

Research Assistant

2004 – 2010

Center for Magnetic Resonance Research,
The University of Minnesota

- Implemented and validated parallel RF transmission in the human brain at 9.4 Tesla for arbitrarily shaped 2D excitation profiles, using 16 RF channels with successful RF pulse design and gradient system characterization.
- Demonstrated a new method to design multi-dimensional adapted rate RF pulses with effective SAR reduction in parallel transmission.
- Developed a SAR computational model to investigate SAR properties of parallel transmit RF pulses based on electromagnetic simulations.

REFEREED
JOURNAL
PUBLICATIONS

- A. Jang, **X. Wu**, E. Auerbach, M. Garwood. *Designing 3D selective adiabatic radiofrequency pulses with single and parallel transmission*. Magn. Reson. Med. doi: 10.1002/mrm.26720(2017).
- A. Erturk, **X. Wu**, Y. Eryaman, P.-F. Van de Moortele, E. Auerbach, R. Lagore, L. DelaBarre, J.T. Vaughan, K. Ugurbil, G. Adriany and G. Metzger. *Toward imaging the body at 10.5 tesla*. Magn. Reson. Med. 77(1):434-443(2017).
- X. Wu**, J. Tian, S. Schmitter, J. T. Vaughan, K. Ugurbil, and P.-F. Van de Moortele. *Distributing coil elements in three dimensions enhances parallel transmission multi-band RF performance: A simulation study in the human brain at 7 Tesla*. Magn. Reson. Med. 75(6):2464-2472(2016).
- X. Wu**, S. Schmitter, E. Auerbach, K. Ugurbil, and P.-F. Van de Moortele. *A generalized slab-wise framework for parallel transmit multiband RF pulse design*. Magn. Reson. Med. 75(4):1444-1456(2016).
- N. Boulant, **X. Wu**, G. Adriany, S. Schmitter, K. Ugurbil, and P.-F. Van de Moortele. *Direct control of the temperature rise in parallel transmission by means of temperature virtual observation points: Simulations at 10.5 tesla*. Magn. Reson. Med. 75(1):249-256(2016).
- X. Wu**, X. Zhang, J. Tian, S. Schmitter, B. Hanna, J. Strupp, J. Pfeuffer, M. Hamm, D. Wang, J. Nistler, B. He, J. T. Vaughan, K. Ugurbil, and P.-F. Van de Moortele. *Comparison of RF body coils for MRI at 3 T: a simulation study using parallel transmission on various anatomical targets*. NMR Biomed. 28(10):1332-1344(2015).
- S. Schmitter, **X. Wu**, K. Ugurbil, and P.-F. Van de Moortele. *Design of parallel transmission radiofrequency pulses robust against respiration in cardiac MRI at 7 Tesla*. Magn. Reson. Med. 74(5):1291-1305(2015).
- X. Wu**, S. Schmitter, E. Auerbach, K. Ugurbil, and P.-F. Van de Moortele. *Mitigating transmit B1 inhomogeneity in the liver at 7T using multispoke parallel transmit RF pulse design*. Quantitative imaging in medicine and surgery. 4(1):4-10(2014).
- S. Schmitter, **X. Wu**, E. Auerbach, G. Adriany, J. Pfeuffer, M. Hamm, K. Ugurbil, and P.-F. Van de Moortele. *Seven-tesla time-of-flight angiography using a 16-channel parallel transmit system with power-constrained 3-dimensional spoke radiofrequency pulse design*. Investigative Radiology. 49(5):314-25(2014).
- S. Schmitter, **X. Wu**, G. Adriany, E. Auerbach, K. Ugurbil, and P.-F. Van de Moortele. *Cerebral TOF angiography at 7T: impact of B1+ shimming with a 16-channel transceiver array*. Magn. Reson. Med. 71(3):966-77(2014).

