

RUILIANG BAI, PHD

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Education

- Ph.D.** University of Maryland, College Park, Aug. 2015
Biophysics Graduate Program at UMD
Graduate Partnerships Program at NIH
Advisor – Peter J. Basser (NIH) & Robert Briber (UMD)
*nominated as candidate for UMD Distinguished Dissertation Award
- B.S.** Hunan University, Changsha, Jul. 2010
Applied Physics, Lida School of Fundamental Science
Minors: Mathematics, Biology

Research Experience

- Associate Professor**
Zhejiang University, Hangzhou Oct. 2017 – Present
Interdisciplinary Institute of Neuroscience and Technology
- Postdoctoral Fellow**
National Institutes of Health, Bethesda Sep. 2015 – Sep. 2017
Advisor – Peter J. Basser
- Pre-doctoral Fellow**
National Institutes of Health, Bethesda Jul. 2011 – Aug. 2015
University of Maryland, College Park
Advisor – Peter J. Basser (NIH) & Robert Briber (UMD)
- Graduate Research Assistant**
Dept. of Chemistry, UMD Mar. 2011 – Jun. 2011
Advisor – Garegin A. Papoian
- Graduate Research Assistant**
Advanced MRI Section, NIH, Bethesda Oct. 2010 – Mar. 2011
Advisor – Jeff Duyn
- Undergraduate Research Assistant**
Beijing MRI center, Institute of Biophysics Jan. 2010 – Jun. 2010
Chinese Academy of Science, Beijing
Advisor – Rong Xue
- Undergraduate Research Assistant**
Dep. of Physics, Hunan University Jun. 2008 – Dec. 2009
Advisor – Quanhui Liu

Teaching Experience

Associate Professor

Zhejiang University

Oct. 2017 – Present

Undergraduate & graduate course – *Systems Neuroscience*

Teaching Assistant

Dept. of Physics, University of Maryland

Aug. 2010 – May. 2011

Undergraduate courses – *Introduction to Physics, Statistical Thermodynamics, Solid State Physics.*

*nominated as UMD Runner-up Ralph D. Myers Teaching Assistant Award

Honors and Awards

Magna cum laude Awards, *International Society for Magnetic Resonance 26th Annual Meeting*, Paris, 2018.

Junior Fellow, *International Society for Magnetic Resonance in Medicine*, 2017.

Summa cum laude Awards, *International Society for Magnetic Resonance 25th Annual Meeting*, Honolulu, 2017.

Educational Stipend Award, *International Society for Magnetic Resonance 25th Annual Meeting*, Honolulu, 2017.

1st Place Young Investigator Award, *Overseas Chinese Society for Magnetic Resonance in Medicine*, Singapore, 2016.

3rd Place Presentation Award in Diffusion Study Group, *International Society for Magnetic Resonance 24th Annual Meeting*, Singapore, 2016.

Summa cum laude Awards (two abstracts), *International Society for Magnetic Resonance 24th Annual Meeting*, Singapore, 2016.

NIH Distinguished Graduate Research Award, *National Institutes of Health*, Bethesda, 2015.

Education Stipend Award, *International Society for Magnetic Resonance 23rd Annual Meeting*, Toronto, 2015.

Presentation Award in White Matter Study Group, *International Society for Magnetic Resonance 22nd Annual Meeting*, Milan, 2014.

Education Stipend Award, *International Society for Magnetic Resonance 22nd Annual Meeting*, Milan, 2014.

Jacob K Goldhaber Travel Award, *University of Maryland*, College Park, 2014.

Runner-up Ralph D. Myers Teaching Assistant Award, *University of Maryland*, College Park, 2012.

International Travel Award, *University of Maryland*, College Park, 2011.

Outstanding Bachelor Thesis Award, *Hunan University*, Changsha, 2010.

National Scholarship of China, *Chinese Ministry of Education and Hunan University*, Changsha, 2009

Outstanding Student Scholarship, *Hunan University*, Changsha, 2006 – 2008.

