Mark Mikkelsen, Ph.D.

Neuroimaging Scientist | Magnetic Resonance Spectroscopy & MRI | Neurochemical Biomarkers

PROFESSIONAL PROFILE

Summary

Neuroimaging scientist with 10+ years of experience in developing advanced in vivo proton magnetic resonance spectroscopy (^{1}H MRS) methods to study the neurochemistry of the human brain. Globally recognized for leading international multi-site research projects, pioneering accelerated and optimized MRS acquisition techniques, and developing widely used open-source MRS data analysis software tools. My scientific work enables precise measurement of low-concentration neurometabolites, such as the inhibitory neurotransmitter GABA and the antioxidant glutathione, supporting research on neuropsychiatric and neurological disorders as well as healthy human function. Passionate advocate for open science, global collaboration, and rigorous research methods in human brain science.

Core Competencies

- In vivo MRS & MRI of the human brain
- Neurochemical biomarker development (GABA, glutathione)
- Advanced edited MRS techniques for low-concentration metabolites (HERMES, HERCULES)
- MATLAB, R, Python, open-source software tool development (Gannet, Osprey, MRS-BIDS, NIfTI-MRS)
- Multi-site studies, reproducibility, and data standards
- International consortium leadership
- Statistics for biomedical science, MR data processing and analysis
- Open science practices
- Neurochemistry of neurodevelopmental disorders
- Substantial dissemination through peer-reviewed publications and presentations at international scientific society meetings
- Extramural grant writing and review

Key Achievements

- Lead investigator of the international "Big GABA" MRS research consortium (26 sites)
- Lead developer of Gannet, a widely used open-source software toolkit for complete, automated analysis and quantification of edited MRS data
- Developer of accelerated MRS acquisition techniques, including HERMES/HERCULES
- Contributor to international MRS data standardization efforts (NIfTI-MRS, MRS-BIDS)
- Co-lead investigator on "CoMP-MRS", the largest multi-site preclinical MRS study to date

EXPERIENCE AND EDUCATION

Faculty Appointments

Assistant Professor of Neuroimaging in Radiology | 08/2022–04/2026
Weill Cornell Medicine (New York, NY, USA)

Postdoctoral Training

Postdoctoral Associate in Radiology | **05/2021–07/2022**
Weill Cornell Medicine (New York, NY, USA); *PI: Dikoma Shungu*

Postdoctoral Fellow | **05/2016–04/2021**
Johns Hopkins University School of Medicine (Baltimore, MD, USA); *PI: Richard Edden*

Postdoctoral Research Scientist | **11/2015–04/2016**
Royal Holloway, University of London (Egham, England, UK); *PI: Narender Ramnani*

Education

Ph.D. Neuroimaging | 09/2012–06/2016 | Cardiff University (Cardiff, Wales, UK)
M.Sc. Neuroimaging | 09/2011–09/2012 | Bangor University (Bangor, Wales, UK)
B.Sc. (Hons) Psychology | 09/2007–06/2011 | University of Glasgow (Glasgow, Scotland, UK)

RESEARCH SUPPORT

Completed Funding

K99 EB028828 (PI) | 09/15/2020—07/31/2022
NIH/NIBIB
Optimized Multi-Metabolite Edited MRS at 3T
This Pathway to Independence Award supported a research training program centered on optimizing multi-metabolite editing of up to eight low-concentration metabolites.

PUBLICATIONS (*h*-index: 34)

Google Scholar | NIH My Bibliography

Peer-Reviewed Original Research

Senior-Author Papers

1. Archibald J, Igwe KC, Kaiser A, Landheer K, Lee J, Kramer JLK, Gudmundson AT, Zöllner HJ, Oeltzschner G, Fleischer CC, Zölch N, Near J, **MIKKELSEN M**. The impact and reliability of tissue segmentation on in vivo magnetic resonance spectroscopy metabolite quantification. *Magn Reson Med*. 2026;96(2):516-529. doi:10.1002/mrm.70380
2. Bouchard AE, **MIKKELSEN M**. Noise decorrelation coil combination optimizes SNR of edited ^{1}H MRS data. *Magn Reson Imaging*. 2025;122:110452. doi:10.1016/j.mri.2025.110452
3. Bouchard AE, Wong D, Bogner W, Gau R, Halchenko YO, Lamb DG, Markiewicz CJ, Mullins PG, Niso G, Oeltzschner G, BIDS Maintainers (*Appelhoff S, Blair R, Earl E, Galassi A, Hardcastle N, Pfarr JK, Ray K, Rogers C, Salo T*), Clarke WT, Wilson M, **MIKKELSEN M**. MRS-BIDS, an extension to the Brain Imaging Data Structure for magnetic resonance spectroscopy. *Sci Data*. 2025;12(1):1384. doi:10.1038/s41597-025-05543-2
4. Archibald J, Bouchard AE, Noeske R, Shungu DC, **MIKKELSEN M**. Test–retest reliability of multi-metabolite edited MRS at 3T using PRESS and sLASER. *Magn Reson Med*. 2026;95(3):1375-1392. doi:10.1002/mrm.70161

