

1-2 Prof. Jianchao Cai



Name:Jianchao Cai

Organization:China University of Geosciences, Wuhan, China

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Education

2013.07-Present: Visiting Scholar, University of Tennessee, Knoxville, USA

2010 Ph.D., Huazhong University of Science and Technology(HUST), Hubei, China

2007 M.S., Huazhong University of Science and Technology(HUST), Hubei, China

2005 B.S., Henan Normal University, Henan, China

Work Experience

2012.12-Present: Associate professor, in CUG, China

2012.03-05: Visiting Professor, King Abdullah University of Science and Technology (KAUST), Saudi Arabia

2010.07-2012.12: Lecturer, in CUG, China

2010.12-2012.12: Post-Doctoral fellow, Geological Resources and Geological Engineering, in CUG, China

Research Interests

Fractal geometry theory

Reservoir engineering especially for enhanced oil recovery(EOR)

Transport phenomena in low permeability porous media (especially for spontaneous imbibition)

Petrophysics

Services&Awards

Editorial board for Austin journal of Hydrology

Guest editor for Fractals

Major Publications

Cai, J., Perfect, E., Cheng, C.-L. Hu, X., Generalized modeling of spontaneous imbibition based on Hagen-Poiseuille flow in tortuous capillaries with variably shaped apertures, *Langmuir*, 2014, 30(18): 5142-5151.

Cai J., A fractal approach to low velocity non-Darcy flow in a low permeability porous medium, *Chin. Phys. B*, 2014, 23(4): 044701.

You L., Cai J., Kang Y., Luo L., A fractal approach to spontaneous imbibition height in natural porous media, *Int. J. Mod. Phys. C*, 2013, 24(9): 1350063.

Cai J., Sun S.,Fractal analysis of fracture increasing spontaneous imbibition in porous media with gas-saturated, *Int. J. Mod. Phys. C*, 2013, 24(8): 1350056.

Cai J., Hu X., Standnes D.C., You L., An analytical model for spontaneous imbibition in fractal porous media including gravity, *Colloids Surf. A: Physicochem. Eng. Aspects*, 2012, 414:

