

# Dong Zhou

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## SUMMARY

A scientist and programmer. Interested in personal growth and social good. Familiar with magnetic resonance imaging, quantum computing, and biophysics.

## SKILLS

Python, Go, C/C++, Matlab, Shell scripts, Polymer.js, D3.js, SQL  
Machine learning, Image processing, Computational physics/mathematics  
Mathematical modeling, Optimization with regularization, Stochastic process

## EDUCATION AND EXPERIENCE

- Senior scientist at Schrödinger, Inc. 2016-2017
- Postdoc in radiology, Weill Medical College of Cornell University 2012–2016
- Postdoc in physics, Yale University 2011–2012
- Ph.D in physics, University of Wisconsin-Madison 2006–2011
- Graduate study in physics, University of Georgia-Athens 2004–2006
- B.S. in physics, Honored Mixed Class, Zhejiang University, China 2000–2004

Reviewer for Journal of Physics A: mathematical and theoretical, IEEE TBME, PLOS ONE, Quantum Information Processing, New Journal of Physics, Medicine, Journal of Neuroscience Methods, NeuroImage, Magnetic Resonance in Medicine, Medical Physics, NMR in Biomedicine

## HONORS AND AWARDS

- International Society for Magnetic Resonance in Medicine (ISMRM) Merit Award, Magna Cum Laude, 2014
- International Student Academic Achievement Award, UW-Madison, 2011
- Ray and Anne Herb Award for Wisconsin Distinguished Graduate Fellowship, 2008
- Emanuel R. Piore Award for Highest Scorer on the Qualifier Exam, UW-Madison, 2007
- University Housing's Favorite Instructor Award for Fall 2006, UW-Madison, 2006
- Van Vleck Fellowship for Graduate Students in Physics, UW-Madison, 2006
- Honored Graduate of Zhejiang University, China, 2004
- Honorary Enrollment, Zhejiang University, China, 2000
- Tan Jiazhen (C. C. Tan) Scholarship for Outstanding High School Student in Biology, 1999
- Kang Hui Scholarship for Highest Scorer in High School Entrance Exam, Hangzhou, China, 1996

## PATENTS

1. *Magnetic resonance imaging systems and methods for optimized parallel receive, excite, and shim (oPRES)*  
Hui Han, Yi Wang, John Stager, Junghun Cho, and **Dong Zhou**, pending

## PUBLICATIONS

1. *Quantitative Susceptibility Mapping (QSM)-Based Cerebral Metabolic Rate of Oxygen (CMRO2) Mapping with Minimum Local Variance (MLV)*  
J. Zhang, J. Cho, **D. Zhou**, T.D. Nguyen, P. Spincemaille, A. Gupta, and Y. Wang, submitted to MRM (2016)
2. *Quantitative susceptibility mapping of magnetic quadrupole moments*  
J. Cho, **D. Zhou**, Y. Kee, P. Spincemaille, Y. Wang, submitted to Magn Reson Med, (2016)
3. *Susceptibility underestimation in a high susceptibility phantom: dependence on imaging resolution, magnitude contrast and other parameters*  
**D. Zhou**, J. Zhang, P. Spincemaille, Y. Wang, accepted by Magn Reson Med, (2016)
4. *Preconditioned Total Field Inversion (TFI) Method for Quantitative Susceptibility Mapping*  
Z. Liu, Y. Kee, **D. Zhou**, Y. Wang, and P. Spincemaille, accepted by Magn Reson Med (2016)
5. *Cerebral Metabolic Rate of Oxygen (CMRO2) Mapping with Hyperventilation Challenge using Quantitative Susceptibility Mapping (QSM)*  
J. Zhang, **D. Zhou**, P. Spincemaille, Y. Wang, accepted by Magn Reson Med, (2016)
6. *Quantitative susceptibility mapping and  $R2^*$  measured changes during white matter lesion development in multiple sclerosis: myelin breaking down, myelin debris degradation and removal, and iron accumulation*  
Y. Zhang, S.A. Gauthier, A. Gupta, W. Chen, J. Comunale, G.C.-Y. Chiang, **D. Zhou**, G. Askin, W. Zhu, D. Pitt, Y. Wang, accepted by AJNR, (2016).
7. *Three-dimensional MR Phase Unwrapping via Dual Decomposition*  
J. Dong, F. Chen, **D. Zhou**, T. Liu, Z. Yu, and Y. Wang, accepted by Magn Reson Med (2016).
8. *On the influence of zero-padding on the nonlinear operations in Quantitative Susceptibility Mapping*  
S. Eskreis-Winkler, **D. Zhou**, T. Liu, A. Gupta, S. A. Gauthier, Y. Wang, and P. Spincemaille, MRI 35, 154 (2017)
9. *Longitudinal change in magnetic susceptibility of new enhanced multiple sclerosis (MS) lesions measured on serial quantitative susceptibility mapping (QSM)*  
Y. Zhang, S.A. Gauthier, A. Gupta, J. Comunale, G. C.-Y. Chiang, **D. Zhou**, W. Chen, A.E. Giambrone, W. Zhu, Y. Wang, JMRI 44 (2) 426 (2016).
10. *Increase in magnetic susceptibility after MS lesion formation and potential diagnostic utility*  
Y. Zhang, S. Gauthier, L. Tu, A. Gupta, J. Comunale, G.C.-Y. Chiang, **D. Zhou**, Y. Wang, MULTIPLE SCLEROSIS JOURNAL 21 502 (2016).
11. *Simultaneous Phase Unwrapping and Removal of chemical Shift (SPURS) using Graph Cuts: Application in Quantitative Susceptibility Mapping*  
J. Dong, T. Liu, F. Chen, **D. Zhou**, A. Dimov, A. Raj, Q. Cheng, P. Spincemaille, and Y. Wang, IEEE TMI 34 (2) 531 (2015).