Memberships

International Society for Magnetic Resonance in Medicine (Junior Fellow)
Biophysical Society
Society for Neuroscience

Professional Activities

Chapter Committee, International Society for Magnetic Resonance in Medicine
Trainee Advisory Work Group, International Society for Magnetic Resonance in Medicine

Journals reviewed for

Theranostics, Biomedical Signal Processing & Control, IET Image Processing,
Microporous & Mesoporous Materials

Invited Presentations

Measuring transmembrane water exchange in rat brain cortical cells in normal and pathological conditions, *International Society for Magnetic Resonance in Medicine Annual Meeting*, Honolulu, April. 2017

The sensitivity of diffusion MRI in direct detection of neuronal activity: an *in-vitro* assessment, *Diffusion Study Group, International Society for Magnetic Resonance in Medicine Annual Meeting*, Singapore, May. 2016

A framework for accurate determination of the T2 distribution from multiple echo magnitude MRI images, *White Matter Study Group, International Society for Magnetic Resonance in Medicine Annual Meeting*, Milan, May. 2014

Journal publications

Y. Li, J. Ye, S. Zhou, **R. Bai**, ..., J. Xie, Multi-parameter MRI to investigate vasculature modulation and photo-thermal ablation combination therapy against cancer. *Nanomedicine: Nanotechnology, Biology and Medicine*. 14 (2018)

R. Bai, C. Springer, D. Plenz, P.J. Basser, Brain active trans-membrane water cycling measured by MR is associated with neuronal activity. **Magn. Reson. Med.** (2018)

R. Bai, C. Springer, D. Plenz, P.J. Basser, Fast, Na⁺/K⁺ pump driven, Steady-state Transcytolemmal Water Exchange Found in Neuronal Tissue: A Study of Rat Brain Cortical Cultures, **Magn. Reson. Med.** 79 (2018) 3207-3217

Y. Liu, Z. Wang, Y. Liu, G. Zhu, O. Jacobson, X. Fu, **R. Bai**, X. Lin, N. Lu, X. Yang, W. Fan, H. Kalish, G. Niu, Z. Nie, X. Chen, Suppressing Nanoparticle-Mononuclear Phagocyte System Interactions of Two-Dimensional Gold Nanorings for Improved Tumor Accumulation and Photothermal Ablation of Tumors. **ACS Nano.** 11 (10) (2017) 10539-10548.

Z. Zhou, **R. Bai**, J. Munasinghe, L. Nie, X. Chen, T_1 - T_2 Dual-Modal Magnetic Resonance Imaging: From Molecular Basis to Contrast Agents, **ACS Nano**, 11(6) (2017) 5227 (DOI: 10.1021/acsnano.7b03075)

H.Chen, X. Tong, L. Lang, O. Jacobson, B. Yung, X. Yang, **R. Bai**, D. Kiesewetter, Y. Ma, H. Wu, G. Niu, X. Chen, Quantification of Tumor Vascular Permeability and Blood Volume by Positron Emission Tomography. **Theranostics.** 7 (9) (2017) 2363-2376 (doi:10.7150/thno.19898)

R. Bai, D. Benjamini, J. Cheng, P.J. Basser, Fast, accurate 2D-MR relaxation exchange spectroscopy (REXSY): beyond compressed sensing, **J. Chem. Phys.** 145 (2016) 154202

R. Bai, C. Stewart, D. Plenz, P.J. Basser, Accessing the sensitivity of diffusion MRI to detect neuronal activity directly, **Proc Natl Acad Sci USA.** 113 (2016) 1728-1737

R. Bai, A. Klaus, T. Bellay, C. Stewart, S. Pajevic, U. Nevo, et al., Simultaneous calcium fluorescence imaging and MR of ex vivo organotypic cortical cultures: a new test bed for functional MRI, **NMR Biomed.** 28 (2015) 1726-1738.

R. Bai, A. Cloninger, W. Czaja, P.J. Basser, Efficient 2D MRI relaxometry using compressed sensing, **J. Magn. Reson.** 255 (2015) 88–99.

A. Cloninger, W. Czaja, **R. Bai**, P.J. Basser, Solving 2D Fredholm integral from incomplete measurements using compressive sensing, **SIAM J. Imaging Sci.** 7 (2014) 1775–1798.

R. Bai, C.G. Koay, E. Hutchinson, P.J. Basser, A framework for accurate determination of the T2 distribution from multiple echo magnitude MRI images, **J. Magn. Reson.** 244 (2014) 53–63.

R. Bai, P.J. Basser, R.M. Briber, F. Horkay, NMR water self-diffusion and relaxation studies on sodium polyacrylate solutions and gels in physiologic ionic solutions, **J. Appl. Polym. Sci.** 131 (2014) 1–7.