First-Author Papers

1. **MIKKELSEN M**, Singh KD, Sumner P, Evans CJ. Comparison of the repeatability of GABA-edited magnetic resonance spectroscopy with and without macromolecule suppression. *Magn Reson Med*. 2016;75(3):946-953. doi:10.1002/mrm.25699
2. **MIKKELSEN M**, Singh KD, Brealy JA, Linden DEJ, Evans CJ. Quantification of γ-aminobutyric acid (GABA) in ^{1}H MRS volumes composed heterogeneously of grey and white matter. *NMR Biomed*. 2016;29(11):1644-1655. doi:10.1002/nbm.3622
3. **MIKKELSEN M**, Barker PB, Bhattacharyya PK, Brix MK, Buur PF, Cecil KM, Chan KL, Chen DY-T, Craven AR, Cuypers K, Dacko M, Duncan NW, Dydak U, Edmondson DA, Ende G, Ersland L, Gao F, Greenhouse I, Harris AD, He N, Heba S, Hoggard N, Hsu T, Jansen JFA, Kangarlu A, Lange T, Lebel RM, Li Y, Lin CE, Liou J, Lirng J-F, Liu F, Ma R, Maes C, Moreno-Ortega M, Murray SO, Noah S, Noeske R, Noseworthy MD, Oeltzschner G, Prisciandaro JJ, Puts NAJ, Roberts TPL, Sack M, Sailasuta N, Saleh MG, Schallmo M, Simard N, Swinnen SP, Tegenthoff M, Truong P, Wang G, Wilkinson ID, Wittsack H-J, Xu H, Yan F, Zhang C, Zipunnikov V, Zöllner HJ, Edden RAE. Big GABA: Edited MR spectroscopy at 24 research sites. *Neuroimage*. 2017;159:32-45. doi:10.1016/j.neuroimage.2017.07.021
4. **MIKKELSEN M**, Saleh MG, Near J, Chan KL, Gong T, Harris AD, Oeltzschner G, Puts NAJ, Cecil KM, Wilkinson ID, Edden RAE. Frequency and phase correction for multiplexed edited MRS of GABA and glutathione. *Magn Reson Med*. 2018;80(1):21-28. doi:10.1002/mrm.27027
5. **MIKKELSEN M**, Loo RS, Puts NAJ, Edden RAE, Harris AD. Designing GABA-edited magnetic resonance spectroscopy studies: Considerations of scan duration, signal-to-noise ratio and sample size. *J Neurosci Methods*. 2018;303:86-94. doi:10.1016/j.jneumeth.2018.02.012
6. **MIKKELSEN M**, Harris AD, Edden RAE, Puts NAJ. Macromolecule-suppressed GABA measurements correlate more strongly with behavior than macromolecule-contaminated GABA+ measurements. *Brain Res*. 2018;1701:204-211. doi:10.1016/j.brainres.2018.09.021
7. **MIKKELSEN M**, Rimbault DL, Barker PB, Bhattacharyya PK, Brix MK, Buur PF, Cecil KM, Chan KL, Chen DYT, Craven AR, Cuypers K, Dacko M, Duncan NW, Dydak U, Edmondson DA, Ende G, Ersland L, Forbes MA, Gao F, Greenhouse I, Harris AD, He N, Heba S, Hoggard N, Hsu T-W, Jansen JFA, Kangarlu A, Lange T, Lebel RM, Li Y, Lin C-YE, Liou J-K, Lirng J-F, Liu F, Long JR, Ma R, Maes C, Moreno-Ortega M, Murray SO, Noah S, Noeske R, Noseworthy MD, Oeltzschner G, Porges EC, Prisciandaro JJ, Puts NAJ, Roberts TPL, Sack M, Sailasuta N, Saleh MG, Schallmo M-P, Simard N, Stoffers D, Swinnen SP, Tegenthoff M, Truong P, Wang G, Wilkinson ID, Wittsack H-J, Woods AJ, Xu H, Yan F, Zhang C, Zipunnikov V, Zöllner HJ, Edden RAE. Big GABA II: Water-referenced edited MR spectroscopy at 25 research sites. *Neuroimage*. 2019;191:537-548. doi:10.1016/j.neuroimage.2019.02.059
8. **MIKKELSEN M**, He J, Tommerdahl M, Edden RAE, Mostofsky SH, Puts NAJ. Reproducibility of flutter-range vibrotactile detection and discrimination thresholds. *Sci Rep*. 2020;10:6528. doi:10.1038/s41598-020-63208-z
9. **MIKKELSEN M**, Tapper S, Near J, Mostofsky SH, Puts NAJ, Edden RAE. Correcting frequency and phase offsets in MRS data using robust spectral registration. *NMR Biomed*. 2020;33(10):e4368. doi:10.1002/nbm.4368 **[EDITOR'S PICK]**

