



Brian Rutt

Professor of Radiology (Radiological Sciences Lab), Emeritus
Graduate School of Business

CONTACT INFORMATION

- **Alternate Contact**

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Bio

ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, Graduate School of Business
- Member, Bio-X
- Member, Wu Tsai Human Performance Alliance
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Wu Tsai Neurosciences Institute

HONORS AND AWARDS

- Fellow, Canadian College of Physicists in Medicine (1989)
- Fellow, International Society for Magnetic Resonance in Medicine (2008)
- Fellow, American Institute for Medical and Biological Engineering (2009)

PROFESSIONAL EDUCATION

- PDF, Univ. of Calif. at San Francisco , Radiology (1986)
- PhD, University of Toronto , Medical Biophysics (1982)
- MSc, Stanford University , Electrical Engineering (1977)
- BAsC, University of Toronto , Engineering Science (1976)

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

I am interested in the technology and applications of Magnetic Resonance Imaging (MRI).

I have ongoing research projects involving the basic technology of MRI (e.g. insertable gradient coils and RF components), biophysical measurements using MR (e.g., combined T1 and T2 mapping using efficient imaging sequences), basic science applications of MR (e.g., in-vivo detection rare cell

populations using MRI and the use of MR to longitudinally monitor tumor growth deep within tissue starting from a single cell), and clinical applications, especially in cardiovascular disease.

I am presently interested in developing and using in-vivo ultra-high field (e.g. 7 Tesla) Magnetic Resonance techniques to study important human diseases. The increased sensitivity and enhanced contrast mechanisms at these high magnetic field strengths should provide insight to unsolved problems, especially in neuroscience and cancer.

CLINICAL TRIALS

- High-Field MRI Iron-Based Contrast-Enhanced Characterization of Multiple Sclerosis and Demyelinating Diseases, Not Specified

Publications

PUBLICATIONS

- **Alzheimer's Imaging Consortium.** *Alzheimer's & dementia : the journal of the Alzheimer's Association*
Dunne, R. A., Taghavi, H. M., DiGiacomo, P., Maclaren, J., Bell, M., Carlson, M. L., Mormino, E. C., Henderson, V. W., Spincemaille, P., Zhuang, H., Wang, Y., Rutt, B. S., Georgiadis, et al
2025; 21 Suppl 8 (Suppl 8): e109954
- **Biomarkers.** *Alzheimer's & dementia : the journal of the Alzheimer's Association*
Dunne, R. A., Taghavi, H. M., DiGiacomo, P., Maclaren, J., Bell, M., Carlson, M. L., Mormino, E. C., Henderson, V. W., Spincemaille, P., Zhuang, H., Wang, Y., Rutt, B. S., Georgiadis, et al
2025; 21 Suppl 2: e106116
- **Identification of Brain Circuits that Mediate Improvements in Executive Function in Moderate to Severe Traumatic Brain Injury Patients Treated with Deep Brain Stimulation (DBS)**
Hook, M. P., Schiff, N. D., Rutt, B. K., Victor, J. D., Baker, J. L., Saranathan, M., Kuceyeski, A., Giacino, J. T., Shah, S. A., Henderson, J. M., Butson, C. R.
ELSEVIER SCIENCE INC.2025
- **THALAMIC NUCLEI VOLUMETRY AND SENSORIMOTOR FUNCTION IN ADULTS ON THE AUTISM SPECTRUM**
Fung, L., Rutt, B., Choi, E.
SPRINGER NATURE.2024: 365
- **Thalamic deep brain stimulation in traumatic brain injury: a phase 1, randomized feasibility study.** *Nature medicine*
Schiff, N. D., Giacino, J. T., Butson, C. R., Choi, E. Y., Baker, J. L., O'Sullivan, K. P., Janson, A. P., Bergin, M., Bronte-Stewart, H. M., Chua, J., DeGeorge, L., Dikmen, S., Fogarty, et al
2023
- **Stimulation of the thalamus for arousal restoral in temporal lobe epilepsy (START) clinical trial**
Blumenfeld, H., Yadav, T., Zhang, Z., Benjamin, C., DaCosta, K., Christison-Lagay, K., Damisah, E., Derry, A., Gummadavelli, A., Hirsch, L., Oriol, M., Litvinov, B., Spencer, et al
WILEY.2023: 52
- **Thalamic nuclei atrophy at high and heterogenous rates during cognitively unimpaired human aging.** *NeuroImage*
Choi, E. Y., Tian, L., Su, J. H., Radovan, M. T., Tourdias, T., Tran, T. T., Trelle, A. N., Mormino, E., Wagner, A. D., Rutt, B. K.
2022: 119584
- **Differential vulnerability of thalamic nuclei in multiple sclerosis.** *Multiple sclerosis (Houndmills, Basingstoke, England)*
Blyau, S., Koubyr, I., Saranathan, M., Coupé, P., Deloire, M., Charré-Morin, J., Saubusse, A., Zhang, B., Rutt, B., Dousset, V., Brochet, B., Ruet, A., Tourdias, et al
2022: 13524585221114247
- **Comparison between 7 Tesla and 3 Tesla MRI for characterizing orbital lesions.** *Diagnostic and interventional imaging*
Lecler, A., Duron, L., Charlson, E., Kolseth, C., Kossler, A. L., Wintermark, M., Moulin, K., Rutt, B.
2022

