

Georg Oeltzschner, PhD

Instructor of Radiology and Radiological Science
Russell H. Morgan Department of Radiology and Radiological Science
Johns Hopkins University School of Medicine

I am an Instructor of Radiology, specializing in magnetic resonance spectroscopy (MRS) in the human brain. Over the course of my career, my research has been dedicated to advanced MRS methods for the detection of low-concentration metabolites, like the primary inhibitory neurotransmitter γ -aminobutyric acid (GABA), and the major antioxidant glutathione (GSH). More than nine years of experience in the field have provided me with a strong methodological background in MR physics data analysis, enabling me to develop accelerated MRS methods with increased precision for research and clinical purposes.

I have extensive experience working with clinical populations with neurological and psychiatric conditions such as hepatic encephalopathy, autism spectrum disorder, Tourette's, tuberous sclerosis, and glioblastoma. Recently, I acquired independent funding to study brain metabolism in mild cognitive impairment with advanced MRS and PET methods.

Collaborative science is a deep passion of mine, and I maintain a strong focus on developing and disseminating free, open-source, peer-reviewed data analysis methods to advance the comparability, reproducibility, and robustness of MRS.

APPOINTMENTS

2020 – present **Instructor of Radiology and Radiological Science**
The Russell H. Morgan Department of Radiology and Radiological Science
The Johns Hopkins University School of Medicine, Baltimore, MD, USA

EDUCATION / TRAINING

2016 – 2020 **Postdoctoral Research Fellow**
The Russell H. Morgan Department of Radiology and Radiological Science
The Johns Hopkins University School of Medicine, Baltimore, MD, USA
Supervision: Prof. Richard A.E. Edden

2012 – 2015 **PhD (magna cum laude)**
Institute of Clinical Neuroscience and Medical Psychology
Department of Diagnostic and Interventional Radiology
Universitätsklinikum Düsseldorf
Heinrich-Heine-Universität, Düsseldorf, Germany
Supervision: Prof. Dr. Alfons Schnitzler

2003 – 2010 **Physics**
Heinrich-Heine-Universität, Düsseldorf, Germany
Lund University, Lund, Sweden (2009)
Degree: Very good (1.0) with honors

RESEARCH ACTIVITIES

Peer-reviewed original publications

1. J Arm, **G Oeltzschner**, O Al-Iedani, R Lea, J Lechner-Scott, S Ramadan. Altered in vivo brain GABA and glutamate levels are associated with multiple sclerosis fatigue. *Eur J Radiol* **137**:109610 (2021).
2. HJ Zöllner, M Považan, SCN Hui, S Tapper, RAE Edden, **G Oeltzschner**. Comparison of different linear-combination modelling algorithms for short-TE proton spectra. *NMR Biomed* **34**:e4482 (2021).
3. S Tapper, M Mikkelsen, BE Dewey, HJ Zöllner, SCN Hui, **G Oeltzschner**, RAE Edden. Frequency and phase correction of J-difference edited MR spectra using deep learning. *Magn Reson Med* **85**:1755-1765 (2021).
4. Smith GS*, **Oeltzschner G***, Gould NF, Leoutsakos JS, Nassery N, Joo JH, Kraut MA, Edden RAE, Barker PB, Wijtenburg SA, Rowland LM, Workman CI. Neurotransmitters and Neurometabolites in Late-Life Depression: A Preliminary Magnetic Resonance Spectroscopy Study at 7T. *J Affect Disorders* **279**:417-425 (2021).
5. HJ Zöllner, **G Oeltzschner**, A Schnitzler, HJ Wittsack. In silico GABA+ MEGA-PRESS: Effects of signal-to-noise ratio and linewidth on modeling the 3 ppm GABA+ resonance. *NMR Biomed* **34**:e4410 (2021).
6. **G Oeltzschner**, HJ Zöllner, SCN Hui, M Mikkelsen, MG Saleh, S Tapper, RAE Edden. Osprey: Open-Source Processing, Reconstruction & Estimation of Magnetic Resonance Spectroscopy Data. *J Neurosci Methods* **343**:108827 (2020).
7. Puts NAJ, Ryan M, **Oeltzschner G**, Horska A, Edden RAE, Mahone EM. Reduced striatal GABA in unmedicated children with ADHD at 7T. *Psychiatry Res Neuroimaging* **301**:111082 (2020).
8. MG Saleh, A Papantoni, M Mikkelsen, SCN Hui, **G Oeltzschner**, NA Puts, RAE Edden, S Carnell. Effect of Age on GABA+ and Glutathione in a Pediatric Sample. *ANJR Am J Neuroradiol* **41**:1099-1104 (2020).
9. M Považan, M Mikkelsen, A Berrington, PK Bhattacharyya, MK Brix, PF Buur, KM Cecil, KL Chan, DYT Chen, AR Craven, K Cuypers, M Dacko, NW Duncan, U Dydak, DA Edmondson, G Ende, L Ersland, MA Forbes, F Gao, I Greenhouse, AD Harris, N He, S Heba, N Hoggard, TW Hsu, JFA Jansen, A Kangarlu, T Lange, RM Lebel, Y Li, CE Lin, JK Liou, JF Lirng, F Liu, JR Long, R Ma, C Maes, M Moreno-Ortega, SO Murray, S Noah, R Noeske, MD Noseworthy, **G Oeltzschner**, EC Porges, JJ Prisciandaro, NAJ Puts, TPL Roberts, M Sack, N Sailasuta, MG Saleh, MP Schallmo, N Simard, D Stoffers, SP Swinnen, M Tegenthoff, P Truong, G Wang, ID Wilkinson, HJ Wittsack, AJ Woods, H Xu, F Yan, C Zhang, V Zipunnikov, HJ Zöllner, RAE Edden, PB Barker. Comparison of Multivendor Single-Voxel MR Spectroscopy Data Acquired in Healthy Brain at 26 Sites. *Radiology* **295**:171-180 (2020).

