

CHRISTOPH JUCHEM

Associate Professor (Tenure Track)
Departments of Biomedical Engineering and Radiology
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EDUCATION & POSITIONS

- 05/2018 – Present Adjunct Faculty, Icahn School of Medicine at Mount Sinai, New York City, NY
- 08/2017 Visiting Professor, Comprehensive Heart Failure Center, University Hospital Würzburg, Germany
- 09/2016 – Present Associate Professor (Tenure Track), Columbia University in the City of New York, Departments of Biomedical Engineering and Radiology, NY, USA
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- 2016 – 2018 Visiting Assistant Professor, Yale University School of Medicine, Department of Diagnostic Radiology, New Haven, CT, USA
- 2012 – 2016 Assistant Professor (Tenure Track), Yale University School of Medicine, Departments of Diagnostic Radiology and Neurology, New Haven, CT, USA
- 2008 – 2011 Associate Research Scientist, Yale University School of Medicine, Department of Diagnostic Radiology, New Haven, CT, USA
- 2007 – 2008 Postdoctoral Associate, Yale University School of Medicine, Dept. of Diagnostic Radiology, New Haven, CT, USA, Supervisor: Prof. R.A. de Graaf
- 2006 ‘Doctor Rerum Naturalium’ (Dr. rer. nat.), University of Tübingen, Germany, Thesis: 1H MR Spectroscopy and Chemical Shift Imaging of the *In Vivo* Brain at 7 Tesla
- 2002 – 2006 Doctoral Studies, Max-Planck Institute for Biological Cybernetics, Dept. Physiology of Cognitive Processes, Supervisors: Prof. N.K. Logothetis / Dr. J. Pfeuffer, and University of Tübingen, University Hospital, Section of Experimental Radiology, Supervisor: Prof. F. Schick, Tübingen, Germany
- 2001 Diploma in Physics, Grade 1.0 (<10%), University of Bonn, Germany, Thesis: Polarized Beam-NMR with Protons on Metals, Supervisor: Prof. K. Maier
- 1998 – 2001 Studies of Physics, University of Bonn, Germany
- 1997 – 1998 Studies of Physics, University of Madrid, Spain
- 1995 – 1997 Studies of Physics, University of Bonn, Germany

AWARDS & HONORS

- 2014 – 2017 Distinguished Reviewer (4x), Magnetic Resonance in Medicine (MRM)
- 2013 Clinical and Translational Science Award (CTSA) Scholar of the Yale Center for Clinical Investigation (YCCI), New Haven, CT
- 2011 Finalist of the I. I. Rabi Young Investigator Award of the ISMRM, ISMRM Annual Meeting, Montreal, QC, Canada
- 2011 Stipend of the German Scholars Organization (GSO): "Building Bridges: Spitzenforscher für Deutschland, Spitzenforschung in Deutschland", Berlin, Germany
- 2010 Best scientific poster in the engineering category, ISMRM Annual Meeting, Stockholm, Sweden
- 2007 – 2008 J. H. Brown & A. Brown Coxe Postdoctoral Fellowship in the Medical Sciences, Yale University, School of Medicine
- 2006 Doctoral Stipend of the Max-Planck Society
- 2006 ISMRM Educational Stipend, ISMRM Annual Meeting, Seattle, WA, USA
- 2005 ISMRM Educational Stipend, ISMRM Annual Meeting, Miami Beach, FL, USA
- 2004 ISMRM Educational Stipend, ISMRM Annual Meeting, Kyoto, Japan
- 1997 – 1998 Erasmus Exchange Fellowship of the European Union