- X. Wu**, S. Schmitter, E. Auerbach, S. Moeller, K. Ugurbil, and P.-F. Van de Moortele. *Simultaneous multislice multiband parallel radiofrequency excitation with independent slice-specific transmit B1 homogenization*. Magn. Reson. Med. 70:630-638(2013).
- X. Wu**, G. Adriany, K. Ugurbil, and P.-F. Van de Moortele. *Correcting for strong eddy current induced B0 modulation enables two-spoke RF pulse design with parallel transmission: Demonstration at 9.4T in the human brain*. PLoS ONE 8(10):e78078(2013).
- S. Schmitter, L. Delabarre, **X. Wu**, A. Greiser, D. Wang, E. Auerbach, J. T. Vaughan, K. Ugurbil, and P.-F. Van de Moortele. *Cardiac imaging at 7 tesla: Single- and two-spoke radiofrequency pulse design with 16-channel parallel excitation*. Magn. Reson. Med. 70(5):1210-9(2013).
- K. Ugurbil, J. Xu, E. Auerbach, S. Moeller, A. Vu, J. Duarte-Carvajalino, C. Lenglet, **X. Wu**, et al. *Pushing spatial and temporal resolution for functional and diffusion MRI in the Human Connectome Project*. Neuroimage 80:80-104(2013).
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- X. Wu**, Z. Chen, and X. Wang. *Application of LCIS for material discrimination with dual energy method*. Nuclear Electronics and Detection Technology 25:782-784(2005).
- Q. Wang, Z. Chen, **X. Wu**, X. Wang, L. Zhang, and K. Kang. *Review of X-ray security inspection technology*. Computerized Tomography Theory and Applications 13:32-37(2004).
- X. Wu**, X. Wang, Y. Xie, Z. Chen, and L. Zhang. *A practical material discrimination method with dual X-ray energy based on Bayesian decision*. Chinese J. of Stereology and Image Analysis 8:162-165(2003).
- X. Wu**, E. Auerbach, A. Vu, S. Moeller, C. Lenglet, S. Schmitter, P.-F. Van de Moortele, E. Yacoub, and K. Ugurbil. *High resolution whole brain diffusion MRI at 7 Tesla using RF parallel transmission*. In Proceedings of 25th Scientific Meeting of ISMRM, page 174, Honolulu, Hawaii, USA, 2017.
- X. Wu**, E. Auerbach, A. Vu, S. Moeller, K. Jamison, S. Schmitter, P.-F. Van de Moortele, E. Yacoub, and K. Ugurbil. *High resolution resting state functional MRI at 7 Tesla using RF parallel transmission*. In Proceedings of 25th Scientific Meeting of ISMRM, page 5231, Honolulu, Hawaii, USA, 2017.
- A. Erturk, **X. Wu**, G. Adriany, P.-F. Van de Moortele, E. Auerbach, A. Grant, K. Ugurbil, and G. Metzger. *A 32-channel loop-dipole transceiver array for body imaging at 7.0 Tesla*. In Proceedings of 25th Scientific Meeting of ISMRM, page 1222, Honolulu, Hawaii, USA, 2017.
- S. Moeller, **X. Wu**, N. Harel, M. Garwood, and M. Akcakaya. *SQUASHER: Slice quadratic phase with HSn encoding and reconstruction*. In Proceedings of 25th Scientific Meeting of ISMRM, page 1522, Honolulu, Hawaii, USA, 2017.
- J. Tian, **X. Wu**, B. Hanna, J. Strupp, K. Ugurbil, G. Adriany, and J. T. Vaughan. *EM-circuit co-simulation experience with a 7T 16-ch array: challenge, errors, speeding factor, and simulation protocol towards simulation automation*. In Proceedings of 25th Scientific Meeting of ISMRM, page 4284, Honolulu, Hawaii, USA, 2017.