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- Cai J., You L., Hu X., Wang J., Peng R., Prediction of effective permeability in porous media based on spontaneous imbibition effect. *Int. J. Mod. Phys. C*, 2012, 23(7): 1250054. Cai-IJMPC-2012-23(7)-1250054.
- Cai J., Yu B., A discussion of the effect of tortuosity on the capillary imbibition in porous media. *Transp. Porous Media*. 2011, 89(2): 251-263. Cai-TiPM-2011-89(2):251-263.
- Cai J., Yu B., Zou M., Mei M., Fractal analysis of invasion depth of extraneous fluids in porous media. *Chem. Eng. Sci.*, 2010, 65(18): 5178-5186. Cai-CES-2010-65(18):5178-5186.
- Cai J., Yu B., Mei M., Luo L., Capillary rise in a single tortuous capillary. *Chin. Phys. Lett.*, 2010, 27(5): 054701. Cai-CPL-2010-27(5)-054701.
- Cai J., Yu B., Prediction of maximum pore size of porous media based on fractal geometry. *Fractals*, 2010, 18(4): 417-423. Cai-Fractals-2010-18(4):417-423.
- Cai J., Yu B., Zou M., Luo L., Fractal characterization of spontaneous co-current imbibition in porous media. *Energy & Fuels*, 2010, 24(3): 1860-1867. Cai-EF-2010-24(3):1860-1867.
- Cai J., Yu B., Zou M., Mei M., Fractal analysis of surface roughness of particles in porous media. *Chin. Phys. Lett.*, 2010, 27(2): 024705.
- Yu B., Cai J., Zou M., On the physical properties of apparent two-phase fractal porous media. *Vadose Zone J.*, 2009, 8(1): 177-186.
- Luo L., Yu B., Cai J., Mei M., Symmetry is not always perfect. *Int. J. Heat Mass Transfer*, 2010, 53(21-22): 5022-5024.
- Mei M., Yu B., Cai J., Luo L., A hierarchical model for multi-phase fractal media. *Fractals*, 2010, 18(1): 53-64.
- Mei M., Yu B., Luo L., Cai J., A model for contact angle of liquid droplets on rough surfaces. *Chin. Phys. Lett.* 2010, 27(7): 076802.
- Yun M., Yu B., Cai J., Analysis of seepage characters in fractal porous media. *Int. J. Heat Mass Transfer*, 2009, 52(13-14): 3272-3278.
- Mei M., Yu B., Cai J., Luo L., A fractal analysis of dropwise condensation heat transfer. *Int. J. Heat Mass Transfer*, 2009, 52(21-22): 4823-4828.
- Xu Q., Yu B., Cai J., Dielectric constant of porous ultra low-k dielectrics by fractal-Monte Carlo simulations. *Phys. Lett. A*, 2009, 373(22): 1978-1982.
- Yun M., Yu B., Cai J., A fractal model for the starting pressure gradient for Bingham fluids in porous media. *Int. J. Heat Mass Transfer*, 2008, 51(5-6): 1402-1408.
- Zou M., Yu B., Cai J., and Peng Xu. Fractal model for thermal contact conductance. *J. Heat Transfer*, 2008, 130(10): 101301.
- Yun M.J., Yu B.M., Xu P., Cai J.C., Fractal analysis of power-law fluid in a single capillary. *Chin. Phys. Lett.*, 2008, 25(2): 616-619.
- Xu P., Yu B., Qiu S., Cai J., An analysis of the radial flow in the heterogeneous porous media based on fractal and constructal tree networks. *Physica A*, 2008, 387(26): 6471-6483.
- Tang Y., Yu B., Hu Y., Cai J., Feng Y., Xu P., A self-similarity model for dielectric constant of porous ultra low-k dielectrics. *J. Phys. D: Appl. Phys.*, 2007, 40(17): 5377-5382.
- Journal articles (in Chinese)
- Shaobing Tian, Jianchao Cai, Xiangyun Hu., Jianhui Li, Sihong Zeng, Shan Xu, Deep conductivity structure in middle-east Junggar Basin using MT, *Earth Science-Journal of China University of Geosciences*, 2014, 39(5): 620-628

- Xiangyun Hu, Guangpu Huo, Rui Gao, Haiyan Wang, Yifan Huang, Yunxia Zuo, Jianchao Cai, The magnetotelluric anisotropic two-dimensional simulation and case analysis, Chinese Journal of Geophysics-Chinese Edition, 2013, 56 (12), 4268-4277
- Cai, J., Guo, S., You, L., Hu, X., Fractal analysis of spontaneous imbibition mechanism in fractured-porous dual media reservoir, Acta Phys. Sin., 2013, 62(1): 014701.
- Cai J., Yu B., Advances in study of spontaneous imbibition in porous media, Advances in Mechanics, 2012, 42(6): 735-754.
- Guo S., Cai J., Zhang X., Li X., Dai G., Research on bridges hidden diseases detection method by GPR. Progress in Geophysics, 2012, 27(4): 1812-1821.
- Yang Q., Tan L., Cai J., Hu X.Y., Fractal models for quantitative characterization of reservoir microscopic heterogeneity, Progress in Geophysics, 2012, 27(2): 603-609.
- Han B., Hu X., He Z., Cai J., Mathematical classification of magnetotelluric inversion methods, Oil Geophysical Prospecting, 2012, 47(1): 177-187.
- Cai J., Zhao C., Tan L., Hu X., Fractal analysis on imbibition coefficient in porous media of low permeability reservoir. Geological Science and Technology Information, 2011, 30(5): 54-59.)
- Other publications
- Cai J., Yu B., Hu X., "A fractal-based approach to model wicking" In: "Wicking in Porous Materials: Traditional and Modern Modeling Approaches" edited by R. Masoodi and K.M. Pillai, Taylor & Francis Group (CRC Press), New York, ISBN: 9781439874325, pp363-293. October 26, 2012.