Co-Author Papers

1. Saleh MG, Oeltzschner G, Chan KL, Puts NAJ, **MIKKELSEN M**, Schär M, Harris AD, Edden RAE. Simultaneous edited MRS of GABA and glutathione. *Neuroimage*. 2016;142:576-582. doi:10.1016/j.neuroimage.2016.07.056
2. Harris AD, Puts NAJ, Wijtenburg SA, Rowland LM, **MIKKELSEN M**, Barker PB, Evans CJ, Edden RAE. Normalizing data from GABA-edited MEGA-PRESS implementations at 3 Tesla. *Magn Reson Imaging*. 2017;42:8-15. doi:10.1016/j.mri.2017.04.013
3. Oeltzschner G, Snoussi K, Puts NA, **MIKKELSEN M**, Harris AD, Pradhan S, Tsapkini K, Schär M, Barker PB, Edden RAE. Effects of eddy currents on selective spectral editing experiments at 3T. *J Magn Reson Imaging*. 2018;47(3):673-681. doi:10.1002/jmri.25813
4. Puts NAJ, Harris AD, **MIKKELSEN M**, Tommerdahl M, Edden RAE, Mostofsky SH. Altered tactile sensitivity in children with attention-deficit hyperactivity disorder. *J Neurophysiol*. 2017;118(5):2568-2578. doi:10.1152/jn.00087.2017
5. Oeltzschner G, Chan KL, Saleh MG, **MIKKELSEN M**, Puts NAJ, Edden RAE. Hadamard editing of glutathione and macromolecule-suppressed GABA. *NMR Biomed*. 2018;31(1):e3844. doi:10.1002/nbm.3844
6. Saleh MG, **MIKKELSEN M**, Oeltzschner G, Chan KL, Berrington A, Barker PB, Edden RAE. Simultaneous editing of GABA and glutathione at 7T using semi-LASER localization. *Magn Reson Med*. 2018;80(2):474-479. doi:10.1002/mrm.27044
7. Wijtenburg SA, Near J, Korenic SA, Gaston FE, Chen H, **MIKKELSEN M**, Chen S, Kochunov P, Hong LE, Rowland LM. Comparing the reproducibility of commonly used magnetic resonance spectroscopy techniques to quantify cerebral glutathione. *J Magn Reson Imaging*. 2019;49(1):176-183. doi:10.1002/jmri.26046
8. Oeltzschner G, Wijtenburg SA, **MIKKELSEN M**, Edden RAE, Barker PB, Joo JH, Leoutsakos J-MS, Rowland LM, Workman CI, Smith GS. Neurometabolites and associations with cognitive deficits in mild cognitive impairment: a magnetic resonance spectroscopy study at 7 Tesla. *Neurobiol Aging*. 2019;73:211-218. doi:10.1016/j.neurobiolaging.2018.09.027
9. Oeltzschner G, Saleh MG, Rimbault D, **MIKKELSEN M**, Chan KL, Puts NAJ, Edden RAE. Advanced Hadamard-encoded editing of seven low-concentration brain metabolites: Principles of HERCULES. *Neuroimage*. 2019;185:181-190. doi:10.1016/j.neuroimage.2018.10.002
10. Saleh MG, Rimbault D, **MIKKELSEN M**, Oeltzschner G, Wang AM, Jiang D, Alhamud A, Near J, Schär M, Noeske R, Murdoch JB, Ersland L, Craven AR, Dwyer GE, Grüner ER, Pan L, Ahn S, Edden RAE. Multi-vendor standardized sequence for edited magnetic resonance spectroscopy. *Neuroimage*. 2019;189:425-431. doi:10.1016/j.neuroimage.2019.01.056
11. Prisciandaro JJ, **MIKKELSEN M**, Saleh MG, Edden RAE. An evaluation of the reproducibility of ^{1}H-MRS GABA and GSH levels acquired in healthy volunteers with J-difference editing sequences at varying echo times. *Magn Reson Imaging*. 2020;65:109-113. doi:10.1016/j.mri.2019.10.004
12. Cuypers K, Verstraelen S, Maes C, Hermans L, Hehl M, Heise K-F, Chalavi S, **MIKKELSEN M**, Edden R, Levin O, Sunaert S, Meesen R, Mantini D, Swinnen SP. Task-related measures of short-interval intracortical inhibition and GABA levels in healthy young and older adults: A multimodal TMS-MRS study. *Neuroimage*. 2020;208:116470. doi:10.1016/j.neuroimage.2019.116470