CONFERENCE
PUBLICATIONS

- X. Wu**, N. Boulant, V. Gras, J. Tian, S. Schmitter, P.-F. Van de Moortele, and K. Ugurbil. *High resolution whole brain diffusion MRI at 7 Tesla using parallel RF transmission: how fast can we go?*. In Proceedings of 24th Scientific Meeting of ISMRM, page 744, Singapore, 2016.
- N. Kobayashi, K. Ugurbil, and **X. Wu**. *Shortening nonlinear phase multiband refocusing pulses with VERSE*. In Proceedings of 24th Scientific Meeting of ISMRM, page 3253, Singapore, 2016.
- X. Wu**, G. Adriany, E. Auerbach, S. Schmitter, K. Ugurbil, and P.-F. Van de Moortele. *Transmit SENSE on a whole body 10.5 Tesla system using 16 RF channels: initial results*. In Proceedings of 24th Scientific Meeting of ISMRM, page 4274, Singapore, 2016.
- D. Wang, X. Li, **X. Wu**, and K. Ugurbil. *Improving time efficiency for T2-weighted fat-water imaging by using multiband simultaneous multi-slice accelerated TSE Dixon*. In Proceedings of 24th Scientific Meeting of ISMRM, page 3262, Singapore, 2016.
- X. Wu**, D. Wang, J. Tian, S. Schmitter, V. Deshpande, J. T. Vaughan, K. Ugurbil, and P.-F. Van de Moortele. *Slab-wise pulse design enhances the performance of dual source parallel RF transmission at 3T*. In Proceedings of 23th Scientific Meeting of ISMRM, page 2289, Toronto, Canada, 2015.
- X. Wu**, A. Vu, S. Schmitter, E. Auerbach, S. Moeller, C. Lenglet, E. Yacoub, P.-F. Van de Moortele, and K. Ugurbil. *Whole brain single shot diffusion weighted EPI at 7 Tesla using parallel transmit multislice multiband RF pulses*. In Proceedings of 22th Scientific Meeting of ISMRM, page 311, Milan, Italy, 2014.
- X. Wu**, J. Tian, S. Schmitter, J. T. Vaughan, K. Ugurbil, and P.-F. Van de Moortele. *Z-stacked RF array design enhances parallel transmit multiband RF performance in whole brain simultaneous multislice imaging at 7T*. In Proceedings of 22th Scientific Meeting of ISMRM, page 543, Milan, Italy, 2014.
- X. Wu**, S. Schmitter, E. Auerbach, S. Moeller, K. Ugurbil, and P.-F. Van de Moortele. *Simultaneous multi-slice parallel RF excitation with in-plane B1+ homogenization*. In Proceedings of 21th Scientific Meeting of ISMRM, page 74, Salt Lake City, Utah, USA, 2013.
- X. Wu**, K. Ugurbil, and P.-F. Van de Moortele. *Peak RF power constrained pulse design for multi-band parallel excitation*. In Proceedings of 21th Scientific Meeting of ISMRM, page 4253, Salt Lake City, Utah, USA, 2013.
- X. Wu**, J. Tian, S. Schmitter, B. Hanna, J. Pfeuffer, M. Hamm, J. Nistler, J. T. Vaughan, K. Ugurbil, and P.-F. Van de Moortele. *Z-shim RF coil design enhances parallel transmit performance in body imaging at 3T*. In Proceedings of 21th Scientific Meeting of ISMRM, page 4398, Salt Lake City, Utah, USA, 2013.
- S. Schmitter, L. DelaBarre, **X. Wu**, A. Greiser, D. Wang, K. Ugurbil, and P.-F. Van de Moortele. *Improved excitation fidelity in cardiac imaging with 2-spoke parallel excitation at 7 Tesla*. In Proceedings of 21th Scientific Meeting of ISMRM, page 71, Salt Lake City, Utah, USA, 2013.
- D. Deelchand, **X. Wu**, P.-G. Henry, K. Ugurbil, and P.-F. Van de Moortele. *Parallel 2D-RF excitation for arbitrarily shaped region-of-interest MR spectroscopy at 16.4 T*. In Proceedings of 21th Scientific Meeting of ISMRM, page 3962, Salt Lake City, Utah, USA, 2013.

