Dr. Chen studied the effects of plant-microbe interactions on plant responses such as heavy metals/metalloids uptake and metabolism. He firstly found that heavy metals/metalloid (arsenic and cadmium) transporters in rice could be significantly influenced by the commonly-found associated symbiotic fungi [1–3]. Upon fungal symbiosis, the correspondingly changed rhizospheric bacterial community significantly affected heavy metal uptake in rice [3]. The symbiotic fungi could also significantly enhance the density of cellulose/hemicellulose content in grass which is of importance during carbon cycling in ecosystems [4].

It is clear that the tripartite system of plants, fungi and bacteria is essential in agro/ecosystems. However, the mechanism of interaction is still obscure in many ways and different genotypes and abiotic factors will lead to distinct outcomes. A model system (like germ-free mice) need to be developed to investigate the mechanisms behind.

Chen is also interested in ecological restoration in degraded lands such as landfill and filled slope in urbanized area. Efficient practices for restoration and tools for assessing ecological performance of the restored man-made ecosystems are still lacking [5–8]. It has been shown that biochar could improve the ecological performance of revegetated final landfill cover [9].

Chen's current interests are

1. To develop a gnobiotic plant-fungi-bacteria (PFB) model system using model plants maize (*Zea mays*), rice (*Oryza sativa*) and medic (*Medicago truncatula*), together with arbuscular mycorrhizal fungi and representative bacterial assemblage;

2. To investigate the mechanism how symbiotic fungi influence the cellulose/hemicellulose formation in the plant cell wall;

3. To investigate the ecological functions and services of man-made ecosystems in urbanized area.

Selected publications

[1] X. Chen, H. Li, W.F. Chan, C. Wu, F. Wu, S. Wu, M.H. Wong, Arsenite transporters expression in rice (*Oryza sativa* L.) associated with arbuscular mycorrhizal fungi (AMF) colonization under different levels of arsenite stress, Chemosphere. 89 (2012) 1248–1254. doi:10.1016/j.chemosphere.2012.07.054.

[2] X.W. Chen, F.Y. Wu, H. Li, W.F. Chan, C. Wu, S.C. Wu, M.H. Wong, Phosphate transporters expression in rice (*Oryza sativa* L.) associated with arbuscular mycorrhizal fungi (AMF) colonization under different levels of arsenate stress, Environ. Exper. Bot. 87 (2013) 92–99. doi:10.1016/j.envexpbot.2012.08.002.

[3] X.W. Chen, L. Wu, N. Luo, C.H. Mo, M.H. Wong, H. Li, Arbuscular mycorrhizal fungi and the associated bacterial community influence the uptake of cadmium in rice, Geoderma. Under Revision. (2018).

[4] X.W. Chen, Y. Kang, P.S. So, C.W.W. Ng, M.H. Wong, Arbuscular mycorrhizal fungi increase the proportion of cellulose and hemicellulose in the root stele of vetiver grass, Plant Soil. 425 (2018) 309–319. doi:10.1007/s11104-018-3583-z.
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[6] J.T.F. Wong, X.W. Chen, W.Y. Mo, Y.B. Man, C.W.W. Ng, M.H. Wong, Restoration of plant and animal communities in a sanitary landfill: A 10-year case study in Hong Kong, Land Degrad. Develop. 27 (2016) 490–499. doi:10.1002/ldr.2402.
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[8] X.W. Chen, J.T.F. Wong, Z.T. Chen, A.O.W. Leung, C.W.W. Ng, M.H. Wong, Arbuscular mycorrhizal fungal community in the topsoil of a subtropical landfill restored after 18 years, J. Environ. Mang. 225 (2018) 17–24. doi:10.1016/j.jenvman.2018.07.068.
[9] X.W. Chen, J.T.F. Wong, Z.T. Chen, T.W.L. Tang, H.W. Guo, A.O.W. Leung, C.W.W. Ng, M.H. Wong, Effects of biochar on the ecological performance of a subtropical landfill, Sci. Total Environ. 644 (2018) 963–975. doi:10.1016/j.scitotenv.2018.06.379.