13. Saleh MG, Wang M, **MIKKELSEN M**, Hui SCN, Oeltzschner G, Boissoneault J, Stennett B, Edden RAE, Porges EC. Simultaneous edited MRS of GABA, glutathione, and ethanol. *NMR Biomed*. 2020;33(4):e4227. doi:10.1002/nbm.4227
14. Považan M, **MIKKELSEN M**, Berrington A, Bhattacharyya PK, Brix MK, Buur PF, Cecil KM, Chan KL, Chen DYT, Craven AR, Cuypers K, Dacko M, Duncan NW, Dydak U, Edmondson DA, Ende G, Ersland L, Forbes MA, Gao F, Greenhouse I, Harris AD, He N, Heba S, Hoggard N, Hsu T-W, Jansen JFA, Kangarlu A, Lange T, Lebel RM, Li Y, Lin C-YE, Liou J-K, Lirng J-F, Liu F, Long JR, Ma R, Maes C, Moreno-Ortega M, Murray SO, Noah S, Noeske R, Noseworthy MD, Oeltzschner G, Porges EC, Prisciandaro JJ, Puts NAJ, Roberts TPL, Sack M, Sailasuta N, Saleh MG, Schallmo M-P, Simard N, Stoffers D, Swinnen SP, Tegenthoff M, Truong P, Wang G, Wilkinson ID, Wittsack H-J, Woods AJ, Xu H, Yan F, Zhang C, Zipunnikov V, Zöllner HJ, Edden RAE, Barker PB. Comparison of Multivendor Single-Voxel MR Spectroscopy Data Acquired in Healthy Brain at 26 Sites. *Radiology*. 2020;295(1):171-180. doi:10.1148/radiol.2020191037
15. Saleh MG, Papantoni A, **MIKKELSEN M**, Hui SCN, Oeltzschner G, Puts NA, Edden RAE, Carnell S. Effect of age on GABA+ and glutathione in a pediatric sample. *Am J Neuroradiol*. 2020;41(6):1099-1104. doi:10.3174/ajnr.A6543
16. Oeltzschner G, Zöllner HJ, Hui SCN, **MIKKELSEN M**, Saleh MG, Tapper S, Edden RAE. Osprey: Open-source processing, reconstruction & estimation of magnetic resonance spectroscopy data. *J Neurosci Methods*. 2020;343:108827. doi:10.1016/j.jneumeth.2020.108827
17. Steel A, **MIKKELSEN M**, Edden RAE, Robertson CE. Regional balance between glutamate+glutamine and GABA+ in the resting human brain. *Neuroimage*. 2020;220:117112. doi:10.1016/j.neuroimage.2020.117112
18. Cuypers K, Hehl M, van Aalst J, Chalavi S, **MIKKELSEN M**, Van Laere K, Dupont P, Mantini D, Swinnen SP. Age-related GABAergic differences in the primary sensorimotor cortex: A multimodal approach combining PET, MRS and TMS. *Neuroimage*. 2021;226:117536. doi:10.1016/j.neuroimage.2020.117536
19. Tapper S, **MIKKELSEN M**, Dewey BE, Zöllner HJ, Hui SCN, Oeltzschner G, Edden RAE. Frequency and phase correction of J-difference edited MR spectra using deep learning. *Magn Reson Med*. 2021;85(4):1755-1765. doi:10.1002/mrm.28525
20. Song Y, Gong T, Xiang Y, **MIKKELSEN M**, Wang G, Edden RAE. Single-dose L-dopa increases upper brainstem GABA in Parkinson's disease: A preliminary study. *J Neurol Sci*. 2021;422:117309. doi:10.1016/j.jns.2021.117309
21. He JL, Wodka E, Tommerdahl M, Edden RAE, **MIKKELSEN M**, Mostofsky SH, Puts NAJ. Disorder-specific alterations of tactile sensitivity in neurodevelopmental disorders. *Commun Biol*. 2021;4(1):97. doi:10.1038/s42003-020-01592-y
22. Rideaux R, **MIKKELSEN M**, Edden RA. Comparison of methods for spectral alignment and signal modelling of GABA-edited MR spectroscopy data. *Neuroimage*. 2021:117900. doi:10.1016/j.neuroimage.2021.117900
23. Song Y, Gong T, Saleh MG, **MIKKELSEN M**, Wang G, Edden RAE. Upper brainstem GABA levels in Parkinson's disease. *Magn Reson Mater Physics Biol Med*. 2021 doi: 10.1007/s10334-021-00910-7
24. Hupfeld KE, Hyatt HW, Alvarez Jerez P, **MIKKELSEN M**, Hass CJ, Edden RAE, Seidler RD, Porges EC. In Vivo Brain Glutathione is Higher in Older Age and Correlates with Mobility. *Cereb Cortex*. 2021;31(10):4576-4594. doi:10.1093/cercor/bhab107

