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## 从事专业：

植物营养学，环境生物学

## 研究方向：

植物吸收重金属的分子机理，污染元素生物地球化学，污染土壤修复

## 简历：

1992年获英国 Newcastle 大学博士学位。1992至2012年任职英国洛桑研究所，先后任研究员、资深研究员。2012年起任南京农业大学全职特聘教授。主要从事环境生物学与植物营养学研究，在植物重金属吸收与解毒的分子机制、生物修复、作物硫素和微量元素营养等方面研究取得重要成果。迄今已发表 SCI 论文 250 多篇，在 Web of Science 被引用次数超过 1.7 万次，H-指数为 73，位于世界同行前列。

## 主持科研项目：

1. 教育部“植物营养生物学”创新团队，300 万元，2013–2015; 第二期滚动支持，300 万元，2018–2020
2. 江苏省“植物营养学”创新团队，300 万元，2013–2015
3. 国家自然科学基金委重点项目“水稻土砷形态转化的生物学机理与调控措施”308 万元，2014–2018
4. 国家自然科学基金委面上项目“水稻 NIP 水通道蛋白向籽粒运输砷的功能解析”86 万元，2014–2017
5. 国家自然科学基金委国际合作重点项目“基于离子组学和基因组学技术揭示水稻重金属积累的分子机理”，333 万元，2016–2020
6. 国家自然科学基金委国际合作重点项目“污染稻田镉、砷的生物地球化学过程与降低水稻镉、砷吸收的稻田管理措施”，296 万元，2017–2020
7. 农业部公益性行业科研专项“阻控作物重金属积累的遗传改良研究与示范”，1512 万元，2014–2018
8. 环保部公益性行业科研专项“现行土壤环境质量标准中镉元素标准值的合理性论证”95 万元，2014–2016
9. 江苏省双创计划，100 万元，2014–2016
10. Unilever（联合利华）“影响茶叶铝积累的环境与生理因子研究”35 万元，2012–2015

## 学术期刊及学会任职：

《Plant and Soil》领域编辑

《European Journal of Soil Science》副主编

《Environmental Pollution》，《Functional Plant Biology》，《环境化学》编委。

国际微量元素生物地球化学学会 (International Society for Trace Element Biogeochemistry) 执行委员 (2009-2013, 2017-2021)。

中国土壤学会理事 (2012 至今)

国际植物营养学会 (International Plant Nutrition Council) 理事(2017 至今)

#### 专著：

Meharg, A. A. and Zhao, F. J. 2012. *Arsenic & Rice*. Springer, Dordrecht, The Netherlands.