10. MG Saleh, M Wang, M Mikkelsen, SCN Hui, **G Oeltzschner**, J Boissoneault, B Stennett, RAE Edden, EC Porges. Simultaneous edited MRS of GABA, glutathione, and ethanol. *NMR Biomed* **33**:e4227 (2020).
11. M Mikkelsen, DL Rimbault, PB Barker, PK Bhattacharyya, MK Brix, PF Buur, KM Cecil, KL Chan, DYT Chen, AR Craven, K Cuypers, M Dacko, NW Duncan, U Dydak, DA Edmondson, G Ende, L Ersland, MA Forbes, F Gao, I Greenhouse, AD Harris, N He, S Heba, N Hoggard, TW Hsu, JFA Jansen, A Kangarlu, T Lange, RM Lebel, Y Li, CYE Lin, JK Liou, JF Lirng, F Liu, JR Long, R Ma, C Maes, M Moreno-Ortega, SO Murray, S Noah, R Noeske, MD Noseworthy, **G Oeltzschner**, EC Porges, JJ Prisciandaro, NAJ Puts, TPL Roberts, M Sack, N Sailasuta, MG Saleh, MP Schallmo, N Simard, D Stoffers, SP Swinnen, M Tegenthoff, P Truong, G Wang, ID Wilkinson, HJ Wittsack, AJ Woods, H Xu, F Yan, C Zhang, V Zipunnikov, HJ Zöllner, RAE Edden. Big GABA II: Water-referenced edited MR spectroscopy at 25 research sites. *NeuroImage* **191**:537-548 (2019).
12. KL Chan, **G Oeltzschner**, MG Saleh, RAE Edden, PB Barker. Simultaneous editing of GABA and GSH with Hadamard-encoded MR spectroscopic imaging. *Magn Reson Med* **82**:21-23 (2019).
13. MG Saleh, D Rimbault, M Mikkelsen, **G Oeltzschner**, AM Wang, D Jiang, A Alhamud, J Near, M Schär, R Noeske, JB Murdoch, L Ersland, AR Craven, GE Dwyer, ER Grüner, L Pan, S Ahn, RAE Edden. Multi-vendor standardized sequence for edited magnetic resonance spectroscopy. *NeuroImage* **189**:425-431 (2019).
14. SA Wijtenburg, LM Rowland, **G Oeltzschner**, PB Barker, CI Workman, GS Smith. Reproducibility of brain MRS in older healthy adults at 7T. *NMR Biomed* **32**:e4040 (2019).
15. **G Oeltzschner**, MG Saleh, D Rimbault, M Mikkelsen, KL Chan, NAJ Puts, RAE Edden. Advanced Hadamard-encoded editing of seven low-concentration brain metabolites: Principles of HERCULES. *NeuroImage* **185**:181-190 (2019).
16. **G Oeltzschner**, SA Wijtenburg, M Mikkelsen, RAE Edden, PB Barker, JH Joo, JMS Leoutsakos, LM Rowland, CI Workman, GS Smith. Neurometabolites and associations with cognitive deficits in mild cognitive impairment: A magnetic resonance spectroscopy study at 7 Tesla. *Neurobiol Aging* **73**:211-218 (2019).
17. K Kurcyus, E Annac, NM Hanning, AD Harris, **G Oeltzschner**, RAE Edden, V Riedl. Opposite dynamics of GABA and glutamate levels in the occipital cortex during visual processing. *J Neurosci* **38**:9967-9976 (2018).
18. TJ Baumgarten, J Neugebauer, **G Oeltzschner**, ND Füllenbach, G Kircheis, D Häussinger, J Lange, HJ Wittsack, M Butz, A Schnitzler. Connecting occipital alpha band frequency, visual temporal resolution, and occipital GABA levels in healthy participants and hepatic encephalopathy patients. *Neuroimage Clin* **20**:347-356 (2018).
19. **G Oeltzschner**, HJ Zöllner, M Jonuscheit, RS Lanzman, A Schnitzler, HJ Wittsack. J-difference-edited MRS measures of γ -aminobutyric acid before and after acute caffeine administration. *Magn Reson Med* **80**:2356-2365 (2018).