- **In vivo high-resolution structural MRI-based atlas of human thalamic nuclei.** *Scientific data*
Saranathan, M., Iglehart, C., Monti, M., Tourdias, T., Rutt, B.
2021; 8 (1): 275
- **Electric field calculation and peripheral nerve stimulation prediction for head and body gradient coils.** *Magnetic resonance in medicine*
Roemer, P. B., Wade, T., Alejski, A., McKenzie, C. A., Rutt, B. K.
2021
- **Minimum electric-field gradient coil design: Theoretical limits and practical guidelines.** *Magnetic resonance in medicine*
Roemer, P. B., Rutt, B. K.
2021
- **Effect of radiofrequency shield diameter on signal-to-noise ratio at ultra-high field MRI.** *Magnetic resonance in medicine*
Zhang, B., Adriany, G., Delabarre, L., Radder, J., Lagore, R., Rutt, B., Yang, Q. X., Ugurbil, K., Lattanzi, R.
2021
- **Association of CSF Biomarkers with Hippocampal-dependent Memory in Preclinical Alzheimer Disease.** *Neurology*
Trelle, A. N., Carr, V. A., Wilson, E. N., Swarovski, M. S., Hunt, M. P., Toueg, T. N., Tran, T. T., Channappa, D. n., Corso, N. K., Thieu, M. K., Jayakumar, M. n., Nadiadwala, A. n., Guo, et al
2021
- **Correlative Microscopy to Localize and Characterize Iron Deposition in Alzheimer's Disease.** *Journal of Alzheimer's disease reports*
Madsen, S. J., DiGiacomo, P. S., Zeng, Y., Goubran, M., Chen, Y., Rutt, B. K., Born, D., Vogel, H., Sinclair, R., Zeineh, M. M.
2020; 4 (1): 525–36
- **White-matter-nulled MPRAGE at 7T reveals thalamic lesions and atrophy of specific thalamic nuclei in multiple sclerosis** *MULTIPLE SCLEROSIS JOURNAL*
Planche, V., Su, J. H., Mournet, S., Saranathan, M., Dousset, V., Han, M., Rutt, B. K., Tourdias, T.
2020; 26 (8): 987–92
- **A within-coil optical prospective motion-correction system for brain imaging at 7T.** *Magnetic resonance in medicine*
DiGiacomo, P. n., Maclaren, J. n., Aksoy, M. n., Tong, E. n., Carlson, M. n., Lanzman, B. n., Hashmi, S. n., Watkins, R. n., Rosenberg, J. n., Burns, B. n., Skloss, T. W., Rettmann, D. n., Rutt, et al
2020
- **Automated thalamic nuclei segmentation using multi-planar cascaded convolutional neural networks.** *Magnetic resonance imaging*
Majdi, M. S., Keerthivasan, M. B., Rutt, B. K., Zahr, N. M., Rodriguez, J. J., Saranathan, M. n.
2020
- **Improved Vim targeting for focused ultrasound ablation treatment of essential tremor: A probabilistic and patient-specific approach.** *Human brain mapping*
Su, J. H., Choi, E. Y., Tourdias, T. n., Saranathan, M. n., Halpern, C. H., Henderson, J. M., Pauly, K. B., Ghanouni, P. n., Rutt, B. K.
2020
- **Hippocampal and cortical mechanisms at retrieval explain variability in episodic remembering in older adults.** *eLife*
Trelle, A. N., Carr, V. A., Guerin, S. A., Thieu, M. K., Jayakumar, M. n., Guo, W. n., Nadiadwala, A. n., Corso, N. K., Hunt, M. P., Litovsky, C. P., Tanner, N. J., Deutsch, G. K., Bernstein, et al
2020; 9
- **Substantia Nigra Volume Dissociates Bradykinesia and Rigidity from Tremor in Parkinson's Disease: A 7 Tesla Imaging Study.** *Journal of Parkinson's disease*
Poston, K. L., Ua Cruadhlaich, M. A., Santoso, L. F., Bernstein, J. D., Liu, T., Wang, Y., Rutt, B., Kerchner, G. A., Zeineh, M. M.
2020; 10 (2): 591–604
- **SMS MUSSELS: A navigator-free reconstruction for simultaneous multi-slice-accelerated multi-shot diffusion weighted imaging.** *Magnetic resonance in medicine*
Mani, M., Jacob, M., McKinnon, G., Yang, B., Rutt, B., Kerr, A., Magnotta, V.
2019
- **Thalamus Optimized Multi Atlas Segmentation (THOMAS): fast, fully automated segmentation of thalamic nuclei from structural MRI** *NEUROIMAGE*

