

# Shuyu Liu

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Small Grains Breeding & Genetics  
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## Education

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

## Research Experience

**August 2007 – present: Research Scientist, small grain breeding and genomics, Department of Crop and Soil Environmental Science, Virginia Tech, Blacksburg, VA, USA.** Breeding and genetic studies for resistance to Fusarium head blight (FHB), powdery mildew, rust, leaf blotch using conventional and genomics technologies in wheat and barley.

**January 2007 – August 2007, Biologist;**  
**January 2004 – December 2006, Visiting Fellow, Greenhouse Processing Crops Research Center, Agriculture and Agri-Food Canada (AAFC), Harrow, ON, Canada.** Marker-assisted selection (MAS) to breed bean varieties resistant to common bacterial blight (CBB), bean common mosaic virus and anthracnose simultaneously founded by AAFC. Fine mapping and map-based cloning of a major QTL for CBB resistance

**August, 1998 – December, 2003, Research Assistant, University of Missouri-Columbia, Columbia, MO 65201, USA**

Conducted research in wheat Fusarium Head Blight (FHB) resistance using conventional and molecular genetics. Mapped QTL associated with FHB resistance in Ernie.

**September, 1996 – August, 1997, Visiting Scholar;**  
**August, 1997 – August, 1998, Research Assistant, Colorado State University, Fort Collins, CO 80523, USA.** Worked on Russian wheat aphid (RWA) resistance in wheat. Located the resistance genes of three major resistant

resources on chromosomes using Chinese spring monosomics.

**August, 1988 – September, 1996, wheat breeder, Shandong Academy of Agricultural Sciences, Jinan, Shandong, 250100, China**

Conducted wheat genetics and breeding studies on high yield, disease resistance, drought tolerance, and good quality.

**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) Design experiments in the greenhouse and field to test breeding lines and statistically analyze data using SAS, Excel.
- 3) Manage experiments in the field, greenhouse, growth chamber, and laboratory.
- 4) Work with AFLP, SSR, STS, SCAR and SNP markers.
- 5) Design primers to amplify specific target bands using Primer 3 and GENERUNR 3.0.
- 6) Target band cloning and DNA sequencing. Compare sequences using BLAST, Vector NTI or other software.
- 7) 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.
- 8) Construct genetic maps of important traits using MapMaker 3.0. Map QTL using QTL Cartographer 2.0. Set up and work with software under DOS, Windows, Unix (linux).
- 9) Extract and purify RNA and study gene expression. Southern and Northern blot analyses of target band or cDNA clones.
- 10) Supervise the personnel who are working in the project to make sure the deadline and goals were met.
- 11) Organize and participate regional field trip to evaluate agronomic performance of bean and wheat varieties with farmers and researchers.

**Publications**

- 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.
- 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.
- 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
- 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

- Abate Z., S. Liu, A. L. McKendry. 2007. QTL associated with resistance to Deoxynivalenol and Fusarium damaged kernel in a soft red winter wheat Ernie. *Crop Science* (In press).
- Liu S., K. Yu, M. Haffner, S.J. Park, Banik, M. Physical mapping of a major QTL conditioning common bacterial blight resistance on chromosome 1 in common bean. (Submitted).
- Liu S., K. Yu, S.J. Park, R.L. Conner, P. Balasubramanian, H-H Mündel and F.A. Kiehn. Breeding multiple disease resistant varieties using MAS in dry bean. (In preparation)
- Liu S., Banik, M., K. Yu, M. Haffner, S.J. Park. Molecular characterization of a major QTL for CBB resistance in common bean (In Preparation).
- 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.
- Zhang Y., J. S. Quick, S. Liu, 1998. Genetic Variation in PI 294994 wheat for resistance to Russian Wheat Aphid. *Crop Science*. 38:527-530.