25. Hui SCN, **MIKKELSEN M**, Zöllner HJ, Ahluwalia V, Alcauter S, Baltusis L, Barany DA, Barlow LR, Becker R, Berman JI, Berrington A, Bhattacharyya PK, Blicher JU, Bogner W, Brown MS, Calhoun VD, Castillo R, Cecil KM, Choi YB, Chu WCW, Clarke WT, Craven AR, Cuypers K, Dacko M, de la Fuente-Sandoval C, Desmond P, Domagalik A, Dumont J, Duncan NW, Dydak U, Dyke K, Edmondson DA, Ende G, Ersland L, Evans CJ, Fermin ASR, Ferretti A, Fillmer A, Gong T, Greenhouse I, Grist JT, Gu M, Harris AD, Hat K, Heba S, Heckova E, Hegarty JP, Heise K, Honda S, Jacobson A, Jansen JFA, Jenkins CW, Johnston SJ, Juchem C, Kangarlu A, Kerr AB, Landheer K, Lange T, Lee P, Levendovszky SR, Limperopoulos C, Liu F, Lloyd W, Lythgoe DJ, Machizawa MG, MacMillan EL, Maddock RJ, Manzhurtsev A V, Martinez-Gudino ML, Miller JJ, Mirzakhanian H, Moreno-Ortega M, Mullins PG, Nakajima S, Near J, Noeske R, Nordhøy W, Oeltzschner G, Osorio-Duran R, Otaduy MCG, Pasaye EH, Peeters R, Peltier SJ, Pilatus U, Polomac N, Porges EC, Pradhan S, Prisciandaro JJ, Puts NA, Rae CD, Reyes-Madrigal F, Roberts TPL, Robertson CE, Rosenberg JT, Rotaru D, O'Gorman Tuura RL, Saleh MG, Sandberg K, et al. Frequency drift in MR spectroscopy at 3T. *Neuroimage*. 2021;241(21):118430. doi:10.1016/j.neuroimage.2021.118430
26. He JL, Oeltzschner G, **MIKKELSEN M**, Deronda A, Harris AD, Crocetti D, Wodka EL, Mostofsky SH, Edden RAE, Puts NAJ. Region-specific elevations of glutamate + glutamine correlate with the sensory symptoms of autism spectrum disorders. *Transl Psychiatry*. 2021;11(1):411. doi:10.1038/s41398-021-01525-1
27. Verstraelen S, Cuypers K, Maes C, Hehl M, Van Malderen S, Levin O, **MIKKELSEN M**, Meesen RLJ, Swinnen SP. Neurophysiological modulations in the (pre)motor-motor network underlying age-related increases in reaction time and the role of GABA levels – a bimodal TMS-MRS study. *Neuroimage*. 2021;243:118500. doi:10.1016/j.neuroimage.2021.118500
28. Dolfen N, Veldman MP, Gann MA, von Leupoldt A, Puts NAJ, Edden RAE, **MIKKELSEN M**, Swinnen S, Schwabe L, Albouy G, King BR. A role for GABA in the modulation of striatal and hippocampal systems under stress. *Commun Biol*. 2021;4(1):1033. doi:10.1038/s42003-021-02535-x
29. Basu SK, Pradhan S, Barnett SD, **MIKKELSEN M**, Kapse KJ, Murnick J, Quistorff JL, Lopez CA, du Plessis AJ, Limperopoulos C. Regional differences in gamma-aminobutyric acid and glutamate concentrations in the healthy newborn brain. *Am J Neuroradiol*. 2022;43(1):125-131. doi:10.3174/ajnr.A7336
30. He JL, **MIKKELSEN M**, Huddleston DA, Crocetti D, Cecil KM, Singer HS, Edden RAE, Gilbert DL, Mostofsky SH, Puts NAJ. Frequency and intensity of premonitory urges-to-tic in Tourette syndrome is associated with supplementary motor area GABA+ levels. *Mov Disord*. 2022;37(3):563-573. doi:10.1002/mds.28868
31. Hui SCN, Gong T, Zöllner HJ, Song Y, Murali-Manohar S, Oeltzschner G, **MIKKELSEN M**, Tapper S, Chen Y, Saleh MG, Porges EC, Chen W, Wang G, Edden RAE. The macromolecular MR spectrum does not change with healthy aging. *Magn Reson Med*. 2022;87(4):1711-1719. doi:10.1002/mrm.29093
32. Craven AR, Bhattacharyya PK, Clarke WT, Dydak U, Edden RAE, Ersland L, Mandal PK, **MIKKELSEN M**, Murdoch JB, Near J, Rideaux R, Shukla D, Wang M, Wilson M, Zöllner HJ, Hugdahl K, Oeltzschner G. Comparison of seven modelling algorithms for γ-aminobutyric acid–edited proton magnetic resonance spectroscopy. *NMR Biomed*. 2022;35(7):e4702. doi:10.1002/nbm.4702