- Su, J. H., Thomas, F. T., Kasoff, W. S., Tourdias, T., Choi, E., Rutt, B. K., Saranathan, M.
2019; 194: 272–82
- **IMPULSE: A scalable algorithm for design of minimum specific absorption rate parallel transmit RF pulses** *MAGNETIC RESONANCE IN MEDICINE*
Pendse, M., Stara, R., Khalighi, M., Rutt, B.
2019; 81 (4): 2808–22
 - **Fast, fully automated segmentation of thalamic nuclei from structural MRI.** *NeuroImage*
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 - **White-matter-nulled MPRAGE at 7T reveals thalamic lesions and atrophy of specific thalamic nuclei in multiple sclerosis.** *Multiple sclerosis (Houndmills, Basingstoke, England)*
Planche, V., Su, J. H., Mournet, S., Saranathan, M., Dousset, V., Han, M., Rutt, B. K., Tourdias, T.
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 - **Close Association of Myeloperoxidase-Producing Activated Microglia with Amyloid Plaques in Hypercholesterolemic Rabbits.** *Journal of Alzheimer's disease : JAD*
Chen, Y., Wang, T., Rogers, K. A., Rutt, B. K., Ronald, J. A.
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 - **Hippocampal CA1 subfield predicts episodic memory impairment in Parkinson's disease.** *NeuroImage. Clinical*
La, C. n., Linortner, P. n., Bernstein, J. D., Ua Cruadhlaioich, M. A., Fenesy, M. n., Deutsch, G. K., Rutt, B. K., Tian, L. n., Wagner, A. D., Zeineh, M. n., Kerchner, G. A., Poston, K. L.
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 - **Close Association of Myeloperoxidase-Producing Activated Microglia with Amyloid Plaques in Hypercholesterolemic Rabbits** *JOURNAL OF ALZHEIMERS DISEASE*
Chen, Y., Wang, T., Rogers, K. A., Rutt, B. K., Ronald, J. A.
2019; 67 (4): 1221–34
 - **Hippocampal CA1 subfield predicts episodic memory impairment in Parkinson's disease** *NEUROIMAGE-CLINICAL*
La, C., Linortner, P., Bernstein, J. D., Cruadhlaioich, M., Fenesy, M., Deutsch, G. K., Rutt, B. K., Tian, L., Wagner, A. D., Zeineh, M., Kerchner, G. A., Poston, K. L.
2019; 23
 - **MR susceptibility contrast imaging using a 2D simultaneous multi-slice gradient-echo sequence at 7T.** *PLoS one*
Bian, W., Kerr, A. B., Tranvinh, E., Parivash, S., Zahneisen, B., Han, M. H., Lock, C. B., Goubran, M., Zhu, K., Rutt, B. K., Zeineh, M. M.
2019; 14 (7): e0219705
 - **IMPULSE: A scalable algorithm for design of minimum specific absorption rate parallel transmit RF pulses.** *Magnetic resonance in medicine*
Pendse, M., Stara, R., Mehdi Khalighi, M., Rutt, B.
2018
 - **Characterization of Magneto-Endosymbionts as MRI Cell Labeling and Tracking Agents** *MOLECULAR IMAGING AND BIOLOGY*
Brewer, K. D., Spitler, R., Lee, K. R., Chan, A. C., Barrozo, J. C., Wakeel, A., Foote, C. S., Machtaler, S., Rioux, J., Willmann, J. K., Chakraborty, P., Rice, B. W., Contag, et al
2018; 20 (1): 65–73
 - **Comparison of new element designs for combined RF-Shim arrays at 7 T.** *Concepts in magnetic resonance. Part B, Magnetic resonance engineering*
Winkler, S. A., Warr, P. A., Stockmann, J. P., Mareyam, A., Keil, B., Watkins, R. D., Wald, L. L., Rutt, B. K.
2018; 48B (1)
 - **Cell Labeling with Magneto-Endosymbionts and the Dissection of the Subcellular Location, Fate, and Host Cell Interactions** *MOLECULAR IMAGING AND BIOLOGY*
Lee, K. R., Wakeel, A., Chakraborty, P., Foote, C. S., Kajiura, L., Barrozo, J. C., Chan, A. C., Bazarov, A. V., Spitler, R., Kutny, P. M., Denegre, J. M., Taft, R. A., Seemann, et al
2018; 20 (1): 55–64