- X. Wu**, S. Schmitter, G. Adriany, E. Auerbach, K. Ugurbil, and P.-F. Van de Moortele. *Enhanced whole brain excitation performance of parallel transmission with a Z-encoding RF coil array at 7T*. In Proceedings of 20th Scientific Meeting of ISMRM, page 638, Melbourne, Victoria, Australia, 2012.
- X. Wu**, S. Schmitter, E. Auerbach, J. Pfeuffer, M. Hamm, K. Ugurbil, and P.-F. Van de Moortele. *Uniform water excitation for 3D MRI using parallel transmission at 7 Tesla*. ISMRM workshop on fat water separation, poster 51, Long Beach, CA, USA, 2012.
- S. Schmitter, **X. Wu**, L. DelaBarre, K. Ugurbil, and P.-F. Van de Moortele. *Predistorted B1 shimming: a new concept based on mutual enhancement between static B1 shim and 1D spoke RF pulse design. Application for cardiac imaging at 7 Tesla*. In Proceedings of 20th Scientific Meeting of ISMRM, page 83, Melbourne, Victoria, Australia, 2012.
- X. Wu**, S. Schmitter, J. Tian, J. T. Vaughan, K. Ugurbil, and P.-F. Van de Moortele. *SAR analysis of parallel transmission in cardiac imaging at 7T*. In Proceedings of 19th Scientific Meeting of ISMRM, page 492, Montreal, Quebec, Canada, 2011.
- X. Wu**, S. Schmitter, E. J. Auerbach, J. Pfeuffer, M. Hamm, K. Ugurbil, and P.-F. Van de Moortele. *Parallel transmission in liver MRI at 7T: initial results*. In Proceedings of 19th Scientific Meeting of ISMRM, page 2940, Montreal, Quebec, Canada, 2011.
- X. Wu**, G. Adriany, K. Ugurbil, and P.-F. Van de Moortele. *Parallel transmission in human brain at 9.4T counteracting eddy current induced excitation errors in RF pulse design*. In Proceedings of 19th Scientific Meeting of ISMRM, page 4441, Montreal, Quebec, Canada, 2011.
- S. Schmitter, **X. Wu**, E. Auerbach, M. Hamm, J. Pfeuffer, K. Ugurbil, and P.-F. Van de Moortele. *TOF angiography in the human brain at 7T using 3D parallel excitation: initial results*. In Proceedings of 19th Scientific Meeting of ISMRM, page 2905, Montreal, Quebec, Canada, 2011.
- X. Wu**, J. T. Vaughan, K. Ugurbil, and P.-F. Van de Moortele. *16-channel parallel transmission in the human brain at 9.4 Tesla: initial results*. In Proceedings of 18th Scientific Meeting of ISMRM, page 107, Stockholm, Sweden, 2010.
- X. Wu**, J. T. Vaughan, K. Ugurbil, and P.-F. Van de Moortele. *Correction of parallel transmit RF pulses at 9.4 T using measured gradient waveforms*. In Proceedings of 17th Scientific Meeting of ISMRM, page 4516, Honolulu, Hawaii, USA, 2009.
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- X. Wu**, D. K. Deelchand, V. L. Yarnykh, K. Ugurbil, and P.-F. Van de Moortele. *Actual flip angle imaging: from 3D to 2D*. In Proceedings of 17th Scientific Meeting of ISMRM, page 372, Honolulu, Hawaii, USA, 2009.
- X. Wu**, N. Powell, M. Marjanska, M. Garwood, K. Ugurbil, and P.-F. Van de Moortele. *A flexible design algorithm for single-shot 2D circular/elliptical OVS RF pulses*. In Proceedings of 17th Scientific Meeting of ISMRM, page 4503, Honolulu, Hawaii, USA, 2009.
- X. Wu**, T.-H. Chang, Z.-Q. Luo, C. Akgun, J. T. Vaughan, K. Ugurbil, and P.-F. Van de Moortele. *Worst case SAR scenario as a new metric for SAR analysis in B1 phase shim*. In Proceedings of 16th Scientific Meeting of ISMRM, page 2980, Toronto, Canada, 2008.

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X. Wu, C. Akgun, J. T. Vaughan, K. Ugurbil, and P.-F. Van de Moortele. *SAR reduction in transmit SENSE using adapted excitation k-space trajectories*. In Proceedings of 15th Scientific Meeting of ISMRM, page 673, Berlin, Germany, 2007.

X. Wu, C. Akgun, J. T. Vaughan, K. Ugurbil, and P.-F. Van de Moortele. *SAR analysis for transmit SENSE at 7T with a human head model*. In Proceedings of 15th Scientific Meeting of ISMRM, page 3350, Berlin, Germany, 2007.

PATENTS

- Multiband RF/MRI pulse design for multichannel transmitters, US 20150362574, Dec. 2015
- High field magnetic resonance, US 7800368, Sept. 2010

AWARDS

- Magna Cum Laude Award, 21th Scientific Meeting of ISMRM, 2013
- Summa Cum Laude Award, 20th Scientific Meeting of ISMRM, 2012
- Student Stipend, 19th Scientific Meeting of ISMRM, 2011
- Student Stipend, 17th Scientific Meeting of ISMRM, 2009
- Student Stipend, 15th Scientific Meeting of ISMRM, 2007
- Educational Stipend, ISMRM High Field Workshop, 2007
- Student Travel Award, BEM & NFSI Conference, 2005
- Guidant Foundation Fellowship, 2004

TEACHING EXPERIENCE

The University of Minnesota, Minneapolis, MN USA

Lecturer for Minnesota High Field MR Workshop **Oct. 2015, 2013, 2011, 2009**

Resource Instructor for IT Talk Program **August 2008**

Teaching Assistant **Fall 2007, Spring 2006**

TECHNICAL SKILLS

Computer Languages:

- Proficient in MatLab, C/C++, \LaTeX , Shells, HTML
- Familiar with Python, Fortran, SQL

Tools and Systems: Proficient in Emacs, Subversion/CVS, SUN grid engine, commercial FDTD solvers (Remcom, Sencad)

Operating Systems: Linux, UNIX, Windows 98/2000/XP

Languages: Chinese native speaker, fluent in English