33. Rogan M, Friend AT, Rossetti GM, Edden R, **MIKKELSEN M**, Oliver SJ, Macdonald JH, Mullins PG. Hypoxia alters posterior cingulate cortex metabolism during a memory task: A ^{1}H fMRS study. *Neuroimage*. 2022;260:119397. doi:10.1016/j.neuroimage.2022.119397
34. Ueno F, Nakajima S, Iwata Y, Honda S, Torres-Carmona E, Mar W, Tsugawa S, Truong P, Plitman E, Noda Y, Mimura M, Sailasuta N, **MIKKELSEN M**, Edden RAE, De Luca V, Remington G, Gerretsen P, Graff-Guerrero A. Gamma-aminobutyric acid (GABA) levels in the midcingulate cortex and clozapine response in patients with treatment-resistant schizophrenia: A proton magnetic resonance spectroscopy (^{1}H-MRS) study. *Psychiatry Clin Neurosci*. 2022;76(11):587-594. doi:10.1111/pcn.13463 **[EDITOR'S PICK]**
35. Clarke WT, Bell TK, Emir UE, **MIKKELSEN M**, Oeltzschner G, Shamaei A, Soher BJ, Wilson M. NIfTI-MRS: A standard data format for magnetic resonance spectroscopy. *Magn Reson Med*. 2022;88(6):2358-2370. doi:10.1002/mrm.29418
36. Li H, Chalavi S, Rasooli A, Rodríguez-Nieto G, Seer C, **MIKKELSEN M**, Edden RAE, Sunaert S, Peeters R, Mantini D, Swinnen SP. Baseline GABA+ levels in areas associated with sensorimotor control predict initial and long-term motor learning progress. *Hum Brain Mapp*. 2024;45(1):e26537. doi:10.1002/hbm.26537
37. Bojesen KB, Rostrup E, Sigvard AK, **MIKKELSEN M**, Edden RAE, Ebdrup BH, Glenthøj B. The Trajectory of Prefrontal GABA Levels in Initially Antipsychotic-Naïve Patients With Psychosis During 2 Years of Treatment and Associations With Striatal Cerebral Blood Flow and Outcome. *Biol Psychiatry Cogn Neurosci Neuroimaging*. 2024;9(7):703-713. doi:10.1016/j.bpsc.2023.12.002
38. Rasooli A, Chalavi S, Li H, Seer C, Adab HZ, Mantini D, Sunaert S, **MIKKELSEN M**, Edden RAE, Swinnen SP. Neural correlates of transfer of learning in motor coordination tasks: role of inhibitory and excitatory neurometabolites. *Sci Rep*. 2024;14(1):3251. doi:10.1038/s41598-024-53901-8
39. Gao Y, Liu Y, Zhao S, Liu Y, Zhang C, Hui S, **MIKKELSEN M**, Edden RAE, Meng X, Yu B, Xiao L. MRS study on the correlation between frontal GABA+/Glx ratio and abnormal cognitive function in medication-naive patients with narcolepsy. *Sleep Med*. 2024;119(April):1-8. doi:10.1016/j.sleep.2024.04.004
40. Mugnol-Ugarte L, Bortolini T, Yao B, **MIKKELSEN M**, Carneiro Monteiro M, Andorinho de Freitas Ferreira AC, Bramatti I, Melo B, Hoefle S, Meireles F, Moll J, Pobric G. Transcranial electrical stimulation modulates emotional experience and metabolites in the prefrontal cortex in a donation task. *Sci Rep*. 2024;14(1):14271. doi:10.1038/s41598-024-64876-x
41. Rodríguez-Nieto G, Rasooli A, Li H, Sunaert S, Mantini D, **MIKKELSEN M**, Edden RAE, Chalavi S, Swinnen SP. The role of inhibitory and excitatory neurometabolites in age-related differences in action selection. *npj Aging*. 2025;11(1):17. doi:10.1038/s41514-025-00204-5
42. DeMayo MM, Botros M, Bell TK, **MIKKELSEN M**, Mosher V, George A, McGirr A, Federico P, Harris AD. Reproducibility of HERMES-measured GABA+ and glutathione in the mesial temporal lobe. *J Neurosci Methods*. 2025;423:110542. doi:10.1016/j.jneumeth.2025.110542
43. Li H, Rasooli A, Rodríguez-Nieto G, **MIKKELSEN M**, Mantini D, Sunaert S, Chalavi S, Swinnen SP. Modulation of neurometabolites in sensory processing brain areas during motor learning. *J Physiol*. 2025;603(19):5681-5700. doi:10.1113/JP287349
44. Rodríguez-Nieto G, Alvarez-Anacona DF, **MIKKELSEN M**, Li H, Swinnen SP. The role of glutathione in cognition, cognitive effort, and cognitive endurance in young and older adults. *Front Aging Neurosci*. 2026;18:1729015. doi:10.3389/fnagi.2026.1729015

45. Rodríguez-Nieto G, Li H, Chalavi S, **MIKKELSEN M**, Edden RAE, Swinnen SP. GABA and Glx distinctively predict motor learning and retention in young and older adults. *J Neurosci*. 2026;(October):e1440252026. doi:10.1523/JNEUROSCI.1440-25.2026
46. Rodríguez-Nieto G, **MIKKELSEN M**, Swinnen SP. Inhibition/excitation balance is associated with functional connectivity during cognitive flexibility performance. *Brain Commun*. 2026;8(5):1-14. doi:10.1093/braincomms/fcag319