- **Closing the loop on impulsivity via nucleus accumbens delta-band activity in mice and man.** *Proceedings of the National Academy of Sciences of the United States of America*
Wu, H. n., Miller, K. J., Blumenfeld, Z. n., Williams, N. R., Ravikumar, V. K., Lee, K. E., Kakusa, B. n., Sacchet, M. D., Wintermark, M. n., Christoffel, D. J., Rutt, B. K., Bronte-Stewart, H. n., Knutson, et al
2018; 115 (1): 192–97
- **In Vivo MRI of Amyloid Plaques in a Cholesterol-Fed Rabbit Model of Alzheimer's Disease** *JOURNAL OF ALZHEIMERS DISEASE*
Chen, Y., Lim, P., Rogers, K. A., Rutt, B. K., Ronald, J. A.
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- **Individual differences in associative memory among older adults explained by hippocampal subfield structure and function** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
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2017; 114 (45): 12075–80
- **PKM2 activation sensitizes cancer cells to growth inhibition by 2-deoxy-D-glucose** *ONCOTARGET*
Tee, S., Park, J., Hurd, R. E., Brimacombe, K. R., Boxer, M. B., Massoud, T. F., Rutt, B. K., Spielman, D. M.
2017; 8 (53): 90959–68
- **PKM2 activation sensitizes cancer cells to growth inhibition by 2-deoxy-D-glucose.** *Oncotarget*
Tee, S. S., Park, J. M., Hurd, R. E., Brimacombe, K. R., Boxer, M. B., Massoud, T. F., Rutt, B. K., Spielman, D. M.
2017; 8 (53): 90959-90968
- **Thalamic alterations remote to infarct appear as focal iron accumulation and impact clinical outcome.** *Brain*
Kuchcinski, G., Munsch, F., Lopes, R., Bigourdan, A., Su, J., Sagnier, S., Renou, P., Pruvo, J., Rutt, B. K., Dousset, V., Sibon, I., Tourdias, T.
2017
- **A Degenerate Birdcage with Integrated Tx/Rx Switches and Butler Matrix for the Human Limbs at 7 T** *APPLIED MAGNETIC RESONANCE*
Stara, R., Tiberi, G., Morsani, F., Symms, M., Fantacci, M. E., Marletta, M., Zampa, V., Pendse, M., Retico, A., Rutt, B. K., Tosetti, M.
2017; 48 (3): 307-326
- **Feasibility of 7T MRI for Imaging Fascicular Structures of Peripheral Nerves.** *Muscle & nerve*
Yoon, D. n., Biswal, S. n., Rutt, B. n., Lutz, A. n., Hargreaves, B. n.
2017
- **Gradient and shim technologies for ultra high field MRI.** *NeuroImage*
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2016
- **On the accurate analysis of vibroacoustics in head insert gradient coils.** *Magnetic resonance in medicine*
Winkler, S. A., Alejski, A., Wade, T., McKenzie, C. A., Rutt, B. K.
2016
- **Direct SAR mapping by thermoacoustic imaging: A feasibility study.** *Magnetic resonance in medicine*
Winkler, S. A., Picot, P. A., Thornton, M. M., Rutt, B. K.
2016
- **In Vivo 7T MR Quantitative Susceptibility Mapping Reveals Opposite Susceptibility Contrast between Cortical and White Matter Lesions in Multiple Sclerosis** *AMERICAN JOURNAL OF NEURORADIOLOGY*
Bian, W., Tranvinh, E., Tourdias, T., Han, M., Liu, T., Wang, Y., Rutt, B., Zeineh, M. M.
2016; 37 (10): 1808-1815
- **MRI and histopathologic study of a novel cholesterol-fed rabbit model of xanthogranuloma.** *Journal of magnetic resonance imaging*
Chen, Y., Hamilton, A. M., Parkins, K. M., Wang, J., Rogers, K. A., Zeineh, M. M., Rutt, B. K., Ronald, J. A.
2016; 44 (3): 673-682
- **Biexponential longitudinal relaxation in white matter: Characterization and impact on T1 mapping with IR-FSE and MP2RAGE.** *Magnetic resonance in medicine*
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2016
