Alexander JS Beckett, PhD

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Employment & Education

2018-present: Research Scientist, Advanced MRI Technologies, LLC, Sebastopol, CA
Research Assistant, University of California, Berkeley, CA

2015-2018: Postdoctoral Scholar, University of California, Berkeley

2013-2015: Research Scientist, Advanced MRI Technologies, LLC, Sebastopol, CA
Visiting Scholar, University of California, Berkeley, CA (Honorary Affiliation)
Supervisor: Dr David Feinberg

2009-2013: University of Nottingham: Ph.D. Visual Neuroscience
Supervisor: Dr Denis Schluppeck.
'The use of High-field fMRI to study neural selectivity in the human visual system'

2008-2009: University of Nottingham: M.Sc. Cognitive Neuroscience and Neuroimaging (Distinction)
Supervisor: Dr Denis Schluppeck.
- **'Investigating the benefits of multi-Echo EPI fMRI in the Ventral Temporal area'**

2003-2007: University of Nottingham: B.Sc. (Hons.) Psychology and Cognitive Neuroscience, 1st class.

Research Interests

I am interested in the use of novel functional MRI techniques (at 3T and 7T) to study the processing of visual stimuli, in particular investigating the ways in which high-resolution scanning can offer improvements and advantages in this area. This includes both the use of non-GE BOLD pulse sequences (e.g. Spin-Echo, VASO) to increase the functional specificity of acquired data, and incorporating a variety of different analysis techniques to extract information from that data.

Skills

- Analysing fMRI data in MATLAB (advanced) using different toolboxes such as mrTools (advanced) and SPM (familiarity), and with standalone software such as FSL (advanced), AFNI (familiarity) and others.
- Processing anatomical MRI data using FreeSurfer (advanced) and other software.
- Creating, programming, and displaying visual stimuli using MATLAB toolboxes such as MGL (advanced) and Psychtoolbox (advanced), and PsychoPy (advanced).
- Experience with bash scripting, and coding in Python, Java and C++.
- Extensive experience maintaining data servers using Ubuntu.
- Advanced expertise in operating MRI scanners (Siemens Tim Trio 3T, Siemens Magnetom 7T, Siemens Terra 7T), including use of custom

sequences, custom reconstruction pipelines and optimizing sequences for high-resolution. Some experience with Phillips scanners (Achieva 3T & 7T)

Teaching Experience

2010:	Demonstrator, Computer programming for stimuli and analysis with demonstration of fMRI data analysis packages – Assisted in teaching MSc students to use MATLAB for general analysis and stimulus presentation, and to use SPM for the analysis of fMRI data. Also marked the assessment at the end of the module.
2008-2010:	Demonstrator, Practical Methods in Psychology and Cognitive Neuroscience – Assisted 2nd year lab class focussing on using visual psychophysics to study the effect of spatial frequency on motion detection, and marked the lab reports.

Funding

NIH R44MH112210
Feinberg, David (PI) Role: Co-Investigator
08/01/2016 - 07/31/2020
Highly Accelerated Simultaneous Multi-Slice Phase Contrast MRI
$2,650,000.

NIH R44 MH129278
Beckett (MPI)
7/01/2021 – 6/30/2024
Highly Efficient MRI Pulse Sequences for High Resolution Physiological and Functional Brain Imaging
$894,679

NIH U24 NS129949
Beckett (MPI)
8/1/2023 – 7/31/2027
NexGen 7T MRI scanner for mesoscale brain imaging: Integration and Dissemination
$5,710,000

NIH R01 MH133637
Bunge (PI) Role: Subaward PI
08/01/2024 - 07/31/2029
Narrowing the mechanistic gap for anterior prefrontal cortex function
$1,257,643

Awards

September 2012:	Guarantors of Brain Travel Grant
April 2011:	Guarantors of Brain Travel Grant
December 2010:	AVA Meeting Travel Bursary

