

Leadership

- Monitor of Doctoral Class 2006, Department of Physics, Huazhong University of Science and Technology, Sep 2006-
- Minister of Academic Department of the Graduate Student Union, Department of Physics, Huazhong University of Science and Technology, Sep 2006-

Research

- The transport properties of the branched network: Study the transport processes including heat conductivity and fluid flow of the branched network with fractal characterization and discuss the influence of the micro-structural parameters on the transport of the network. And I'm going to do some research on the optimum design of the network structure.
- Application of the branched network: Discuss the application of the branched network on the bronchial tree, blood circulation system, cooling of micro-electronic devices, flow passage in the fuel cell, and allometric scaling law in biology etc. I'm going to investigate the bronchial disease with Lattice Boltzmann Method.
- Fractal and permeability of the porous media: Investigate the permeable properties of the porous media with fractal theory. I have revised the Kozeny-Carman Equation and derived the analytical expression of permeability for radial flow towards a well in the heterogeneous geologic porous media.

Publications and Submitted Manuscripts

1. [Peng Xu](#), Boming Yu *et al.*, Heat conduction in fractal tree-like branched networks, *Int. J. Heat Mass Transfer* 49 (2006) 3746-3751.
2. [Peng Xu](#), Boming Yu *et al.*, Analysis of permeability for the fractal-like tree network by parallel and series models, *Physica A* 369 (2006) 884-894.
3. [Peng Xu](#), Boming Yu *et al.*, Permeability of the fractal disk-shaped branched network with tortuosity effect, *Phys. Fluids* 18 (2006) 078103.
4. [Peng Xu](#) and Boming Yu, The scaling laws of transport properties for fractal-like tree network, *J. Appl. Phys.* 100(2006)104906.
5. [Peng Xu](#) and Boming Yu, Developing a new form of permeability and Kozeny-Carman constant for homogeneous porous media by means of fractal geometry, revised version submitted to *Advances in Water Resources*.
6. [Peng Xu](#) and Boming Yu, The fractal branching network model for the radial flow in the porous media. The local and global effective permeability for the radial flow in the heterogeneous geologic porous media, submitted 2007.

7. Jun Chen, Boming Yu, [Peng Xu](#) and Yonghua Li, Fractal-like tree networks increasing the permeability, *Physical Review E* 75(2007)056301.
8. Yanjun Liu, Boming Yu, [Peng Xu](#) and Jinsui Wu, Study of the effect capillary pressure on permeability, *Fractals* 15(2007)55-62.
9. Yongjin Feng, Boming Yu, [Peng Xu](#) and Mingqing Zou, The effective thermal conductivity of nanofluids based on the nanolayer and the aggregation of nanoparticles, *J. Phys. D* 40(2007)3164-3171.
10. Meijuan Yun, Boming Yu, [Peng Xu](#) and Jinsui Wu, Geometrical Models for Tortuosity of Streamlines in Three-Dimensional Porous Media, *The Canadian Journal of Chemical Engineering* 84(2006) 1-9.
11. Yongjin Feng, Boming Yu, Mingqing Zou and [Peng Xu](#), A Generalized Model for the Effective Thermal Conductivity of Unsaturated Porous Media Based on Self-Similarity, *Journal of Porous Media* 10(2007)1.
12. Jie Xu, Boming Yu, Mingqing Zou and [Peng Xu](#), A new model for heat conduction of nanofluids based on fractal distributions of nanoparticles, *J. Phys. D* 39(2006)4486-4490.
13. Yongjin Feng, Boming Yu, [Peng Xu](#) and Mingqing Zou, Thermal conductivity of nanofluids by Monte Carlo simulations, revised version submitted to *Physical Review E*.