- **Molecular Magnetic Resonance Imaging of Tumor Response to Therapy** *SCIENTIFIC REPORTS*
Shuhendler, A. J., Ye, D., Brewer, K. D., Bazalova-Carter, M., Lee, K., Kempen, P., Wittrup, K. D., Graves, E. E., Rutt, B., Rao, J.
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- **Activated iron-containing microglia in the human hippocampus identified by magnetic resonance imaging in Alzheimer disease.** *Neurobiology of aging*
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2015; 36 (9): 2483-2500
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2015; 93 (9): 991-1001
- **Ultra-high resolution in-vivo 7.0 T structural imaging of the human hippocampus reveals the endfolial pathway** *NEUROIMAGE*
Parekh, M. B., Rutt, B. K., Purcell, R., Chen, Y., Zeineh, M. M.
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- **Optimization of White-Matter-Nulling Magnetization Prepared Rapid Gradient Echo (MP-RAGE) Imaging** *MAGNETIC RESONANCE IN MEDICINE*
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- **Practical Methods for Improving B-1(+) Homogeneity in 3 Tesla Breast Imaging** *JOURNAL OF MAGNETIC RESONANCE IMAGING*
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- **Characterization of magnetotactic bacteria as MRI cell labeling and tracking agents**
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Ye, D., Pandit, P., Kempen, P., Lin, J., Xiong, L., Sinclair, R., Rutt, B., Rao, J.
2014; 25 (8): 1526-1536
- **Redox-Triggered Self-Assembly of Gadolinium-Based MRI Probes for Sensing Reducing Environment** *BIOCONJUGATE CHEMISTRY*
Ye, D., Pandit, P., Kempen, P., Lin, J., Xiong, L., Sinclair, R., Rutt, B., Rao, J.
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- **Ultrahigh-resolution imaging of the human brain with phase-cycled balanced steady-state free precession at 7 T.** *Investigative radiology*
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Saranathan, M., Tourdias, T., Kerr, A. B., Bernstein, J. D., Kerchner, G. A., Han, M. H., Rutt, B. K.
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2014; 5 (10): 3845-3852
- **Visualization of intra-thalamic nuclei with optimized white-matter-nulled MPRAGE at 7 T** *NEUROIMAGE*
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- **Efficient bloch-siegert B1 (+) mapping using spiral and echo-planar readouts.** *Magnetic resonance in medicine*
Saranathan, M., Khalighi, M. M., Glover, G. H., Pandit, P., Rutt, B. K.
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Kerchner, G. A., Bernstein, J. D., Fenesy, M. C., Deutsch, G. K., Saranathan, M., Zeineh, M. M., Rutt, B. K.
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- **Adiabatic RF pulse design for Bloch-Siegert B-1(+) mapping** *MAGNETIC RESONANCE IN MEDICINE*
Khalighi, M. M., Rutt, B. K., Kerr, A. B.
2013; 70 (3): 829-835
- **Flip angle mapping with the accelerated 3D look-locker sequence.** *Magnetic resonance in medicine : official journal of the Society of Magnetic Resonance in Medicine / Society of Magnetic Resonance in Medicine*
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Tardif, J., Spence, J. D., Heinonen, T. M., Moody, A., Pressacco, J., Frayne, R., L'Allier, P., Chow, B. J., Friedrich, M., Black, S. E., Fenster, A., Rutt, B., Beanlands, et al
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2012; 68 (5): 1553-1562
- **Hippocampal CA1 apical neuropil atrophy and memory performance in Alzheimer's disease** *NEUROIMAGE*
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