Journal Articles

1. Schilling, **Beckett**, Amandola, Walker, Feinberg, Bunge, and Vu. (2026) "Advancing high-resolution 7 T diffusion MRI: Evaluating phase-encoding correction strategies for distortion correction from basic to four-way acquisitions." *Magnetic Resonance Imaging*: 110694.
2. Zhao, Guo, Yang, Shao, Ma, **Beckett**, Vu, Feinberg, and Wang (2026) "Next Generation 7 Tesla Arterial Spin Labeling With Rotated Spiral Acquisition Enables Mesoscale Resolution in 3D Brain Perfusion and Functional MRI," *Magn Reson Medicine* 95, no. 5: 2702–2717, https://doi.org/10.1002/mrm.70265.
3. Townsend, Muller, Naeem, **Beckett**, Kalisetti, Abbasi-Asl, Liao and Vu (2025) 'Imaging joy with generalized slice dithered enhanced resolution and SWAT reconstruction: 3T high spatial–temporal resolution fMRI.' *Front. Neuroimaging.* 4:1537440. doi: 10.3389/fnimg.2025.1537440
4. Cao, **Beckett**, Liao, et al. (2025) 'In Vivo Meso-Scale Whole-Brain Quantitative Imaging With Tailored MRF on the NexGen 7T Scanner.' *Magn Reson Med*. 2025; 1–16, doi: 10.1002/mrm.70234.
5. Feinberg, Ma, Walker, **Beckett**, Rattenbacher, Rummert, Dietz, Davids and Boulant 'Reassessment of peripheral nerve stimulation thresholds for the Impulse model-optimized asymmetric head gradient coil.' *Magn Reson Med*. 2025; 94: 1326-1338. doi: 10.1002/mrm.30523
6. Park, **Beckett**, Häkkinen, Walker, Ma, Kim, Kim & Feinberg (2025) 'Higher spatial resolution and sensitivity in whole brain functional MRI at 7T using 3D EPI accelerated with variable density CAIPI sampling and temporal random walk.' *Magn Reson Med.* 2025; 94: 678-693. doi: 10.1002/mrm.30512
7. Huber, Stirnberg, Morgan, Feinberg, Ehses, Knudsen, Gulban, Koiso, Gephart, Swegle, Wardle, Persichetti, **Beckett**, Stöcker, Boulant, Poser & Bandettini (2025) 'Short-term gradient imperfections in high-resolution EPI lead to Fuzzy Ripple artifacts.' *Magn Reson Med.* 2025; 94: 571-587. doi: 10.1002/mrm.30489
8. Boulant, Ma, Walker, **Beckett**, Vu, Gunamony & Feinberg (2024) 'Acoustic noise reduction in the NexGen 7 T scanner.' *Magn Reson Med.* 2024; 92: 2261-2270. doi: 10.1002/mrm.30211
9. Boulant, Le Ster, Amadon, Aubert, **Beckett**, Belorgey, Bonnelye, Bosch, Brunner, Dilasser, Dubois, Ehses, Feinberg, Feizollah, Gras, Gross, Guihard, Lannou, Le Bihan, Mauconduit, Molinié, Nunio, Pruessmann, Quettier, Scheffler, Stöcker, Tardif, Ugurbil, Vignaud, Vu & Wu (2024) 'The possible influence of third-order shim coils on gradient-magnet interactions: an inter-field and inter-site study.' MAGMA. 2024 Apr;37(2):169-183. doi: 10.1007/s10334-023-01138-3.
10. Davids, Dietz, Ruyters, Roesler, Klein, **Beckett**, Vu, Guérin, Feinberg & Wald (2023) 'Peripheral nerve stimulation informed design of a high‐performance asymmetric head gradient coil'. *Magn Reson Med.* 2023; 90: 784-801. doi: 10.1002/mrm.29668
11. Gruber, Stockmann, Mareyam, Keil, Bilgic, Chang, Kazemivalipour, **Beckett**, Vu, Feinberg & Wald (2023) 'A 128-channel receive array for cortical brain imaging at 7 T.' Magn Reson Med. 2023 Dec;90(6):2592-2607
12. Feinberg., **Beckett**, Vu, *et al.* (2023) 'Next-generation MRI scanner designed for ultra-high-resolution human brain imaging at 7 Tesla.' *Nat Methods* **20**, 2048–2057