PROFESSIONAL MEMBERSHIPS & SERVICE

2018 – Present	Member, External MR Advisory Board, New York State Psychiatric Institute
2017 – Present	Co-PI for Columbia University, North American Imaging in MS (NAIMS)
2016 – Present	Member, Health Analytics Committee, Columbia Univ. Data Science Institute
2016 – Present	Institute of Electrical and Electronics Engineers (IEEE)
2016 – Present	Member, ISMRM Annual Meeting Planning Committee (AMPC)
2015 – 2016	Member, Yale MRRC / IRB Protocol Review Committee
2014 – 2015	Member, ISMRM Workshop and Study Group Review Committee
2014 – 2015	Chair of ISMRM MR Engineering Study Group
2014 – 2016	Initiator & Organizer: Journal Club on Translational and Clinical MR Research, Yale University, Department of Diagnostic Radiology
2013 – 2014	Vice-Chair of ISMRM MR Engineering Study Group
2012 – 2013	Secretary of ISMRM MR Engineering Study Group
2010 – 2016	Co-Director of the 7 Tesla Brain MR Spectroscopy Core at Yale MRRC
2010 – 2016	System Manager Human 7 Tesla MR Scanner, Diagn. Radiology, Yale MRRC
2008 – Present	Member of ISMRM MR Engineering Study Group
2007 – Present	Member of German Physical Society (DPG)
2004 – Present	Member of Intern. Society for Magnetic Resonance in Medicine (ISMRM)
2002 – Present	Member of German Section of the ISMRM (DS-ISMRM)

SCIENTIFIC PUBLICATIONS, BOOK CHAPTERS & REVIEWS

- 1) Landheer K, **Juchem C**. Dephasing optimization through coherence order pathway selection (DOTCOPS) for improved crusher schemes in MR spectroscopy. *Magn Reson Med* 81:2209-2222 (2019).
- 2) Abdallah CG, De Feyter HM, Averill LA, Jiang L, Averill CL, Chowdhury G, Purohit P, de Graaf RA, Esterlis I, **Juchem C**, Krystal JH, Rothman DL, Sanacora G, Mason GF. The effects of ketamine on prefrontal glutamate neurotransmission in healthy and depressed subjects. *Neuropsychopharmacology* 43:2154-2160 (2018).
- 3) Swanberg KM, Prinsen H, de Graaf RA, **Juchem C**. Quantification of glutathione transverse relaxation time T_2 using echo time extension with variable refocusing selectivity and symmetry in the human brain at 7 Tesla. *J Magn Reson* 290:1-11 (2018).
- 4) Rudrapatna SU, Fluerebrock F, Nixon TW, de Graaf RA, **Juchem C**. Combined Imaging and Shimming with the Dynamic Multi-Coil Technique. *Magn Reson Med* 81:1424-1433 (2018).
- 5) Tricò D, Prinsen H, Giannini C, de Graaf R, **Juchem C**, Li F, Caprio S, Santoro N, Herzog RI. Elevated Alpha-Hydroxybutyrate and Branched-Chain Amino Acid Levels Predict Deterioration of Glycemic Control in Adolescents. *J Clin Endocrinol Metab* 102:2473-2481 (2017).
- 6) Prinsen H, de Graaf RA, Mason GF, Pelletier D, **Juchem C**. Reproducibility measurement of glutathione, GABA and glutamate: Towards in vivo neurochemical profiling of multiple sclerosis with MR Spectroscopy at 7T. *J Magn Reson Imaging* 45:187-198 (2017).
- 7) **Juchem C**, de Graaf RA. The Public Multi-Coil Information (PUMCIN) Policy. *Magn Reson Med* 78:2042-2047 (2017).
- 8) **Juchem C**, de Graaf RA. B_0 Magnetic Field Homogeneity and Shimming for MR Spectroscopy. *Anal Biochem* 529:17-29 (2017).
- 9) de Graaf RA, **Juchem C**. Book chapter "Shim Coils", in "MR Technology", Royal Society of Chemistry (2016).
- 10) Coman D, Huang Y, Rao JU, De Feyter HM, Rothman DL, **Juchem C**, Hyder F. Imaging the intratumoral-peritumoral extracellular pH gradient of gliomas. *NMR Biomed* 29:309-319 (2016).
- 11) Shu CY, Herman P, Coman D, Sanganahalli BG, Wang H, **Juchem C**, Rothman DL, de Graaf RA, Hyder F. Brain region and activity-dependent properties of M for calibrated fMRI. *NeuroImage* 125:848-856 (2016).
- 12) Rudrapatna SU, **Juchem C**, Nixon TW, de Graaf RA. Dynamic multi-coil tailored excitation for transmit B_1 correction at 7 Tesla. *Magn Reson Med* 76:83-93 (2016).
- 13) **Juchem C**, Nahhass OM, Nixon TW, de Graaf RA. Multi-Slice Magnetic Resonance Imaging with the Dynamic Multi-Coil Technique. *NMR Biomed*, 28:1526-1534 (2015).
- 14) **Juchem C***, Umesh Rudrapatna*, Nixon TW, de Graaf RA. Dynamic Multi-Coil Technique (DYNAMITE) Shimming for Echo-Planar Imaging of the Human Brain at 7 Tesla. *contributed equally. *NeuroImage* 105:462-472 (2015).
- 15) **Juchem C**, Pelletier D. Book chapter "MR Spectroscopy", in "Oxford Textbook in Clinical Neurology", Oxford University Press (2015).
- 16) **Juchem C**, Herman P, Sanganahalli BG, Nixon TW, Brown PB, McIntyre S, Hyder F, de Graaf RA. Dynamic Multi-Coil Technique (DYNAMITE) Shimmied EPI of the Rat Brain at 11.7 Tesla. *NMR Biomed* 27, 897-906 (2014).