20. MG Saleh, M Mikkelsen, **G Oeltzschner**, KL Chan, A Berrington, PB Barker, RAE Edden. Simultaneous editing of GABA and glutathione at 7T using semi-LASER localization. *Magn Reson Med* **80**:474-479 (2018).
21. M Mikkelsen, MG Saleh, J Near, KL Chan, T Gong, AD Harris, **G Oeltzschner**, NAJ Puts, KM Cecil, ID Wilkinson, RAE Edden. Frequency and Phase Correction for Multiplexed Edited MRS of GABA and Glutathione. *Magn Reson Med* **80**:21-28 (2018).
22. **G Oeltzschner**, KL Chan, MG Saleh, M Mikkelsen, NA Puts, RAE Edden. Hadamard editing of glutathione and macromolecule-suppressed GABA. *NMR Biomed* **31**:e3844 (2018).
23. **G Oeltzschner**, K Snoussi, NA Puts, M Mikkelsen, AD Harris, S Pradhan, K Tsapkini, M Schär, PB Barker, RAE Edden. Effects of eddy currents on selective spectral editing experiments at 3T. *J Magn Reson Imaging* **47**:673-681 (2018).
24. M Mikkelsen, PB Barker, PK Bhattacharyya, MK Brix, PF Buur, KM Cecil, KL Chan, DYT Chen, AR Craven, K Cuypers, M Dacko, NW Duncan, U Dydak, DA Edmondson, G Ende, L Ersland, F Gao, I Greenhouse, AD Harris, N He, S Heba, N Hoggard, TW Hsu, JFA Jansen, A Kangarlu, T Lange, RM Lebel, Y Li, CYE Lin, JK Liou, JF Lirng, F Liu, R Ma, C Maes, M Moreno-Ortega, SO Murray, S Noah, R Noeske, MD Noseworthy, **G Oeltzschner**, JJ Prisciandaro, NAJ Puts, TPL Roberts, M Sack, N Sailasuta, MG Saleh, MP Schallmo, N Simard, SP Swinnen, M Tegenthoff, P Truong, G Wang, ID Wilkinson, HJ Wittsack, H Xu, F Yan, C Zhang, V Zipunnikov, HJ Zöllner, RAE Edden. Big GABA: Edited MR spectroscopy at 24 research sites. *NeuroImage* **159**:32-45 (2017).
25. KL Chan, MG Saleh, **G Oeltzschner**, PB Barker, RAE Edden. Simultaneous measurement of Aspartate, NAA, and NAAG using HERMES spectral editing at 3 Tesla. *NeuroImage* **155**:587-593 (2017).
26. KL Chan, **G Oeltzschner**, M Schär, PB Barker, RAE Edden. Spatial Hadamard encoding of J-edited spectroscopy using slice-selective editing pulses. *NMR Biomed* **30**:e3688 (2017).
27. **G Oeltzschner**, NAJ Puts, KL Chan, VO Boer, PB Barker, RAE Edden. Dual-Volume Excitation and Parallel Reconstruction for J-Difference-Edited MR Spectroscopy. *Magn Reson Med* **77**:16-22 (2017).
28. MG Saleh, **G Oeltzschner**, KL Chan, NAJ Puts, M Mikkelsen, M Schär, AD Harris, RAE Edden. Simultaneous edited MRS of GABA and glutathione. *NeuroImage* **142**:576-582 (2016).
29. **G Oeltzschner**, A Schnitzler, F Wickrath, HJ Zöllner, HJ Wittsack. Use of quantitative brain water imaging as concentration reference for J-edited MR spectroscopy of GABA. *Magn Reson Imaging* **34**:1057-1063 (2016)
30. TJ Baumgarten, **G Oeltzschner**, N Hoogenboom, HJ Wittsack, A Schnitzler, J Lange. Beta Peak Frequencies at Rest Correlate with Endogenous GABA+/Cr Concentrations in Sensorimotor Cortex Areas. *PLoS One* **11**:e0156829 (2016)