#### 代表性文章：

1. Wang, C.C., Na, G.N., Sanchez Bermejo, E., Chen, Y., Banks, J.A., Salt, D.E. and Zhao, F.J.\* 2017. Dissecting the components controlling root-to-shoot arsenic translocation in *Arabidopsis thaliana*. *New Phytologist*. doi: 10.1111/nph.14761
2. Xu, J.M., Shi, S.L., Wang, L., Tang, Z., Lv, T.T., Zhu, X.L., Ding, X.M., Wang, Y.F., Zhao, F.J.\* and Wu, Z.C.\* 2017. OsHAC4 is critical for arsenate tolerance and regulates arsenic accumulation in rice. *New Phytologist*. 215: 1090–1101.
3. Xu, X.W., Chen, C., Wang, P., Kretschmar, R. and Zhao, F.J.\* 2017. Control of arsenic mobilization in paddy soils by manganese and iron oxides. *Environmental Pollution*. 231: 37–47.
4. Chen, Y., Sun, S.K., Tang, Z., Liu, G.D., Moore, K.L., Maathuis, F.J.M., Miller, A.J., McGrath, S.P. and Zhao, F.J.\* 2017. The Nodulin 26-like intrinsic membrane protein OsNIP3;2 is involved in arsenite uptake by rice lateral roots. *Journal of Experimental Botany* 68: 3007-3016
5. Zhang, J., Zhao, S.C., Xu, Y., Zhou, W.X., Huang, K., Tang, Z. and Zhao, F.J.\* 2017. Nitrate stimulates anaerobic microbial arsenite oxidation in paddy soils. *Environmental Science and Technology*. 51: 4377–4386.
6. Tang, Z., Chen, Y., Chen, F., Ji, Y.C., and Zhao, F.J.\* 2017. OsPTR7 (OsNPF8.1), a putative peptide transporter in rice, is involved in dimethylarsenate accumulation in rice grain. *Plant Cell Physiology* 58: 904-913.
7. Shi, S.L., Wang, T., Chen, Z., Tang, Z., Wu, Z.C., Salt, D.E., Chao, D.Y.\* and Zhao, F.J.\* 2016. OsHAC1;1 and OsHAC1;2 function as arsenate reductases and regulate arsenic accumulation. *Plant Physiology* 172: 1708–1719.
8. Wang, P.T., Zhang, W.W., Mao, C.Z., Xu, G.H. and Zhao, F.J.\* 2016. The role of OsPT8 in arsenate uptake and varietal difference in arsenate tolerance in rice. *Journal of Experimental Botany*. 67: 6051-6059.
9. Xie, W.Y., McGrath, S.P., Su, J.Q., Hirsch, P., Clark, I., Shen, Q.R., Zhu, Y.G. and Zhao, F.J.\* 2016. Long-term impact of field applications of sewage sludge on soil antibiotic resistance. *Environmental Science and Technology*. 50, 12602–12611.
10. Huang, K., Chen, C., Zhang, J., Tang, Z., Shen, Q.R., Rosen, B.P. and Zhao, F.J.\* 2016. Efficient arsenic methylation and volatilization mediated by a novel bacterium from an arsenic-contaminated paddy soil. *Environmental Science and Technology*. 50: 6389–6396.
11. Yan, J.L., Wang, P.T., Wang, P., Yang, M., Lian, X.M., Tang, Z., Huang, C.F., Salt, D.E. and Zhao, F.J.\* 2016. A loss-of-function allele of OsHMA3 associated with high cadmium accumulation in shoots and grain of Japonica rice cultivars. *Plant, Cell and Environment*. 39: 1941–1954.
12. Huang, K., Chen, C., Shen, Q.R., Rosen, B.P. and Zhao, F.J.\* 2015. Genetically engineering *Bacillus subtilis* with a heat-resistant arsenite methyltransferase for bioremediation of arsenic-contaminated organic waste. *Applied and Environmental Microbiology* 81: 6718-6724.
13. Chen, Y., Moore, K.L., Miller, A.J., McGrath, S.P., Ma, J.F. and Zhao, F.J.\* 2015. The role of nodes in arsenic storage and distribution in rice *Journal of Experimental Botany* 66: 3717–3724.
14. Zhao, F.J.\* , Ma, Y.B., Zhu, Y.G., Tang, Z. and McGrath, S.P. 2015. Soil contamination in China: Current status and mitigation strategies. *Environmental Science and Technology* 49: 750-759.
15. Zhang, J., Zhou, W.X., Liu, B.B., He, J., Shen, Q.R. and Zhao, F.J. 2015\*. Anaerobic arsenite oxidation by an autotrophic arsenite-oxidizing bacterium from an arsenic-contaminated paddy soil. *Environmental Science and Technology* 49: 5956–5964.
16. Chao DY\*, Chen Y, Chen JG, Shi SL, Chen ZR, Wang CC, Danku JM, Zhao FJ\* and Salt DE\*. 2014. Genome-wide association mapping identifies a new arsenate reductase enzyme critical for limiting arsenic accumulation in plants. *PLoS Biology* 12(12): e1002009.