- 17) **Juchem C**, Rothman DL. Book chapter "Basis of Magnetic Resonance", in "Magnetic Resonance Spectroscopy: Tools for Neuroscience Research and Emerging Clinical Applications ", Elsevier (2014).
- 18) **Juchem C**, Green D, de Graaf RA. Multi-Coil Magnetic Field Modeling. J Magn Reson 236, 95-104 (2013).
- 19) Stockmann JP, Galiana G, Tam L, **Juchem C**, Nixon TW, Constable RT. In vivo o-space imaging with a dedicated 12 cm Z2 insert coil on a human 3T scanner using phase map calibration. Magn Reson Med 69, 444-455 (2013).
- 20) Boer VO, Klomp DWJ, **Juchem C**, Luijten PR, de Graaf RA. Multi-Slice ¹H MRSI of the Human Brain at 7 Tesla using Dynamic B₀ and B₁ Shimming. Magn Reson Med 68, 662-670 (2012).
- 21) **Juchem C**, Nixon TW, McIntyre S, Boer VO, Rothman DL, de Graaf RA. Dynamic Multi-Coil Shimming of the Human Brain at 7 Tesla. J Magn Reson 212, 280-288 (2011).
- 22) **Juchem C**, Brown PB, Nixon TW, McIntyre S, Rothman DL, de Graaf RA. Multi-Coil Shimming of the Mouse Brain. Magn Reson Med 66, 893-900 (2011).
- 23) **Juchem C**, Nixon TW, Diduch P, McIntyre S, Rothman DL, Starewicz P, de Graaf RA. Dynamic Shimming of the Human Brain at 7 Tesla. Conc Magn Reson 37B, 116-128 (2010).
- 24) **Juchem C**, Nixon TW, McIntyre S, Rothman DL, de Graaf RA. Magnetic Field Modeling with a Set of Individual Localized Coils. J Magn Reson 204, 281-289 (2010).
- 25) **Juchem C**, Nixon TW, McIntyre S, Rothman DL, de Graaf RA. Magnetic Field Homogenization of the Human Prefrontal Cortex with a Set of Localized Electrical Coils. Magn Reson Med 63, 171-180 (2010).
- 26) **Juchem C**, Logothetis NK, Pfeuffer J. ¹H MR Spectroscopy of the Macaque Primary Visual Cortex at 7 Tesla: Strategies and Pitfalls of Shimming at the Brain Surface. Magn Reson Imaging 25, 902-912 (2007).
- 27) **Juchem C**, Muller-Bierl B, Schick F, Logothetis NK, Pfeuffer J. Combined Passive and Active Shimming for In Vivo MR Spectroscopy at High Magnetic Fields. J Magn Reson 183, 278-289 (2006).
- 28) Schmid MC, Oeltermann A, **Juchem C**, Smirnakis SM, Logothetis NK. Simultaneous EEG and fMRI in the macaque monkey at 4.7 T, Magn Reson Imaging 24, 335-342 (2006).
- 29) **Juchem C**, Logothetis NK, Pfeuffer J. High-resolution (¹H) chemical shift imaging in the monkey visual cortex. Magn Reson Med 54, 1541-1546 (2005).
- 30) **Juchem C**, Merkle H, Schick F, Logothetis NK, Pfeuffer J. Region and volume dependencies in spectral line width assessed by (¹H) 2D MR chemical shift imaging in the monkey brain at 7 T. Magn Reson Imaging 22, 1373-1383 (2004).
- 31) Pfeuffer J, **Juchem C**, Merkle H, Nauwerth A, Logothetis NK. High-field localized ¹H NMR spectroscopy in the anaesthetized and in the awake monkey. Magn Reson Imaging 22, 1361-1372 (2004).