31. RAE Edden, **G Oeltzschner**, AD Harris, NAJ Puts, KL Chan, VO Boer, M Schär, PB Barker. Prospective frequency correction for macromolecule-suppressed GABA editing at 3T. *J Magn Reson Imaging* **44**:1474-1482 (2016).
32. **G Oeltzschner**, M Butz, F Wickrath, HJ Wittsack, A Schnitzler. Covert hepatic encephalopathy: elevated total glutathione and absence of brain water content changes. *Metab Brain Dis* **31**:517-527 (2016).
33. **G Oeltzschner**, M Butz, TJ Baumgarten, N Hoogenboom, HJ Wittsack, A Schnitzler. Low visual cortex GABA levels in hepatic encephalopathy: links to blood ammonia, critical flicker frequency, and brain osmolytes. *Metab Brain Dis* **30**:1429-1438 (2015)
34. A Müller-Lutz, N Khalil, B Schmitt, V Jellus, G Pentang, **G Oeltzschner**, G Antoch, RS Lanzman, HJ Wittsack. Pilot study of Iopamidol-based quantitative pH imaging on a clinical 3T MR scanner. *MAGMA* **27**:477-485 (2014)
35. **G Oeltzschner**, N Hoogenboom, T Baumgarten, HJ Wittsack, A Schnitzler. Absolute GABA spectroscopy with MEGA-PRESS and watermapping in sensorimotor and visual cortex and correlation to handedness. *Eur J Med Res* **19** (Suppl 1):S28 (2014)
36. RS Lanzman, HJ Wittsack, N Khalil, B Schmitt, P Heusch, **G Oeltzschner**, G Antoch, A Müller-Lutz. Chemical exchange saturation transfer (CEST) MRT mit Iopamidol zur pH-Messungen bei 3T: Phantommessungen und erste in-vivo Messung. *RöFo-Fortschritte auf dem Gebiet der Röntgenstrahlen und der bildgebenden Verfahren* **185**:VO105_II_3 (2013)

Named contributions to consensus efforts

37. R Kreis, V Boer, IY Choi, C Cudalbu, RA de Graaf, C Gasparovic, A Heerschap, M Krssak, B Lanz, AA Maudsley, M Meyerspeer, J Near, G Öz, S Posse, J Slotboom, M Terpstra, I Tkac, M Wilson, W Bogner, **Experts' Working Group on Terminology for MR Spectroscopy**. Terminology and concepts for the characterization of in vivo MR spectroscopy methods and MR spectra: Background and experts' consensus recommendations. *NMR Biomed* e4347 (2020)

Conference contributions

Oral presentations (speaker in italics)

1. *WT Clarke*, T Bell, U Emir, M Mikkelsen, **G Oeltzschner**, BC Rowland, A Shamaei, BJ Soher, S Tapper, M Wilson. NIfTI MRS: A standard format for spectroscopic data. 29th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2021, virtual meeting.
2. *SCN Hui*, T Gong, HJ Zöllner, Y Song, Y Chen, MG Saleh, M Mikkelsen, **G Oeltzschner**, S Tapper, W Chen, RAE Edden, G Wang. The macromolecular background spectrum does not change with age in healthy participants. 29th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2021, virtual meeting.

3. SCN Hui et al (Full Author List: bit.ly/MRSFrequencyDrift). Frequency Drift in MR Spectroscopy: A 99-scanner Phantom Study. 29th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2021, virtual meeting.
4. **G Oeltzschner**. Osprey – Open-source processing, reconstruction & estimation of MRS data. 5th International Symposium on GABA and Advanced MRS 2019, Park City, United States.
5. **G Oeltzschner**, G Zupan, RAE Edden. Simultaneous linear-combination modeling of MEGA-PRESS sum and difference spectra without soft constraints. 27th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2019, Montréal, Canada.
6. NAJ Puts, **G Oeltzschner**, AD Harris, M Mikkelsen, SH Mostofsky, RAE Edden. GABA levels in children with autism and typically developing children differentially relate to social gesture performance. 26th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2018, Paris, France.
7. **G Oeltzschner**. Multi-voxel editing: PRIAM and SHERPA. 4th International Symposium on MRS of GABA 2017, Leuven, Belgium.
8. *HJ Zöllner*, M Jonuscheit, RS Lanzman, HJ Wittsack, **G Oeltzschner**. Caffeine effects on human brain metabolites measured by J-edited in vivo MR spectroscopy. 33rd Annual Meeting of the European Society for Magnetic Resonance in Medicine and Biology (ESMRMB) 2016, Vienna, Austria.
9. **G Oeltzschner**. Absolute GABA spectroscopy with MEGA-PRESS and watermapping in sensorimotor and visual cortex and correlation with handedness. 2nd International Symposium on MRS of GABA 2013, Cardiff, UK.
10. **G Oeltzschner**, E Cankaya, G Antoch, HJ Wittsack. In-vitro-Detektion von 2HG mit VeSPA-Simulationen. 44th Annual Meeting of the Deutsche Gesellschaft für Medizinische Physik (DGMP) 2013, Cologne, Germany.
11. G Pentang, R Bastkowski, RS Lanzman, P Heusch, A Müller-Lutz, **G Oeltzschner**, D Blondin, G Antoch, HJ Wittsack. MR Whole Brain Atlas on the Basis of Diffusion Tensor and Diffusion Kurtosis Data at 3T. 29th Annual Meeting of the European Society for Magnetic Resonance in Medicine and Biology (ESMRMB) 2012, Lisbon, Portugal.