17. Zhao, F.J.\* , Moore, K.L., Lombi, E. and Zhu, Y.G. 2014. Imaging element distribution and speciation in plant cells. *Trends in Plant Science* 19: 183-192.
18. Zhu, Y.G., Yoshinaga, M., Zhao, F.J. and Rosen, B.P. 2014. Earth abides arsenic biotransformations. *Annual Review of Earth and Planetary Sciences* 42:443-467.
19. Eagling, T., Neal, A.L., McGrath, S.P., Fairweather-Tait, S., Shewry, P.R. and Zhao, F.J.\* 2014. Distribution and speciation of iron and zinc in grain of two wheat genotypes. *Journal of Agricultural and Food Chemistry* 62: 708-716.
20. Moore, K.L.\* , Chen, Y., van de Meene, A.M.L., Hughes, L., Liu, W.J., Geraki, T., Mosselmans, F., McGrath, S.P., Grovenor, C., and Zhao, F.J.\* 2014 Combined NanoSIMS and Synchrotron X-ray fluorescence reveals distinct cellular and subcellular distribution patterns of trace elements in rice tissues. *New Phytologist* 201: 104-115
21. Zhao, F.J.\* , Zhu, Y.G. and Meharg, A.A. 2013. Methylated arsenic species in rice: Geographical variation, origin, and uptake mechanisms. *Environmental Science & Technology* 47: 3957-3966.
22. Lomax, C., Liu, W.J., Wu, L.Y., Xue, K., Xiong, J., Zhou, J.Z., McGrath, S.P., Meharg, A.A., Miller, A.J. and Zhao, F.J.\* 2012. Methylated arsenic species in plants originate from soil microorganisms. *New Phytologist*. 193: 665-672.
23. Wu, Z.C., Ren, H.Y., McGrath, S.P., Wu, P. and Zhao, F.J.\* 2011. Investigating the contribution of the phosphate transport pathway to arsenic accumulation in rice. *Plant Physiology* 157: 498-508.
24. Moore, K.L., Schröder, M., Wu, Z.C., Martin, B.G.H., Hawes, C.R., McGrath, S.P., Hawkesford, M.J., Ma, J.F., Zhao, F.J. and Grovenor, C.R.M. 2011. High-Resolution Secondary Ion Mass Spectrometry reveals the contrasting subcellular distribution of arsenic and silicon in rice roots. *Plant Physiology* 156: 913-924.
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26. Ye, W.L., Wood, B.A., Stroud, J.L., Andralojc, P.J., Raab, A., McGrath, S.P., Feldmann, J. and Zhao, F.J.\* 2010. Arsenic speciation in phloem and xylem exudates of castor bean. *Plant Physiology* 154: 1505-1513.
27. Zhao, F.J.\* , McGrath, S.P. and Meharg, A.A. 2010. Arsenic as a food-chain contaminant: mechanisms of plant uptake and metabolism and mitigation strategies. *Annual Review of Plant Biology* 61: 535-559.
28. Liu W.J., Wood B.A., Raab A., McGrath S.P., Zhao F.J.\* and Feldmann J. 2010. Complexation of arsenite with phytochelatins reduces arsenite efflux and translocation from roots to shoots in *Arabidopsis thaliana*. *Plant Physiology* 152: 2211-2221.
29. Zhao, F.J.\* , Ago, Y., Mitani, N., Li, R.Y., Su, Y.H., Yamaji, N., McGrath, S.P. and Ma, J.F.\*. 2010. The role of the rice aquaporin Lsi1 in arsenite efflux from roots. *New Phytologist* 186: 392-399.
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31. Zhu, Y.G., Pilon-Smits, E.A.H., Zhao, F.J., Williams, P.N. and Meharg, A.A. 2009. Selenium in higher plants: understanding mechanisms for biofortification and phytoremediation. *Trends in Plant Science* 14: 436-442.
32. Li, R.Y., Stroud, J.L., Ma, J.F., McGrath, S.P. and Zhao, F.J.\* 2009. Mitigation of arsenic accumulation in rice with water management and silicon fertilization. *Environmental Science and Technology* 43: 3778-3783.
33. Zhao, F.J.\* and McGrath, S.P. 2009. Biofortification and phytoremediation. *Current Opinion in Plant Biology* 12: 373-380.
34. Zhao, F.J.\* , Ma, J.F., Meharg, A.A. and McGrath, S.P. 2009. Arsenic uptake and metabolism in plants. *New Phytologist* 181: 777-794.
35. Fan, M.S., Zhao, F.J.\* , Fairweather-Tait, S.J., Poulton, P.R., Dunham, S.J. and McGrath, S.P. 2008 Evidence of decreasing mineral density in wheat grain over the last 160 years. *Journal of Trace Elements in Medicine and Biology* 22: 315-324.
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37. Xu, X.Y., McGrath, S.P., Meharg, A.A. and Zhao, F.J.\* 2008. Growing rice aerobically markedly decreases arsenic accumulation. *Environmental Science and Technology* 42: 5574-5579.
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39. Xu, X.Y., McGrath, S.P. and Zhao, F.J.\* 2007. Rapid reduction of arsenate in the medium mediated by plant roots. *New Phytologist* 176: 590–599.
40. Zhao, F.J.\*, R.F. Jiang, S.J. Dunham and McGrath, S.P. 2006. Cadmium uptake, translocation and tolerance in the hyperaccumulator *Arabidopsis halleri*. *New Phytologist* 172: 646–654
41. Zhao, F.J.\*, Lehmann, J., Solomon, D., Fox, M.A. and McGrath, S.P. 2006. Sulphur speciation and turnover in soils: evidence from sulphur K-edge XANES spectroscopy and isotope dilution studies. *Soil Biology and Biochemistry* 38: 1000-1007.
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46. Zhao, F.J., Dunham, S.J. and McGrath, S.P. 2002. Arsenic hyperaccumulation by different fern species. *New Phytologist* 156: 27-31.
47. Zhao, F.J.\*, Hamon, R.E., Lombi, E., McLaughlin, M.L. and McGrath, S.P. 2002. Characteristics of cadmium uptake in two contrasting ecotypes of the hyperaccumulator *Thlaspi caerulescens*. *Journal of Experimental Botany* 53: 535-543.
48. Zhao, F.J.\*, Hamon, R.E. and McLaughlin, M.J. 2001. Root exudates of the hyperaccumulator *Thlaspi caerulescens* do not enhance metal mobilisation. *New Phytologist* 151: 613-620.
49. Lombi, E., Zhao, F.J., Dunham, S.J. and McGrath, S.P. 2001. Phytoremediation of heavy metal contaminated soils: natural hyperaccumulation versus chemically-enhanced phytoextraction. *Journal of Environmental Quality* 30: 1919-1926.
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52. Sun, B., Zhao, F.J., Lombi, E. and McGrath, S.P. 2001. Leaching of heavy metals from contaminated soils using EDTA. *Environmental Pollution* 113: 111-120.
53. Küpper, H., Lombi, E., Zhao, F.J. and McGrath, S.P. 2000. Cellular compartmentation of cadmium and zinc in relation to other elements in the hyperaccumulator *Arabidopsis halleri*. *Planta* 212: 75-84.
54. Küpper, H., Zhao, F.J. and McGrath, S.P. 1999. Cellular compartmentation of zinc in leaves of the hyperaccumulator *Thlaspi caerulescens*. *Plant Physiology* 119: 305-311.