Q.H. Liu, Y. Shen, **R. Bai**, X. Wang, A notable difference between ideal gas and infinite molar volume limit of van der Waals gas, **Eur. J. Phys.** 31 (2010) 671–673.

H.R. Sun, **R. Bai**, S Yang and Q.H. Liu, Quantum-classical correspondence for a charge in a uniform magnetic field, **College Physics**. (Chinese) 29 (2010) 7–8.

Patents

P.J. Basser, **R. Bai**, A. Cloninger, W. Czaja, Magnetic resonance 2D relaxometry reconstruction using partial data. (Filed April 2015, PCT/US2015/026533).

Conference Proceedings and Talks

R. Bai, C. S. Springer, D. Plenz, P.J. Basser, Active, neuronal-activity-dependent trans-membrane water cycling detected by NMR, In **Proc. Intl. Soc. Mag. Reson. Med** 26, Pairs, 2018. (*Oral*, Abstract No. 7146).

R. Bai, X. Ju, P.J. Basser, Formalin fixation significantly changes cell membrane permeability in cortical brain tissue, In **Proc. Intl. Soc. Mag. Reson. Med** 26, Pairs, 2018. (*Oral*, Abstract No. 7629).

R. Bai, C. S. Springer, D. Plenz, P.J. Basser, Measuring transmembrane water exchange in rat brain cortical cells in normal and pathological conditions, In **Proc. Intl. Soc. Mag. Reson. Med** 25, Honolulu, 2017. (*Oral*, Abstract No. 203).

R. Bai, C. S. Springer, D. Plenz, P.J. Basser, The Vanishing Shutter-Speed Limit, In **Proc. Intl. Soc. Mag. Reson. Med** 25, Honolulu, 2017. (*Poster*, Abstract No. 1918).

R. Bai, C. Stewart, D. Plenz, P.J. Basser, The sensitivity of diffusion MRI in direct detection of neuronal activity: an *in-vitro* assessment, In **Proc. Intl. Soc. Mag. Reson. Med** 24, Singapore, 2016. (*Oral*, Abstract No. 4534).

*nominated for ISMRM *Summa cum laude* Award

R. Bai, A. Klaus, T. Bellay, C. Stewart, S. Pajevic, U. Nevo, et al., A novel test bed for non-BOLD functional MRI, In **Proc. Intl. Soc. Mag. Reson. Med** 24, Singapore, 2016. (*Poster*, Abstract No. 4796).

*nominated for ISMRM *Summa cum laude* Award

E. Mertz, K. Koon, F. Horkay, **R. Bai**, M. Komlosh, et al., Imaging extracellular matrix in human placenta, In **The Human Placenta Project: 3rd Annual Meeting**, Bethesda, U.S., 2016.

R. Bai, A. Cloninger, W. Czaja, P.J. Basser, Efficient 2D MRI relaxometry using compressed sensing, In **Proc. Intl. Soc. Mag. Reson. Med** 23, Toronto, Canada, 2015. (*Poster*, Abstract No. 3256).

F. Horkay, D. Benjamini, U. Eliav, **R. Bai**, et al., Imaging functional properties and composition of cartilage extracellular matrix, In **NICHD intramural research**

symposia, Bethesda, U.S., 2015.

R. Bai, P.J. Basser, Multi-component water dynamics and exchange in brain cortical tissue probed via in-vitro D-T2 2D correlation NMR, In *Biophysical Society 59th Annual Meeting*, Baltimore, U.S., 2015. (Biophysical Journal; vol. 108, no.2.).

R. Bai, C.G. Koay, E. Hutchinson, P.J. Basser, A framework for accurate determination of the T2 distribution from multiple echo magnitude MRI images, In *Proc. Intl. Soc. Mag. Reson. Med* 22, Milan, Italy, 2014. (*Poster*, Abstract No. 4958).

R. Bai, P.J. Basser, Physical limits of magnetic resonance imaging (MRI) on directly detecting neuronal excitation, In *NIH Graduate Student Symposium*, Bethesda, U.S., 2013.

R. Bai, F. Horkay and P.J. Basser, NMR relaxation and water self-diffusion studies in sodium polyacrylate solution and gel, In *Magnetic Resonance in Porous Medium* 11, Guildford, U.K., 2012.