LICENSES

- 1) Landheer K, **Juchem C**. Magnetic Resonance Spectrum Simulator (MARSS). CTV license CU19205 (2019).
- 2) Theilenberg S, **Juchem C**. Computer-Aided Design (CAD) Software for the Development of Multi-Coil Systems in SolidWorks. CTV license CU18406 (2018).

- 3) Landheer K, **Juchem C.** Optimized Magnetic Resonance Crusher Design. CTV license CU18146 (2018).
- 4) Landheer K, **Juchem C.** FAMASITO: Fastmap Shim Tool for efficient B₀ shimming. CTV license CU18208 (2018).
- 5) **Juchem C.** INSPECTOR - Magnetic resonance spectroscopy software for *in vivo* biomedical and clinical research. CTV license CU17130 (2017).
- 6) **Juchem, C.** B₀DETOX: B₀ detoxification software for magnetic field shimming. CTV license CU17326 (2017)

PATENTS

- 1) Theilenberg MS, **Juchem C.** Multi-coil array for B₀ manipulation and STEREO MRI of the human head. Provisional Patent Application, US (2018).
- 2) Landheer K, **Juchem C.** Techniques for Operating Magnetic Resonance Imagers to Crush Returns from Unwanted Coherence Pathways. Provisional Patent Application, US 62/612,104 (2017).
- 3) Garwood M, Adriany G, DelaBarre L, Mullen M, Jayatilake M, **Juchem C.**, de Graaf R. Methods for Magnetic Resonance Imaging with Multi-Coil Array Steering of Resonance Through Space. Provisional Patent Application, US 62/482,299 (2017).
- 4) **Juchem C.**, Nixon TW, de Graaf RA. Magnetic Field Homogenization Using Arrays of Localized Electrical Coils. Provisional Patent Application, US 61/156,077 (2009).
- 5) **Juchem C.** Passive Shimming for MR Spectroscopy at High Magnetic Fields. US Patent 7,459,908 B2 (2008)

SELECTED CONFERENCE PAPERS (61 TOTAL, 29 FIRST AUTHOR, 21 LAST AUTHOR)

- 1) Landheer K, **Juchem C.** Dephasing Optimization Through Coherence Order Pathway Selection (DOTCOPS): Validation and Inclusion of Phase Cycling. Proc. ISMRM, 192 (2019).
- 2) Prinsen H, de Graaf RA, Mason GF, Pelletier D, **Juchem C.** Towards Pathoneurochemical Profiling of Multiple Sclerosis: Single-Session Measurement of Glutathione, GABA and Glutamate with MR Spectroscopy at 7 Tesla. Proc ISMRM, 3041 (2014).
- 3) Rudrapatna SU, Nixon TW, McIntyre S, de Graaf RA, **Juchem C.** Improved EPI at 7T with Dynamic Multi-Coil Technique (DYNAMITE) Shimming. Proc ISMRM, 2035 (2014).
- 4) **Juchem C.**, Brown PB, Nixon TW, McIntyre S, Rothman DL, de Graaf RA. Multi-Coil Shimming of the Mouse Brain. Proc. ISMRM, 97 (2011). *I.I. Rabi Young Investigator Award finalist*
- 5) **Juchem C.**, Nixon TW, McIntyre S, Rothman DL, de Graaf RA. Magnetic Field Modeling With A Set Of Electrical Coils. Proc. ISMRM, 1534 (2010). *Poster award of the engineering category.*

