Robert Jones

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EDUCATION

University of Michigan
Ann Arbor, MI

PhD Student, Electrical and Computer Engineering
Aug 2022 - Present

- **Major**: Signal & Image Processing and Machine Learning

Bates College
Lewiston, ME

Bachelor of Arts, Double Major in Biological Chemistry and Mathematics
Sept 2013 - May 2017

- **Senior Thesis, Biological Chemistry**: "Investigating the Role of *Borrelia burgdorferi* Ribonucleases in the Transmission of Lyme Disease." Advisor: Prof. Paula Schlax
- **Senior Thesis, Mathematics**: "An Examination of a Theorem from Jacobson." Advisor: Prof. Martin Montgomery

RESEARCH EXPERIENCE

Laboratory for Computational Neuroimaging, Athinoula A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital
Boston, MA

Research Technician
Aug 2017 - Aug 2021

Data Analyst
Sept 2021 - Aug 2022

- Actively assisted PIs and post-docs in preparing results, papers and grants for multiple concurrent research projects
- Collected, processed and analyzed ex vivo and in vivo MRI and optical imaging data
- Developed and optimized software tools for analysis of imaging data
- Prepared conference abstracts, journal publications and preliminary results for grant applications

Boston Adolescent Neuroimaging of Depression and Anxiety (BANDA) Study
Boston, MA

MRI study site coordinator
June 2018 - Aug 2022

- Performed 2 hour MRI scans on over 150 adolescent study participants
- Responsible for quality assurance of imaging data and management of IRB protocol

IronTract Challenge, MICCAI 2019
Boston, MA

Organizer, Imaging Team
Apr 2019 - Oct 2019

- Prepared data and analysis tools for open challenge assessing diffusion MRI tractography algorithms

FreeSurfer Boston Course
Boston, MA

Course Staff
Spring 2019, Fall 2019

- Educated participants on the use FreeSurfer software tools

Bates College, Department of Chemistry
Lewiston, ME

Undergraduate Research Assistant
Sept 2016 - Apr 2017

- Investigated the role of ribonucleases, mRNA decay and host-specific differential gene expression in *Borrelia burgdorferi*, the causative agent of Lyme disease
- Performed Western blots to test the efficacy of primary antibodies developed to target *B. burgdorferi* ribonucleases

PUBLICATIONS

C. Maffei, G. Girard, K. Schilling, B. Aydogan, N. Aduluru, A. Zhylka, Y. Wu, M. Mancini, A. Hamamci, A. Sarica, A. Telliac, S. Baete, D. Karimi, F. Yeh, M. Yildiz, A. Gholipour, Y. Bihan-Poudec, B. Hiba, An. Quattrone, Al. Quattrone, T. Boshkovski, N. Stikov, P.T. Yap, A. De Luca, J. Pluim, A. Leemans, V. Prabhakaran, B.B. Bendlin, A. Alexander, B. Landman, E. Canales-Rodriguez, M. Barakovic, J. Rafael-Patino, T. Yu, G. Rensonnet, S. Schiavi, A. Daducci, M. Pizzolato, E. Fischi-Gomez, J.P. Thiran, G. Dai, G. Grisot, N. Lazovski, S. Puch, M. Ramos, P. Rodrigues, V. Prchkovska, **R. Jones**, J. Lehman, S. Haber, A. Yendiki. 2022. "Insights from the IronTract challenge: optimal methods for mapping brain pathways from multi-shell diffusion MRI." *NeuroImage*, 257, Pp. 119327. DOI: 10.1016/j.neuroimage.2022.119327.

N.A. Hubbard, R.P. Auerbach, V. Siless, N. Lo, I.R. Frosch, D.E. Clark, **R. Jones**, R. Kremens, M. Pinaire, F. Vaz De Souza, S. Ghosh, A. Henin, S.G. Hofmann, D.A. Pizzagalli, I.M. Rosso, A. Yendiki, S. Whitfield-Gabrieli, J.D.E. Gabrieli. 2022. "Connectivity patterns evoked by fearful faces demonstrate reduced flexibility across a shared dimension of adolescent anxiety and depression." *Clinical Psychological Science*, p. 21677026221079628. DOI: 10.1177/21677026221079628.