12. *Background field removal by solving the Laplacian boundary value problem*  
**D. Zhou**, T. Liu, P. Spincemaille, and Y. Wang, NMR in Biomedicine, 27 (3), 312 (2014).
13. *An Iterative Spherical Mean Value (iSMV) Method for Background Field Removal in MRI*  
Y. Wen, **D. Zhou**, T. Liu, P. Spincemaille, and Y. Wang, Magn Reson Med 72 (4) 1065 (2014).
14. *Magnetic susceptibility anisotropy: cylindrical symmetry from macroscopically ordered anisotropic molecules and accuracy of MRI measurements using few orientations*  
C. Wisnieff, T. Liu, P. Spincemaille, S. Wang, **D. Zhou**, and Y. Wang, NeuroImage 70, 363 (2013).
15. *Mediated gates between spin qubits*  
J. Fei, **D. Zhou**, Y.-P. Shim, S. Oh, X. Hu, and M. Friesen, Phys. Rev. A 86, 062328 (2012).  
arXiv:1207.6063
16. *Cavity-assisted quantum bath engineering with a superconducting qubit*  
K. W. Murch, U. Vool, **D. Zhou**, S. J. Weber, S.M. Girvin, and I. Siddiqi, Phys. Rev. Lett. 109, 163602 (2012); arXiv:1207.0053
17. *Phenomenological noise model for superconducting qubits: two-state fluctuators and 1/f noise*  
**D. Zhou** and R. Joynt, Supercond. Sci. Techno. 25, 045003 (2012); arXiv:1102.5766
18. *Topology of entanglement evolution of two qubits*  
**D. Zhou**, G.-W. Chern, J. Fei, and R. Joynt, Int. J. Mod. Phys. B 26, 1250054 (2012);  
arXiv:1007.1749
19. *Disappearance of entanglement: a topological point of view*  
**D. Zhou** and R. Joynt, QIP 11, 571 (2012); arXiv:1006.5474
20. *Suppression of decoherence and disentanglement by the exchange interaction*  
A. De, A. Lang, **D. Zhou**, and R. Joynt, Phys. Rev. A 83, 042331 (2011); arXiv:1006.5943
21. *Quasi-Hamiltonian Method for Computation of Decoherence Rates.*  
R. Joynt, **D. Zhou** and Q.-H. Wang, Int. J. Mod. Phys. B 25, 2115 (2011); arXiv:0906.2843
22. *Noise-induced looping on the Bloch sphere: Oscillatory effects in dephasing of qubits subject to broad-spectrum noise.*  
**D. Zhou** and R. Joynt, Phys. Rev. A 81, 010103 (2010); arXiv:0907.0463
23. *Nacre Protein Fragment Templates Lamellar Aragonite Growth*  
RA Metzler, JS Evans, CE Killian, **D Zhou**, TH Churchill, N Appathurai, SN Coppersmith, PUPA Gilbert, J. Am. Chem. Soc. 132, 6329-6334 (2010).
24. *X-ray photoelectron emission spectromicroscopic analysis of arborescent lycopsid cell wall composition and Carboniferous coal ball preservation.*  
C. K. Boyce, M. Abrecht, **D. Zhou**, and P.U.P.A. Gilbert, Int. J. Coal Geol. 83, 146-153 (2010).
25. *Disentanglement and decoherence from classical non-Markovian noise: Random telegraph noise.*  
**D. Zhou**, A. Lang, and R. Joynt, QIP 9, 727 (2010); arXiv:0912.3313
26. *Two-particle quantum walks applied to the graph isomorphism problem.*  
J. Gamble, M. Friesen, **D. Zhou**, R. Joynt, and S.N. Coppersmith, Phys. Rev. A 81, 052313 (2010); arXiv:1002.3003

27. *A high-resolution chemical and structural study of framboidal pyrite formed within a low-temperature bacterial biofilm.*  
L.C.W. MacLean, T. Tylizszczak, P.U.P.A. Gilbert, **D. Zhou**, T.J. Pray, T.C. Onstott, G. Southam. *Geobiology* 6, 471-480 (2008).
28. *Gradual Ordering in Red Abalone Nacre.*  
P.U.P.A. Gilbert, R. A. Metzler, **D. Zhou**, A. Scholl, A. Doran, A. Young, M. Kunz, N. Tamura, S. N. Coppersmith. *J. Am. Chem. Soc.* 130, 17519-17527 (2008); arXiv:0710.4573
29. *Assignment of polarization-dependent peaks in carbon K-edge spectra from biogenic and geologic aragonite.*  
**D. Zhou**, R.A. Metzler, T. Tylizszczak, J. Guo, M. Abrecht, S.N. Coppersmith, P.U.P.A. Gilbert. *J. Phys. Chem. B* 112, 13128-13135 (2008).
30. *Probing the organic-mineral interface in model biominerals.*  
R. A. Metzler, I.-W. Kim, K. Delak, J.S. Evans, **D. Zhou**, E. Beniash, F. Wilt, M. Abrecht, J.-W. Chiou, J. Guo, S.N. Coppersmith, P.U.P.A. Gilbert. *Langmuir* 24, 2680-2687 (2008).
31. *Polarization-dependent imaging contrast in abalone shells.*  
R.A. Metzler, **D. Zhou**, M. Abrecht, J.-W. Chiou, J. Guo, D. Ariosa, S.N. Coppersmith, P.U.P.A. Gilbert. *Phys. Rev. B* 77, 064110 (2008).