SELECTED INVITED TALKS AND SEMINARS (39 TOTAL)

- 1) École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland, Prof. R. Gruetter, "MR Spectroscopy in the Anesthetized Monkey at 7 Tesla", (2006).
- 2) University of California San Francisco, VA, CIND, San Francisco/CA, Prof. N. Schuff, "Magnetic Field Modeling for MR Imaging and Spectroscopy", (2011).

- 3) ISMRM Annual Meeting, Melbourne, Australia, Prof. M.H. Buonocore, Prof. J.R. Reichenbach & Prof. J.P. Mugler, Educational Course "MR Physics for Physicists", Lecture on "Theory and Practice in 2D-NMR Spectroscopic Imaging", (2012).
- 4) Vanderbilt University, Nashville/TN, Prof. A. Maier, "Dynamic Multi-Coil Technique (DYNAMITE) for Magnetic Field Shimming in Mouse, Rat and Human Brain", (2013).
- 5) Columbia University, New York City/NY, Prof. E. Konofagou, "Magnetic Resonance Spectroscopy at 7 Tesla Towards *In Vivo* Metabolomics of Multiple Sclerosis Pathology", (2015).
- 6) ISMRM Ultra-High Field Workshop, DKFZ Heidelberg, Germany, Chair Prof. L.L. Wald, "B₀ Magnetic Field Homogeneity and Shimming", (2016).

REVIEWER & EDITORIAL BOARD

- Reviewer: Research Grants (National/International)
 - 1) Israel Science Foundation (ISF), Israel
 - 2) Research Foundation Flanders (FWO), Belgium
 - 3) Dutch National Research Society (NWO), The Netherlands
 - 4) Dutch Technology Foundation (STW), The Netherlands
 - 5) National Multiple Sclerosis Society (NMSS), USA
 - 6) Multiple Sclerosis Society, United Kingdom
- Reviewer: Research Grants (Intramural)
 - 1) Yale Center for Clinical Investigations (YCCI)
 - 2) Irving Institute for Clinical and Translational Research, Columbia University
 - 3) Research Initiatives in Science and Engineering (RISE), Columbia University
 - 4) Revson Senior Fellowship in Biomedical Science, Columbia University
 - 5) Collaboratory Fellows Fund, Columbia University
- Reviewer: Conference Abstracts
 - 1) International Society for Magnetic Resonance in Medicine (ISMRM)
- Reviewer: Scientific Journals
 - 1) European Journal of Neuroscience (EJN)
 - 2) Magnetic Resonance in Medicine (MRM)
 - 3) Journal of Magnetic Resonance (JMR)
 - 4) Nuclear Magnetic Resonance in Biomedicine (NMR Biomed)
 - 5) Concepts in Magnetic Resonance A (Conc MR A)
 - 6) Biological Psychiatry (Biol Psych)
 - 7) Neurobiology of Aging
 - 8) Analytical Biochemistry (Anal Biochem)
 - 9) Public Library of Science (PLOS ONE)
 - 10) Magnetic Resonance Materials in Physics, Biology and Medicine (MAGMA)
 - 11) IEEE Transactions on Biomedical Engineering (IEEE Trans Biomed Eng)
 - 12) Tomography

- 13) Journal of Magnetic Resonance Imaging (JMRI)
 - 14) Multiple Sclerosis Journal (MSJ)
 - 15) Neuropsychopharmacology
 - 16) NeuroImage
 - 17) Neurology
- *Editorial Board: Scientific Journals*
 - 1) Nuclear Magnetic Resonance in Biomedicine (NMR Biomed)