Poster presentations (selection)

1. **G Oeltzschner**, J He, M Mikkelsen, A DeRonda, D Crocetti, SH Mostofsky, RAE Edden, NAJ Puts. Increased glutamate+glutamine correlates with altered tactile perception and sensory responsivity in children with autism spectrum disorder. 29th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2021, virtual meeting.
2. G Zupan, S Stefanovic, M Turk Jerovsek, B Stabuc, **G Oeltzschner**, S Ropele, D Suput, A Vovk. GABA and susceptibility changes in striatum with liver cirrhosis: preliminary results. 29th

- Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2021, virtual meeting.
3. HJ Zöllner, S Tapper, SCN Hui, PB Barker, RAE Edden, **G Oeltzschner**. Linear-combination modeling of GABA-edited MEGA-PRESS at 3T: Evaluating different modeling strategies. 29th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2021, virtual meeting.
 4. D Rotaru, **G Oeltzschner**, R Edden, D Lythgoe. Repeatability assessment of GABA and GSH concentrations with HERMES: a comparison between traditional analysis and a novel approach. 29th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2021, virtual meeting.
 5. **G Oeltzschner**, HJ Zöllner, RAE Edden. Osprey – Open-source processing, reconstruction & estimation of MRS data. 28th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2020, virtual meeting.
 6. **G Oeltzschner**, HJ Zöllner, RAE Edden. Osprey – Open-source processing, reconstruction & estimation of MRS data. 26th Annual Meeting of the Organization for Human Brain Mapping (OHBM) 2020, virtual meeting.
 7. **G Oeltzschner**, MG Saleh, D Rimbault, M Mikkelsen, NAJ Puts, RAE Edden. Simultaneous spectral editing of seven low-concentration brain metabolites at 3T with HERCULES. 25th Annual Meeting of the Organization for Human Brain Mapping (OHBM) 2019, Rome, Italy.
 8. MG Saleh, AM Wang, M Mikkelsen, **G Oeltzschner**, J Boissoneault, EC Porges, RAE Edden. Dynamic MRS measurements of GABA, glutathione and ethanol. 25th Annual Meeting of the Organization for Human Brain Mapping (OHBM) 2019, Rome, Italy.
 9. B Papazov, B Rauchmann, D Keeser, S Gürsel, S Milani, M Brendel, C Palleis, J Levin, G Höglinger, C Haass, **G Oeltzschner**, B Ertl-Wagner, S Stöcklein, R Pernecky. GABA and Glx levels in patients with early-stage AD and CBS: Initial results from the ActiGLIA study. 25th Annual Meeting of the Organization for Human Brain Mapping (OHBM) 2019, Rome, Italy.
 10. 7T MRS of neurometabolites and associations with cognitive deficits in mild cognitive impairment. **G Oeltzschner**, SA Wijtenburg, M Mikkelsen, RAE Edden, PB Barker, JH Joo, JMS Leoutsakos, LM Rowland, CI Workman, GS Smith. 27th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2019, Montreal, Canada.
 11. A Universal Edited MRS Sequence for 4 Vendors. MG Saleh, D Rimbault, M Mikkelsen, **G Oeltzschner**, AM Wang, D Jiang, A Alhamud, J Near, M Schär, R Noeske, JB Murdoch, L Ersland, AR Craven, GE Dwyer, ER Grüner, L Pan, S Ahn, RAE Edden. 27th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2019, Montreal, Canada.
 12. Analyzing Big GABA: Comparison of Five Software Packages for GABA-Edited MRS. M Mikkelsen, PK Bhattacharyya, PK Mandal, D Shukla, AM Wang, M Wilson, U Dydak, JB