13. Park, Torrisi, Townsend, **Beckett** & Feinberg (2020) 'Highly Accelerated Sub-Millimeter Resolution 3D GRASE with Controlled T2 Blurring in T2-Weighted FMRI at 7T: Feasibility Study' Magnetic resonance in medicine 85 (5): 2490-2506
14. **Beckett,** Dadakova, Townsend, Huber, Park & Feinberg (2020) 'Comparison of BOLD and CBV using 3D EPI and 3D GRASE for cortical layer fMRI at 7T' Magnetic resonance in medicine 84 (6): 3128-3145
15. Park, Chen, **Beckett** & Feinberg (2019) 'Virtual slice concept for improved simultaneous multi‐slice MRI employing an extended leakage constraint' Magnetic Resonance in Medicine, 82 (1): 377-386
16. Feinberg, Vu & **Beckett** (2018) 'Pushing the limits of ultra-high resolution human brain imaging with SMS-EPI demonstrated for columnar level fMRI' Neuroimage, 154: 155-163
17. Vu, **Beckett**, Setsompop & Feinberg (2018) 'Evaluation of SLIce Dithered Enhanced Resolution Simultaneous MultiSlice (SLIDER-SMS) for human fMRI' Neuroimage, 164: 164-171
18. Chen, **Beckett**, Verma & Feinberg (2015) 'Dynamics of respiratory and cardiac CSF motion revealed with real-time simultaneous multi-slice EPI velocity phase contrast imaging' Neuroimage, 122: 281-287
19. Feinberg, **Beckett** & Chen (2013) 'Arterial spin labeling with simultaneous multi‐slice echo planar imaging' Magnetic Resonance in Medicine, 70 (6): 1500-1506
20. Sanchez-Pancheulo, Besle**, Beckett**, Bowtell, Schluppeck & Francis (2012) 'Within-Digit Functional Parcellation of Brodmann Areas of the Human Primary Somatosensory Cortex Using Functional Magnetic Resonance Imaging at 7 Tesla' Journal of Neuroscience, 32 (45): 15815-15822
21. **Beckett**, Peirce, Sanchez-Panchuelo, Francis & Schluppeck (2012) 'Contribution of large scale biases in decoding of direction-of-motion from high-resolution fMRI data in human early visual cortex' Neuroimage, 63 (3): 1623-1632.
22. Bowns & **Beckett** (2010) 'An independent effect of spatial frequency on motion integration reveals orientation resolution' Vision Research, 50 (15): 1445-51.

Conference Abstracts

1. Walker, **Beckett**, Häkkinen, Vu, Huber and Feinberg (2025) Whole-brain, cerebral blood volume weighted imaging of cortical networks using the Next Generation (NexGen) 7T scanner. Neuroscience, San Diego, CA
2. Vu, Avram, Walker, Schilling, Magdoom, **Beckett**, Bunge, Basser and Feinberg (2025) Acquisition Optimization of Ultra-High Resolution Diffusion MRI for the Next-Generation 7T scanner. ISMRM, Honolulu, HI
3. **Beckett**, Park, Häkkinen, Walker, Vu and Feinberg (2025) Development of GRASE Pulse Sequence with larger field of view for Mesoscale functional MRI on the Next Generation (NexGen) 7T scanner. ISMRM, Honolulu, HI
4. Häkkinen, Beckett, Walker, Huber and Feinberg, (2025) Functional imaging of hippocampal layers using VASO on the Next Generation (NexGen) 7T. ISMRM, Honolulu, HI
5. Cao, **Beckett**, Liao, Gao, Walker, Zhu, Kerr, Yang, Feinberg and Setsompop (2025) In-vivo quantitative histology using 0.36-mm MR Fingerprinting: technical development. ISMRM, Honolulu, HI

