Plant and Animal XVIII Conference**. Jan 9-13. San Diego, CA USA.
 27. **Liu S.**, W.E. Thomason, C.A. Griffey, M.D. Hall. P.G. Gumdrum, W.S. Brooks, R. Pitman, M. Vaughn, T. Lewis. and D. Dunaway. Integrated Management of Scab in Wheat using Resistant Varieties and Fungicide. In: S. Canty, A. Clark, E. Walton, E. Ellis, J. Mundell, and D. Van Sanford (Eds.),

- Proceedings of the National Fusarium Head Blight Forum**; 2009 December 7-9, Orlando, FL, USA. Lexington, KY: University of Kentucky p66.
28. **Liu S.**, W.S. Brooks, S. Chao. C.A. Griffey, M.D. Hall, P.G. Gundrum, G.L. Berger, P.A. Khatibi, and D.G. Schmale. Association Analyses of SNP Markers with Scab Resistance in Winter Feed Barley. In: S. Canty, A. Clark, E. Walton, E. Ellis, J. Mundell, and D. Van Sanford (Eds.), **Proceedings of the National Fusarium Head Blight Forum**; 2009 December 7-9, Orlando, FL, USA. Lexington, KY: University of Kentucky p133.
 29. **Liu S.**, C.A. Griffey, A.L. McKendry. M.D. Hall and W.S. Brooks. Saturation Mapping of Scab Resistance QTL in Ernie and Identification of Diagnostic Markers for Breeding Scab Resistance. In: S. Canty, A. Clark, E. Walton, E. Ellis, J. Mundell, and D. Van Sanford (Eds.), **Proceedings of the National Fusarium Head Blight Forum**; 2009 December 7-9, Orlando, FL, USA. Lexington, KY: University of Kentucky p134.
 30. **Liu S.**, M.D. Hall, C. A. Griffey, A.L. McKendry, J. Chen, W.S. Brooks, G. Brown-Guand D. Van Sanford. Saturation Mapping QTL for Scab Resistance in a Virginia Wheat Cultivar Massey. In: S. Canty, A. Clark, E. Walton, E. Ellis, J. Mundell, and D. Van Sanford (Eds.), **Proceedings of the National Fusarium Head Blight Forum**; 2009 December 7-9, Orlando, FL, USA. Lexington, KY: University of Kentucky p135.
 31. Hall M.D., **S. Liu**, D. Marshall, D. Van Sanford, J. Costa, G. Brown-Guedira, C.A. Griffey. 2009. Molecular detection of QTL associated with adult plant resistance to powdery mildew in two soft red winter wheat populations. **The International Plant and Animal Genome Conference**. San Diego, CA USA. January 10-14, 2009.
 32. O'Boyle P.D., M.D. Hall, **S. Liu**, W.S. Brooks, S. Chao, B.J. Steffenson, C.A. Griffey. Identification and molecular characterization of barley net blotch resistance genes using a diallel mating scheme. **The International Plant and Animal Genome Conference**. San Diego, CA USA. January 10-14, 2009.
 33. Griffey, C.A., W.E. Thomason, J.E. Seago, MD. Hall, **S. Liu**, W. S. Brooks, and P.G. Gundrum. 2009. Virginia wheat production and research progress. Annual Wheat Newsletter. Vol. 55.
 34. 29 poster abstracts or papers in proceedings in international, national and regional conferences before 2009.

Cultivar and Germplasm Release

Participated the release of one dry bean line, 10 wheat cultivars (7 soft red, two hard red, and one durum), two wheat germplasm lines, and two barley cultivars.

Instruction of Students and Outreach

Grant review panel for a state wheat commission to select better proposals for funding.

Co-Major advisors for one Ph. D. student at College Station and one M.S. student at WTAMU, join in graduate committee members of two Ph. D. students. Supervised two M.S. students and three undergraduate students from WTAMU and Amarillo College in research projects.

Present research progress in meetings with producers and seed companies organized by Virginia Crop Improvement Association on February 18, 2010.

Participated and presented in annual field days in Agriculture Agri-Food Canada from 2004 to 2007 and in Eastern Virginia Agricultural Research and Extension Center since 2008.

Co-instructed interdisciplinary graduate student course "Topics in Molecular Cell Biology and Biotechnology" in the fall of 2008 (ALS6024).

Guest lectures in Plant Breeding and Genetics for both graduate and undergraduate students in Virginia Tech (CECS5414, 4414).

Supervised 14 Intern undergraduate students in Agriculture Agri-Food Canada in plant breeding and molecular genetics related research work.

Supervised 6 part time undergraduate students working in scab resistance related research projects including disease inoculation and molecular marker screening at Virginia Tech.

Reviewer of Journal Articles

Crop Science (7)
Euphytica (1)
Europ. J. of Plant Path. (1)
Internat J. of Plat Bio and Res.(1)
Journal of Phytopathology (3)
Mol Breed (1)
Phytopathology (1)
Plant Science (1)
PLOS one (1)
Theorl and Appl Genet (2)
ASA book proposals (6)

Professional Association Members and Activities

1. Crop Science Society of America – member since 2003
2. American Society of Agronomy – Member since 2009
3. CSSA-C454-Young Scientist Award Committee (Jan 2014 – Dec 2015)
4. ACS320: Book and Multimedia Publishing Committee (2013-2015)
5. ASA-A45: Tengtou Ag Sci, Award Committee Jan 1, 2012 – Dec 31, 2013
6. CSSA-C451: Crop Science Research Award Committee, CSSA, 2008-2010.
7. Editorial Board: International Journal of Plant Biology & Research Since September, 2013:
<http://www.jscimedcentral.com/PlantBiology/editors.php>