- Murdoch, J Near, **G Oeltzschner**, RAE Edden. 27th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2019, Montreal, Canada.
13. J-edited Cerebral MR spectroscopy in Patients with Hepatic Encephalopathy. HJ Zöllner, **G Oeltzschner**, M Butz, M Jördens, ND Füllenbach, D Häussinger, HJ Wittsack, A Schnitzler. 27th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2019, Montreal, Canada.
 14. MG Saleh, AM Wang, M Mikkelsen, **G Oeltzschner**, EC Porges, RAE Edden. Simultaneous edited detection of GABA, glutathione and ethanol using HERMES. 27th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2019, Montreal, Canada.
 15. D Rotaru, **G Oeltzschner**, RAE Edden, D Lythgoe. Simultaneous modelling of Hadamard encoded spectra for GABA and GSH using LCMoDel. 27th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2019, Montreal, Canada.
 16. **G Oeltzschner**, D Rimbault, M Mikkelsen, MG Saleh, NAJ Puts, RAE Edden. Editing everything with HERCULES: Hadamard-encoded editing of seven low-concentration metabolites. 26th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2018, Paris, France.
 17. **G Oeltzschner**, KL Chan, MG Saleh, M Mikkelsen, NAJ Puts, RAE Edden. Simultaneous edited MR spectroscopy of glutathione and macromolecule-suppressed GABA. 26th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2018, Paris, France.
 18. M Mikkelsen, MG Saleh, J Near, KL Chan, T Gong, AD Harris, **G Oeltzschner**, NAJ Puts, KM Cecil, ID Wilkinson, RAE Edden. Multi-step frequency-and-phase correction for multiplexed edited MRS data. 26th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2018, Paris, France.
 19. MG Saleh, M Mikkelsen, **G Oeltzschner**, KL Chan, A Berrington, PB Barker, RAE Edden. Simultaneous editing of GABA and glutathione at 7T. 26th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2018, Paris, France.
 20. MG Saleh, M Mikkelsen, **G Oeltzschner**, KL Chan, A Berrington, PB Barker, RAE Edden. Spectral simulations of glutathione at 7T: Comparison of two different spin system parameter sets. 26th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2018, Paris, France.
 21. D Rimbault, **G Oeltzschner**, A Alhamud, E Meintjes, RAE Edden. Simultaneous modeling of sum and difference spectra improves quantitative outcomes for edited MRS. 26th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2018, Paris, France.
 22. KL Chan, RAE Edden, **G Oeltzschner**, MG Saleh, PB Barker. Simultaneous MRSI of GABA and glutathione using HERMES spectral editing at 3T. 26th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2018, Paris, France.

23. **G Oeltzschner**, KL Chan, MG Saleh, NAJ Puts, M Mikkelsen, RAE Edden. Simultaneous edited MR spectroscopy of glutathione and macromolecule-suppressed GABA. 23rd Annual Meeting of the Organization for Human Brain Mapping (OHBM) 2017, Vancouver, Canada.
24. **G Oeltzschner**, NAJ Puts, KL Chan, VO Boer, PB Barker, RAE Edden. MEGA-PRIAM: Dual-volume excitation and parallel reconstruction for J-difference-edited MR spectroscopy. 25th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2017, Honolulu, USA.
25. **G Oeltzschner**, K Snoussi, NAJ Puts, M Mikkelsen, AD Harris, S Pradhan, K Tsapkini, M Schär, PB Barker, RAE Edden. Measuring and minimizing effects of eddy currents on selective spectral editing experiments at 3T. 25th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2017, Honolulu, USA.
26. KL Chan, MG Saleh, **G Oeltzschner**, PB Barker, RAE Edden. Simultaneous measurement of Aspartate, NAA, and NAAG using HERMES spectral editing at 3 Tesla. 25th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2017, Honolulu, USA.
27. KL Chan, **G Oeltzschner**, M Schär, PB Barker, RAE Edden. Spatial Hadamard encoding of J-edited spectroscopy using slice-selective editing pulses. 25th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2017, Honolulu, USA.
28. M Mikkelsen, ..., **G Oeltzschner**, ... RAE Edden. Integrative analysis of GABA-edited MRS data acquired at 19 research sites. 25th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2017, Honolulu, USA.
29. MG Saleh, **G Oeltzschner**, KL Chan, NAJ Puts, M Mikkelsen, RAE Edden. Gannet 3.0: Developing post-processing tools for accelerated editing. 25th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2017, Honolulu, USA.
30. MG Saleh, **G Oeltzschner**, KL Chan, NAJ Puts, M Mikkelsen, M Schär, AD Harris, RAE Edden. Simultaneous Hadamard editing of GABA and glutathione. 25th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2017, Honolulu, USA.
31. TJ Baumgarten, M Butz, **G Oeltzschner**, N Hoogenboom, HJ Wittsack, A Schnitzler. Corticomuscular Coherence Correlates with Critical Flicker Frequency but not with GABA+/Cr Levels in Patients with Hepatic Encephalopathy. 20th International Conference on Biomagnetism (Biomag) 2016, Seoul, Korea.
32. HJ Zöllner, **G Oeltzschner**, F Wickrath, HJ Wittsack, A Schnitzler. Wassergehaltskartierung des menschlichen Gehirns – Vergleich quantitativer magnetresonanztomographischer Methoden. 47th Annual Meeting of the Deutsche Gesellschaft für Medizinische Physik (DGMP) 2013, Würzburg, Germany.
33. **G Oeltzschner**, N Hoogenboom, TJ Baumgarten, M Butz, F Wickrath, G Antoch, HJ Wittsack, A Schnitzler. GABA in hepatic encephalopathy – Links to blood ammonia, CFF, brain

osmolytes, and cerebral water. 21st Annual Meeting of the Organization for Human Brain Mapping (OHBM) 2015, Honolulu, USA.