Peer-Reviewed Review Articles

1. **MIKKELSEN M**, Wodka EL, Mostofsky SH, Puts NAJ. Autism spectrum disorder in the scope of tactile processing. *Dev Cogn Neurosci*. 2018;29:140-150. doi:10.1016/j.dcn.2016.12.005
2. Poldrack RA, Markiewicz CJ, Appelhoff S, Ashar YK, Auer T, Baillet S, Bansal S, Beltrachini L, Benar CG, Bertazzoli G, Bhogawar S, Blair RW, Bortoletto M, Boudreau M, Brooks TL, Calhoun VD, Castelli FM, Clement P, Cohen AL, Cohen-Adad J, D'Ambrosio S, de Hollander G, de la Iglesia-Vayá M, de la Vega A, Delorme A, Devinsky O, Draschkow D, Duff EP, DuPre E, Earl E, Esteban O, Feingold FW, Flandin G, Galassi A, Gallitto G, Ganz M, Gau R, Gholam J, Ghosh SS, Giacomel A, Gillman AG, Gleeson P, Gramfort A, Guay S, Guidali G, Halchenko YO, Handwerker DA, Hardcastle N, Herholz P, Hermes D, Honey CJ, Innis RB, Ioanas HI, Jahn A, Karakuzu A, Keator DB, Kiar G, Kincses B, Laird AR, Lau JC, Lazari A, Legarreta JH, Li A, Li X, Love BC, Lu H, Marcantoni E, Maumet C, Mazzamuto G, Meisler SL, **MIKKELSEN M**, Mutsaerts H, Nichols TE, Nikolaidis A, Nilsonne G, Niso G, Norgaard M, Okell TW, Oostenveld R, Ort E, Park PJ, Pawlik M, Pernet CR, Pestilli F, Petr J, Phillips C, Poline JB, Pollonini L, Raamana PR, Ritter P, Rizzo G, Robbins KA, Rockhill AP, Rogers C, Rokem A, Rorden C, Routier A, Saborit-Torres JM, et al. The past, present, and future of the brain imaging data structure (BIDS). *Imaging Neurosci*. 2024;2:1-19. doi:10.1162/imag_a_00103
3. Li H, Rodríguez-Nieto G, Chalavi S, Seer C, **MIKKELSEN M**, Edden RAE, Swinnen SP. MRS-assessed brain GABA modulation in response to task performance and learning. *Behav Brain Funct*. 2024;20(1):22. doi:10.1186/s12993-024-00248-9

Peer-Reviewed Articles as an Invited Expert Contributor

1. Peek AL, Rebbeck TJ, Leaver AM, Foster SL, Refshauge KM, Puts NA, Oeltzschner G, MRS Expert Panel (*Andronesi OC, Barker PB, Bogner W, Cecil KM, Choi I-Y, Deelchand DK, de Graaf RA, Dydak U, Edden RA, Emir UE, Harris AD, Lin AP, Lythgoe DJ, **MIKKELSEN M**, Mullins PG, Near J, Öz G, Rae CD, Terpstra M, Williams SR, Wilson M*). A comprehensive guide to MEGA-PRESS for GABA measurement. *Anal Biochem*. 2023;669:115113. doi:10.1016/j.ab.2023.115113

Preprints

1. Szinte M, Bach DR, Draschkow D, Esteban O, Gagl B, Gau R, Gregorova K, Halchenko YO, Huberty S, Kling SM, Kulkarni S, The BIDS Maintainers, Markiewicz CJ, **MIKKELSEN M**, Oostenveld R, Pfarr JK. Eye-Tracking-BIDS: the Brain Imaging Data Structure extended to gaze position and pupil data. *bioRxiv*. Published online February 5, 2026. doi:10.64898/2026.02.03.703514

Under Preparation

1. **MIKKELSEN M**, Oeltzschner G, Saleh MG, Zöllner HJ, Puts NAJ, Evans CJ, Harris AD, Edden RAE. Gannet 3: Full-suite open-source software for automated preprocessing and quantitative analysis of edited MRS data. 2026.
2. Archibald J, MacMillan EL, Craven AR, Ensworth A, Kramer JLK, Weber AM, Zöllner HJ, Oeltzschner G, Near J, **MIKKELSEN M**, Zölch N. An end-to-end guide for simulating a ^{1}H magnetic resonance spectroscopy metabolite basis set. 2026.

EDUCATIONAL ACTIVITIES

Mentoring (no end date indicates ongoing mentorship)

Former Lab Members

2023–	Jessica Archibald, Ph.D.	Postdoctoral Research Associate, Weill Cornell Medicine *(currently a consultant for Universität Zürich)*
2024–2025	Amy Bouchard, Ph.D.	Postdoctoral Research Associate, Weill Cornell Medicine (*currently a postdoc at Université Laval)*

External Mentees

2024–	Diana Rotaru, Ph.D.	Postdoctoral Research Associate, Medical University of Vienna
2025–	Kay Chioma Igwe	Ph.D. Student, Columbia University

Teaching

Lectures

Internal

08/2025	Weill Cornell Graduate School of Medical Sciences, M.S. Biomedical Imaging, Special Topics Seminar

Workshops/Seminars

International

12/2018	EDITINGSCHOOL 2018, Instructor, Playa del Carmen, Mexico
12/2020	EDITINGSCHOOL 2020, Instructor, Online

RECOGNITION

Awards/Honors

2010	Chancellor's Fund summer research placement (University of Glasgow, UK)
2011	Chancellor's Fund summer research placement (University of Glasgow, UK)
2011–2012	Medical Research Council (UK) Master's Scholarship
2012–2015	School of Psychology PhD Studentship (Cardiff University, UK)
2014	ISMRM Educational Stipend
2014	Guarantors of Brain travel grant
2015	ISMRM Educational Stipend
2015	Guarantors of Brain travel grant
2017	ISMRM Educational Stipend
2018	ISMRM Educational Stipend

