

# Juyou Wu



## Areas of Research

Pear germplasm resources and enhancement;  
Development of flowers and the interaction between pollen and pistil of pear.

## Contact Information

**Office location:** No.1 Weigang, Nanjing, Jiangsu, China

**Office phone:** 025-84395985

**Lab location:** State Key Laboratory of Crop Genetics and Germplasm Enhancement, Nanjing Agricultural University

**Email address:** [juyouwu@njau.edu.cn](mailto:juyouwu@njau.edu.cn)

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## Research Interests

Pear germplasm resources and and enhancement;  
Development of flowers and the interaction between pollen and pistil of pear

## Research Projects

National Natural Science Foundation for Excellent Young Scholars;  
National Key Technology Research and Development Program of the Ministry of Science and Technology of China;  
National Primary Research and Development Project;  
Ph.D. Programs Foundation of Ministry of Education of China;  
Natural Science Fund of Jiangsu Province;  
Independent Agricultural Innovation Fund of Jiangsu Province;  
Talents introduction project of Nanjing Agricultural University.

## Scientific Research Results and Honors

We focus on the reproductive development of fruit trees and germplasm resources and enhancement research. Self-incompatibility (SI) is a genetic mechanism to prevent self-fertilization in flowering plants. The key role of S-RNase in determining

S-RNase-based SI pollen rejection has been widely acknowledged. Pear (*Pyrus bretschneideri*) is a Rosaceae fruit tree with the typical S-RNase-based SI system. The SI of pear leading to reducing pollination and fertilization, which further result in the decline of yield and quality of pear. In order to overcome this bottleneck in pear industry, we have carried out the systematic and in-depth study. We established the "S-RNase concentration threshold" molecular model of pear SI, and clarified the changing characteristics of ion channel activity in SI pear pollen tube and the molecular mechanism of pear pollen tube tip expansion. Besides, we also constructed the breeding technology system of pear SI gene  $S_4^{SM}$  introduced by crossing method.

We have published more than 50 papers in *Plant Cell*, *Plant Journal*, *Plant Physiology*, *New Phytologist*, etc, which have been cited for more than 900 times. Besides, we built four standards for pear industry and participated in the breeding of five new pear varieties.

Currently, I serve as the director of the China Young Scientists Association, the vice chairman of the Youth Branch of the Chinese Horticultural Society, the managing director of the Jiangsu Horticultural Society, the managing director of the Jiangsu Society of Cell and Developmental Biology, the director of the Agricultural Sector of the Nanjing Youth Federation, the editorial board member of the SCI journal "Molecular Breeding" and "Horticulture Research", the chairman of the International Youth Horticulture Research Forum, etc.

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## Education Background

**Bachelor:** Nanjing Agricultural University (2000.09-2004.07)

**Ph.D:** Nanjing Agricultural University / University of Birmingham (2004.09-2010.12)

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## Work Experience

Postdoctor, the University of California in San Diego, 2011.02-2012.02

Professor, Nanjing Agricultural University, 2012.02-2014.06

Professor / Associate Dean of the College of Horticulture, Nanjing Agricultural University, 2014.06-2017.05

Professor / Dean of the College of Horticulture, Nanjing Agricultural University, 2017.05-

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## Selected Publication

Chen, J., Wang, P., de Graaf, B.H.J., Zhang, H., Jiao, H., Tang, C., Zhang, S.\* , and **Wu, J.\*** (2018). Phosphatidic acid counteracts S-RNase signaling in pollen by stabilizing the actin cytoskeleton. *Plant Cell* 30, 1023-1039. (Cover Article)

**Wu, J.Y.#**, Qin, X.Y. # , Tao, S.T. # , Jiang, X.T., Liang, Y.K., and Zhang, S.L.\* (2014).

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**Wu, J.Y.**, Wang, S., Gu, Y.C., Zhang, S.L., Publicover, S.J., and Franklin-Tong, V.E.\* (2011). Self-Incompatibility in *Papaver rhoeas* activates nonspecific cation

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- Wu, J.Y.** #, Qu, H.Y. #, Shang, Z.L., Tao, S.T., Xu, G.H., Wu, J., Wu, H.Q., and Zhang, S.L.\* (2011). Reciprocal regulation of Ca<sup>2+</sup>-activated outward K<sup>+</sup> channels of *Pyrus pyrifolia* pollen by heme and carbon monoxide. *New Phytol* 189, 1060-1068.
- Wu, J.Y.**, Shang, Z.L., Wu, J., Jiang, X.T., Moschou, P.N., Sun, W.D., Roubelakis-Angelakis, K.A., and Zhang, S.L.\* (2010). Spermidine oxidase-derived H<sub>2</sub>O<sub>2</sub> regulates pollen plasma membrane hyperpolarization-activated Ca<sup>2+</sup>-permeable channels and pollen tube growth. *Plant J* 63, 1042-1053.
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- Jiao, H., Liu, Q., Zhang, H., Qi, K., Liu, Z., Wang, P., **Wu, J.**\* , and Zhang, S.\* (2019). PbrPCCP1 mediates the PbrTTS1 signaling to control pollen tube growth in pear. *Plant Science* 289, 110244.
- Chen, G., Wang, L., Chen, Q., Qi, K., Yin, H., Cao, P., Tang, C., Wu, X., Zhang, S., Wang, P.\* , and **Wu, J.**\* (2019). PbrSLAH3 is a nitrate-selective anion channel which is modulated by calcium-dependent protein kinase 32 in pear. *BMC Plant Biol* 19, 190.
- Chen, G., Li, X., Chen, Q., Wang, L., Qi, K., Yin, H., Qiao, X., Wang, P., Zhang, S., **Wu, J.**\* , and Huang, Z.\* (2018). Dynamic transcriptome analysis of root nitrate starvation and re-supply provides insights into nitrogen metabolism in pear (*Pyrus bretschneideri*). *Plant Science* 277, 322-333.
- Liu, X., Zhang, H., Jiao, H., Li, L., Qiao, X., Fabrice, M.R., **Wu, J.**\* , and Zhang, S.\* (2017). Expansion and evolutionary patterns of cysteine-rich peptides in plants. *BMC Genomics* 18, 610.
- Sun, J., Li, L., Wang, P., Zhang, S., and **Wu, J.**\* (2017). Genome-wide characterization, evolution, and expression analysis of the leucine-rich repeat receptor-like protein kinase (LRR-RLK) gene family in Rosaceae genomes. *BMC Genomics* 18, 763.
- Wang, P. #, Liu, Z.#, Cao, P., Liu, X., Wu, X., Qi, K., Zhang, S.\* , and **Wu, J.**\* (2017). PbrCOL8 is a clock-regulated flowering time repressor in pear. *Tree Genetics & Genomes* 13.
- Gao, Y., Zhou, H., Chen, J., Jiang, X., Tao, S., **Wu, J.**\* , and Zhang, S.\* (2015). Mitochondrial dysfunction mediated by cytoplasmic acidification results in pollen tube growth cessation in *Pyrus pyrifolia*. *Physiol Plant* 153, 603-615.
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