34. **G Oeltzschner**, PK Bhattacharyya. Editing efficiency for macromolecule-suppressed and unsuppressed J-edited GABA spectroscopy. 23rd Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2015, Toronto, Canada.
35. **G Oeltzschner**, N Hoogenboom, T Baumgarten, K Heberlein, HJ Wittsack, A Schnitzler. Absolut quantitative GABA-Spektroskopie mit Watermapping im motorischen und visuellen Kortex. 44th Annual Meeting of the Deutsche Gesellschaft für Medizinische Physik (DGMP) 2013, Cologne, Germany.
36. HJ Wittsack, J Weller, A Müller-Lutz, P Heusch, **G Oeltzschner**, G Pentang, G Antoch, RS Lanzman. Zeitaufgelöste Bestimmung der Diffusionskoeffizienten der menschlichen Niere mit EKG-getriggelter diffusionsgewichteter MRT. 44th Annual Meeting of the Deutsche Gesellschaft für Medizinische Physik (DGMP) 2013, Cologne, Germany.
37. A Müller-Lutz, N Khalil, B Schmitt, V Jellus, G Pentang, **G Oeltzschner**, G Antoch, RS Lanzman, HJ Wittsack. pH-Bildgebung mittels des CEST-Kontrastmittels Iopamidol an einem 3T MRT. 44th Annual Meeting of the Deutsche Gesellschaft für Medizinische Physik (DGMP) 2013, Cologne, Germany.

Educational talks

1. **G Oeltzschner**. An Incomplete Guide to MRS Data Analysis. Part of the Educational Course “MRS of GABA: Methods and Applications for understanding brain function” (Chair: Dr. C. Stagg) at the 27th Annual Meeting of the Organization for Human Brain Mapping (OHBM) 2021, virtual meeting.
2. **G Oeltzschner**. Introduction to MR Physics. Lecture at EDITINGSCHOOL 2020, virtual meeting.
3. **G Oeltzschner**. J-difference editing explained. Lecture at EDITINGSCHOOL 2018, Playa del Carmen, Mexico.

FUNDING

1R00AG062230-01 (PI Oeltzschner) 04/15/2021 – 03/31/2023
NIH/NIA \$170,968 (total cost)
Towards a comprehensive neurometabolic profile in patients with mild cognitive impairment
This project is dedicated to developing advanced spectral edited MRS/MRSI techniques with large spatial coverage to investigate brain metabolite levels in patients with mild cognitive impairment.

1K99AG062230-01 (PI Oeltzschner) 04/01/2019 – 03/31/2021
NIH/NIA \$170,968 (total cost)
Towards a comprehensive neurometabolic profile in patients with mild cognitive impairment

This project is dedicated to developing advanced spectral edited MRS/MRSI techniques with large spatial coverage to investigate brain metabolite levels in patients with mild cognitive impairment.

ORGANIZATIONAL ACTIVITIES

Professional societies

2015-present Member, International Society for Magnetic Resonance in Medicine (ISMRM)
2015-present Member, Organization for Human Brain Mapping (OHBM)
2012 Member, German Society for Medical Physics (DGMP)

Committee memberships

2020-present Founding member, Committee on MRS Code and Data Sharing, MRS Study Group of the International Society for Magnetic Resonance in Medicine (ISMRM)

Editorial activities

Guest editor

2020-present Frontiers in Neurology (Topic: “Ultrahigh Field Metabolic MRI: Current Status, Clinical Applications and Future Perspectives”)

Review editor

2020-present Frontiers in Neuroscience

Journal reviewer

2021-present CNS Spectrums
2021-present Neurochemistry International
2020-present Scientific Reports
2018-present Magnetic Resonance Materials in Physics, Biology, and Medicine
2018-present Journal of Magnetic Resonance
2017-present Magnetic Resonance in Medicine
2017-present NeuroImage: Clinical
2016-present Biological Psychiatry
2016-present Journal of Magnetic Resonance Imaging
2016-present NeuroImage

Institutional administrative appointments

2017-2018 Treasurer, Johns Hopkins Postdoc Association (JHPDA)
Member, 2017-2018 JHPDA Executive Board
2016-2017 Treasurer, Johns Hopkins Postdoc Association (JHPDA)
Member, 2016-2017 JHPDA Executive Board

Conference and workshop organization

2020 Organizing committee, Virtual EDITINGSCHOOL (Online workshop on theory and practice of spectral editing)
2019 Organizing committee, 5th International Symposium on GABA and Advanced MRS, Park City, Utah, USA

- 2018 Organizing committee, EDITINGSCHOOL (Workshop on theory and practice of spectral editing), Playa del Carmen, Mexico
- 2018 Organizing committee, 5th Annual Johns Hopkins Postdoctoral Retreat, Baltimore, USA
- 2017 Session chair, 4th International Symposium on MRS of GABA, Leuven, Belgium
- 2017 Organizing committee, 4th International Symposium on MRS of GABA, Leuven, Belgium
- 2017 Organizing committee, 4th Annual Johns Hopkins Postdoctoral Retreat, Baltimore, USA