6. Feinberg, Ma, Walker, **Beckett**, Rattenbacher, Rummert, Dietz, Davids and Boulant, Nicolas (2025) Reassessment of Peripheral Nerve Stimulation thresholds for the Impulse model-optimized asymmetric head gradient coil. ISMRM, Honolulu, HI
7. Ertan, Ma, Walker, **Beckett**, Boulant, Feinberg and Rutt (2025) Subject-specific head gradient PNS prediction using only demographics and head dimensions. ISMRM, Honolulu, HI
8. Avram, Vu, Magdoom, **Beckett**, Feinberg and Basser (2025) Ultrahigh-resolution, whole-brain MAP-MRI in vivo using the NexGen 7T scanner. ISMRM, Honolulu, HI
9. Walker, Vu, Mukherjee, Boulant, Gras, Mauconduit, Massire, Krahn, Liu, **Beckett** and Feinberg, (2025) Universal Pulses Enable a One-Hour Clinical Neuroimaging Protocol at Submillimeter Resolution on the NextGen 7T. ISMRM, Honolulu, HI
10. Zhao, Yang, Guo, Shou, Shao, **Beckett**, Walker, Ma, Feinberg and Wang (2025) Whole-cerebrum Arterial Spin Labeling Perfusion at 7T with isotropic 1 mm and sub-millimeter resolution with 3D TFL-pCASL and Stack-of-Spirals. ISMRM, Honolulu, HI
11. Zhao, Guo, Yang, Shou, Shao, **Beckett**, Walker, Ma, Feinberg and Wang (2025) Whole-cerebrum isotropic 1 mm Arterial Spin Labeling Perfusion at 7T with Improved Temporal Resolution. ISMRM, Honolulu, HI
12. Gunamony, **Beckett**, Boulant, & Feinberg (2024). Evaluation of performance gains combining high‐density receive arrays with transceiver arrays for brain imaging at 7T. ISMRM, Singapore
13. Boulant, Le Ster, Amadon, Aubert, **Beckett**, Belorgey, Bonnelye, Bosch, Brunner, Dilasser, Dubois. (2024) Impact of third order shim coils on gradient-magnet interactions and gradient waveform fidelity. ISMRM, Singapore
14. Boulant, Walker, Samantha, **Beckett,** Vu, Gunamony & Feinberg (2024) Reducing acoustic noise in head-only scanners with padding on the RF coil. ISMRM, Singapore
15. Le Ster, Mauconduit, Vu, Feizollah, Tardif, **Beckett**, Feinberg & Boulant (2024) Comparison at 7T of the Impulse head gradient and whole-body SC72 gradient transfer functions. ISMRM, Singapore
16. Park, Häkkinen, **Beckett**, Walker, Ma & Feinberg (2024) Submillimeter Whole-Brain VASO fMRI using a View-Sharing with Temporal Random Walk at 7 Tesla. ISMRM, Singapore
17. **Beckett**, Ma, Vu, & Feinberg (2023) Pushing limits of spatial resolution in 3D EPI for fMRI on the NexGen 7T scanner. ISMRM, Toronto, CAN
18. **Beckett**, Huber, Ma, Häkkinen, Gunamony & Feinberg (2023) Whole brain layer-fMRI on the NexGen 7T scanner with high performance gradients and 64-channel receiver array. ISMRM, Toronto, CAN
19. Gruber, Stockmann, Mareyam, Chang, Keil, Bilgic, **Beckett**, Feinberg & Wald (2023) Performance Evaluation of a 128-Channel head-only Receiver array at 7 Tesla. ISMRM, Toronto, CAN
20. Ma, **Beckett**, Laub & Feinberg (2023) Utilizing High Performance Gradients to Image Human Brain Arterial Vasculature with High Resolution 7T Time-of-flight MR Angiography. ISMRM, Toronto, CAN

21. Cao, Liao, **Beckett**, Vu, Ma, Schauman, Iyer, Yurt, Tong, Kerr, Feinberg & Setsompop. Rapid mesoscale 3D whole-brain MRF in the Next-Generation 7T brain scanner: challenges and advantages. ISMRM, Toronto, CAN
22. Park, **Beckett**, Hakkinen, Ma & Feinberg (2023) Whole-Brain Sub-Millimeter Resolution fMRI using 3D EPI Accelerated with Temporal Random Walk. ISMRM, Toronto, CAN
23. Huber, Stirnberg, Feinberg, Moeller, Yacoub, De Martino, Ma, Ehses, Gulban, Polimeni, Koiso, Ma, **Beckett**, Stöcker, Bandettini, and Poser (2023) Low spatial-frequency ripple artifacts in layer-fMRI EPI: Identification, cause, and mitigation strategies with Dual-polarity readout. ISMRM, Toronto, CAN
24. **Beckett**, Vu, Ma, Yacoub & Feinberg (2023) Multi-Echo EPI performed on NexGen 7T scanner increases spatial resolution and shortens TE. ISMRM, Toronto, CAN
25. Feinberg, Torrisi, **Beckett**, Stirnberg, Stöcker, Ehses & Huber (2022) Sub-0.1 microliter CBV fMRI on the Next Generation 7T scanner. ISMRM, London, UK
26. Vu, **Beckett**, Torrisi, Ahn, Koehler, Dietz & Feinberg (2022) Evaluation of high resolution diffusion MRI on the next-generation 7T scanner. ISMRM, London, UK
27. **Beckett**, Chen, Gunamony, Vu, Torrisi, Liu, Stockmann & Feinberg (2022) Structural brain imaging with high-resolution 3D MRI on the Next-Generation 7T brain scanner. ISMRM, London, UK
28. **Beckett**, Vu, Ahn, Torrisi, Polimeni, Yacoub, Setsompop, Bilgic, Potthast, Dietz, Chang & Feinberg (2022) Evaluation of Single-Shot EPI with Sub-Millimeter Resolution FMRI on the Next-Generation 7T Brain Scanner. ISMRM, London, UK
29. Vu, **Beckett**, Townsend, Torrisi & Feinberg (2021) Combining BOLD and CBV for enhanced fMRI CNR. ISMRM
30. **Beckett**, Torrisi, Setsompop, Feinberg & Vu (2021) Evaluation of spin-echo generalized Slice Dithered Enhanced Resolution (gSLIDER) for high-resolution fMRI at 3T. ISMRM
31. Feinberg, Dietz, Liu, Setsompop, Mukherjee, Wald, Vu, **Beckett**, Insua, Schröder, & Stocker (2021) Design and development of a next-generation 7T human brain scanner with high-performance gradient coil and dense RF arrays. ISMRM
32. Park, Torrisi, Townsend, **Beckett** & Feinberg (2020) 'Highly accelerated sub-millimeter resolution 3D GRASE with controlled T2 blurring in T2-weighted FMRI at 7T: feasibility study' ISMRM
33. Townsend, Yi, **Beckett**, Leonard, Vu, Chang & Feinberg (2019) 'Non-invasive mapping of acoustic-phonetic speech features in human superior temporal gyrus using ultra-high field 7T fMRI' Neuroscience, Chicago, IL
34. Park, **Beckett** & Feinberg (2019) 'Sub-Millimeter Resolution Compressed Sensing GRASE for T2-Weighted Functional MRI at 7 Tesla' ISMRM, Montreal, CAN
35. Vu, **Beckett**, Feinberg & Mukherjee (2018) 'StImulus Locked K-space shuffling (SILK) for ultra-high resolution fMRI' ISMRM, Paris, FR
36. Vu, **Beckett**, Feinberg & Mukherjee (2018) 'Dual reconstructions of SLIDER-XD for high spatial and temporal resolution resting state fMRI at 7T' ISMRM, Paris, FR