2022 Faculty Incentive Hiring Award of the Mastercard Diversity-Mentorship Collaborative (Weill Cornell Medicine/Mastercard)

Invited Talks

National

06/2017 "GABA-Edited MRS: Experiences with 24 Research Sites", Division of Neuroradiology, The Johns Hopkins University School of Medicine, Baltimore, MD

02/2018 "State of the Art in Edited MR Spectroscopy", Child and Adolescent NeuroDevelopment Initiative (CANDI), Department of Psychiatry, University of Massachusetts Medical School, Worcester, MA

10/2018 "Big GABA: Edited MRS at 25 Sites", Division of MR Research, The Johns Hopkins University School of Medicine, Baltimore, MD

02/2020 "State of the Art in Edited MR Spectroscopy", Department of Radiology, Weill Cornell Medicine, New York, NY

08/2020 "State of the Art in Edited MR Spectroscopy", McLean Imaging Center, McLean Hospital, Belmont, MA *(virtual)*

01/2021 "Edited Magnetic Resonance Spectroscopy: Methodology and Brain–Behavior Relationships", Laboratory of Neurocognitive Development, Department of Psychology, University of Pittsburgh, Pittsburgh, PA *(virtual)*

04/2022 "Edited Magnetic Resonance Spectroscopy: Methodology and Brain–Behavior Relationships", Magnetic Resonance Imaging Research Institute (MRIRI), Department of Radiology, Weill Cornell Medicine, New York, NY

10/2022 "In Vivo Magnetic Resonance Spectroscopy (MRS): An Old and New MR Technique for Noninvasively Quantifying Chemical Compounds in the Human Brain", Center for Neuroscience, University of Colorado Boulder, Boulder, CO

12/2023 "Magnetic Resonance Spectroscopy: An Old and New Technique for Noninvasively Quantifying Chemicals in the Human Brain", Weill Cornell Medicine, New York, NY

06/2025 "An Overview of Modern In Vivo MR Spectroscopy Methodology", McLean Imaging Center, McLean Hospital, Harvard Medical School, Belmont, MA

04/2026 "In Vivo Magnetic Resonance Spectroscopy of the Brain", Department of Physical Therapy and Movement Sciences, University of Texas at El Paso, El Paso, TX

International

09/2017 "State of the Art in Edited MR Spectroscopy", CUBRIC, School of Psychology, Cardiff University, Cardiff, UK

06/2018 "State of the Art in Edited MR Spectroscopy", Department of Biological and Medical Psychology, University of Bergen/Haukeland University Hospital, Bergen, Norway

PROFESSIONAL ACTIVITIES

Grant Reviewing/Study Sections

10/2023 NIH Center for Scientific Review; Neural Basis of Psychopathology, Addictions and Sleep Disorders (NPAS) Study Section; Temporary Member

Editorial Roles

2022– *Frontiers in Neuroscience/Frontiers in Neuroimaging*, Review Editor for "Brain Imaging Methods"
2022– *Frontiers in Physiology/Frontiers in Physics*, Review Editor for "Medical Physics and Imaging"

Journal Peer Review

64 verified reviews

2016– *NMR in Biomedicine*
2016– *NeuroImage: Clinical*
2017– *Magnetic Resonance Materials in Physics, Biology and Medicine (MAGMA)*
2018– *Magnetic Resonance in Medicine*
2018– *NeuroImage*
2018– *Frontiers in Neurology*
2020– *The Journals of Gerontology: Series A, Biological Sciences*
2020– *Journal of Magnetic Resonance*
2020– *Frontiers in Psychiatry*
2020– *Scientific Reports*
2021– *Journal of Neurochemistry*
2022– *Progress in Neurobiology*
2023– *PLOS ONE*
2024– *Journal of Magnetic Resonance Imaging*
2025– *Aging and Disease*
2025– *Brain Research*
2025– *Neurochemistry International*
2026– *Imaging Neuroscience*
2026– *European Journal of Radiology*
2026– *IEEE Transactions on Biomedical Engineering*

Professional Societies

2011–2015 British Psychological Society, Graduate Member
2014–2016 International Society for Magnetic Resonance in Medicine (ISMRM) British Chapter, Postgraduate Observer & Executive Committee Member
2013–2021 ISMRM, Trainee Member
2019–2021 ISMRM Psychiatric MR Spectroscopy & Imaging Study Group, Trainee Representative
2022– ISMRM, Full Member
2023– ISMRM, Equity, Diversity, and Inclusion (EDI) Task Force Member
2025– American Association for the Advancement of Science (AAAS), Supporting Member

Conference Organization

National

04/2014 23rd ISMRM British Chapter Postgraduate Symposium, Cardiff, UK

International

09/2017 4th International Symposium on MRS of GABA, Leuven, Belgium
12/2018 EDITINGSCHOOL 2018, Playa del Carmen, Mexico

11/2019 5th International Symposium on MRS of GABA, Park City, UT