RECOGNITION

Honors, Awards

- 2020 1st Prize of the MR Spectroscopy Study Group, 28th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) 2020 (virtual meeting)
- 2019 Educational Stipend, 27th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM), Montréal, Canada
- 2018 Educational Stipend, 26th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM), Paris, France
- 2017 Best Presentation, 20th Annual Division of Johns Hopkins MR Research Retreat, Liberty Mountain, USA
- 2017 Educational Stipend, 25th Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM), Honolulu, USA
- 2013 Student Presentation Award, 2nd International Symposium on MRS of GABA, Cardiff, UK

Panels

- 01/29/2020 “In-vivo magnetic resonance spectroscopy of GABA to study anxiety”
Panel “The Highs and Lows of Gabaergic Transmission in Anxiety: Reconciling Contradictory Findings from Rodents and Humans Studies”, Winter Conference on Brain Research (WCBR) 2020, Big Sky, United States

Invited talks

- 05/27/2021 “An incomplete guide to MRS data analysis”, Virtual MR Spectroscopy Workshop, NeuroMET (jointly held by University of Greifswald and Physikalisch-Technische Bundesanstalt Berlin), University of Greifswald, Greifswald, Germany
- 04/14/2021 “Advanced modeling and open-source software development for in-vivo magnetic resonance spectroscopy”, NeuroPoly Neuroimaging Research Laboratory, École Polytechnique, Université de Montréal, Montréal, Canada
- 11/20/2020 “MRS Hub – Online Resources for MRS Code & Data Sharing”, 4th Annual INSPECTOR MRS Workshop, Columbia University, New York City, United States (virtual)
- 09/25/2020 “New techniques in edited magnetic resonance spectroscopy”, Vanderbilt University Institute of Imaging Science, Vanderbilt University, Nashville, United States

- 06/25/2020 “MRSHub – An Online MRS Code & Data Repository”, ISMRM MR Spectroscopy Study Group Virtual Meeting (joint talk with Brian J. Soher and William Clarke)
- 04/28/2020 “Progress in edited magnetic resonance spectroscopy”, joint virtual talk with Richard Edden, Wellcome Center for Integrative Neuroscience, University of Oxford, Oxford, UK
- 12/05/2019 “New Frontiers in edited magnetic resonance spectroscopy”, Athinoula A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital / Harvard Medical School, Boston, United States
- 11/06/2019 “New Frontiers in edited magnetic resonance spectroscopy”, Department of Kinesiology, University of Georgia, Athens, United States
- 05/09/2019 “New Frontiers in edited magnetic resonance spectroscopy”, CERVO Brain Research Centre, Université Laval, Québec City, Canada
- 11/20/2018 “New Frontiers in edited magnetic resonance spectroscopy”, Neuroscience Institute, New York University Medical Center, New York City, United States
- 10/31/2017 “An Introduction to Edited MRS of GABA”, Department of Physiology, University of Ljubljana, Ljubljana, Slovenia
- 9/26/2017 “New Frontiers in edited MRS – Measuring multiple metabolites in multiple regions”, Central Institute for Mental Health, Mannheim, Germany
- 6/23/2017 “Edited Magnetic Resonance Spectroscopy of GABA – Applications and New Frontiers”, Department of Psychiatry, University of British Columbia, Vancouver, Canada

PROFESSIONAL SKILLS

Strong proficiency

Clinical MRI scanner operator on various platforms (Siemens 3T, Philips 3T/7T)
Data acquisition from healthy and clinical populations of all ages (pediatric, adult, elderly)
Protocol design, sequence optimization, acquisition and analysis of conventional and edited MRS
All major MRS analysis software packages (LCModel, jMRUI, Tarquin, Vespa)
Full density-matrix simulations of MRS experiments in MATLAB
Full software development in MATLAB (Osprey, Gannet)

Good proficiency

Analysis of functional and structural MRI data with various major software packages (SPM, FSL)
Statistical analysis (R, SPSS)
Philips MR sequence development

Basic proficiency

DWI/DTI/DKI acquisition and analysis
Software development in C/C++ and Python

TEACHING ACTIVITIES

Mentees

2020 – present Helge Jörn Zöllner, postdoctoral research fellow
2020 – present Aimie Peek, PhD student (University of Sydney)

2020 – present Diana Rotaru, PhD student (King's College London)

Supervised students

2016 Marc Jonuscheit, BSc
2015 Helge Jörn Zöllner, MSc
2014 Frithjof Wickrath, MSc; Viktor Pfaffenrot, BSc; Dennis Pantke, BSc
2013 Lukas Gottwald, BSc; Helge Jörn Zöllner, BSc
2012 Elif Cankaya, BSc

REFERENCES

Prof. Richard A.E. Edden, Johns Hopkins University, Baltimore, United States
Prof. Peter B. Barker, Johns Hopkins University, Baltimore, United States
Prof. Alfons Schnitzler, Heinrich Heine University, Düsseldorf, Germany