37. Dadakova, **Beckett**, Vu, Polimeni & Feinberg (2018) 'Blood-volume imaging using GRASE-VASO at ultra-high field for layer specific fMRI in human brain' ISMRM, Paris, FR
38. **Beckett,** Vu, Schillak & Feinberg (2017) 'A high density 24 channel array coil extendable to 48 channels for human cortical MRI at 7T' ISMRM, Honolulu, HI
39. **Beckett,** Vu, Schillak & Feinberg 'Array coils for ultra-high resolution columnar imaging in visual cortex' Neuroscience, 2016
40. **Beckett,** Vu, Keil, Setsompop, Wald, Schillak & Feinberg (2016) 'Assessment of coil arrays with small loop diameter at 7T for micron-scale resolution fMRI of human neocortex.' ISMRM, Singapore
41. Feinberg, **Beckett**, Vu & Chen (2016) 'Cine Phase Contrast Simultaneous Multi-Slice Imaging of blood flow and CSF motion.' ISMRM, Singapore
42. Vu, **Beckett**, Setsompop & Feinberg (2016) 'Evaluation of SLIce Dithered Enhanced Resolution Simultaneous Multislice (SLIDER-SMS) for human fMRI at 3T.' ISMRM, Singapore
43. **Beckett**, Chen & Feinberg (2015) 'Novel coil designs for ultra-high resolution cortical fMRI at 7T.' Neuroscience, San Diego, CA
44. **Beckett**, Chen, Verma & Feinberg (2015) 'Velocity phase imaging with simultaneous multi-slice EPI reveals respiration driven motion in spinal CSF' ISMRM, Toronto, CAN
45. **Beckett**, Chen, Vu & Feinberg (2015) 'A novel design 20-channel head coil for cortical imaging with ultra-high resolution' ISMRM, Toronto, CAN
46. Chen, **Beckett** & Feinberg (2015) 'Background suppressed arterial spin labeling with simultaneous multi-slice echo planar imaging' ISMRM, Toronto, CAN
47. Feinberg, Chen & **Beckett** (2014) 'Arterial Spin Labeling with Simultaneous Multi- Slice EPI compared to EPI and 3D GRASE' ISMRM, Milan, IT
48. Chen, **Beckett**, Verma & Feinberg (2014) '7D velocity phase imaging with zoomed simultaneous multi-slice EPI reveals respiration driven motion in brain and CSF' ISMRM, Milan, IT
49. **Beckett**, Peirce, Francis, Sanchez-Panchuelo & Schluppeck (2012) 'Multivariate classification of pattern-motion in human visual cortex using high-field fMRI' Neuroscience, New Orleans, LA
50. **Beckett**, Peirce, Francis & Schluppeck (2011) 'Multivariate classification of motion direction using high-field fMRI' VSS, Naples, FL
51. Bowns & **Beckett** (2010) 'A tool for investigating orientation resolution in the human vision system' ECVP, Lausanne, CH

Invited Talks

'New opportunities and discoveries from NexGen 7T'
CMRR High Field Workshop, 2025, Minneapolis, MN

Professional Activities

Member of International Society for Magnetic Resonance in Medicine
Member of Society for Neuroscience (2012-2018)