C. Liu, W. Ammon, **R. Jones**, J. Nolan, R. Wang, S. Chang, M. P. Frosch, A. Yendiki, D. A. Boas, C. Magnain, B. Fischl, H. Wang. 2022. "Refractive-index matching enhanced polarization sensitive optical coherence tomography quantification in human brain tissue." *Biomedical Optics Express*, 13(1), Pp. 358-372. 10.1364/BOE.443066.

C. Maffei, C. Lee, M. Planich, M. Ramprasad, N. Ravi, D. Trainor, Z. Urban, M. Kim, **R. Jones**, A. Henin, S.G. Hofmann, D.A. Pizzagalli, R.P. Auerbach, J.D.E. Gabrieli, S. Whitfield-Gabrieli, D.N. Greve, S.N. Haber, A. Yendiki. 2021. "Using diffusion MRI data acquired with ultra-high gradients to improve tractography in routine-quality data." *NeuroImage*, 245, Pp. 118706. DOI: 10.1016/j.neuroimage.2021.118706.

R. Jones, C. Maffei, J. Augustinack, B. Fischl, H. Wang, B. Bilgic, A. Yendiki. 2021. "High-fidelity approximation of grid- and shell-based sampling schemes from undersampled DSI using compressed sensing: Post mortem validation." *NeuroImage*, 244, Pp. 118621. DOI: 10.1016/j.neuroimage.2021.118621.

R.P. Auerbach, D. Pagliaccio, N.A. Hubbard, I. Frosch, R. Kremens, E. Cosby, **R. Jones**, V. Siless, N. Lo, A. Henin, S.G. Hofmann. 2021. "Reward-Related Neural Circuitry in Depressed and Anxious Adolescents: A Human Connectome Project." *Journal of the American Academy of Child & Adolescent Psychiatry.* DOI: 10.1016/j.jaac.2021.04.014.

R. Jones, G. Grisot, J. Augustinack, C. Magnain, D. A. Boas, B. Fischl, H. Wang, A. Yendiki. 2020. "Insight into the fundamental trade-offs of diffusion MRI from polarization-sensitive optical coherence tomography in ex vivo human brain." *NeuroImage*, 214, Pp. 116704. DOI: 10.1016/j.neuroimage.2020.116704.

V. Siless, N. A. Hubbard, **R. Jones**, J. Wang, N. Lo, C. C.C. Bauer, M. Goncalves, I. Frosch, D. Norton, G. Vergara, K. Conroy, F. Vaz De Souza, I. M. Rosso, A. H. Wickham, E. A. Cosby, M. Pinaire, D. Hirshfeld-Becker, D. A. Pizzagalli, A. Henin, S. G. Hofmann, R. P. Auerbach, S. Ghosh, J. Gabrieli, S. Whitfield-Gabrieli, A. Yendiki. 2020. "Image acquisition and quality assurance in the boston adolescent neuroimaging of depression and anxiety study." *NeuroImage Clin.*, 26, Pp. 102242. DOI: 10.1016/j.nicl.2020.102242.

N. A. Hubbard, V. Siless, I. Frosch, M. Goncalves, N. Lo, C. Bauer, K. Conroy, E. Cosby, A. Hay, **R. Jones**, M. Pinaire, F. Vaz De Souza, G. Vergara, S. Ghosh, A. Henin, D. R. Hirshfeld-Becker, S. Hofmann, I. M. Rosso, R. P. Auerbach, D. Pizzagalli, A. Yendiki, JDE Gabrieli, S. Whitfield-Gabrieli. 2020. "Brain Function and Clinical Characterization in a Human Connectome Adolescent Depression and Anxiety Study." *NeuroImage Clin.*, 27, Pp. 102240. DOI: 10.1016/j.nicl.2020.102240.

PREPRINTS

C.J. Liu, W. Ammon, **R. Jones**, J.C. Nolan, D. Gong, C. Maffei, B.L. Edlow, J.C. Augustinack, C. Magnain, A. Yendiki, M. Villiger, B. Fischl, H. Wang. 2023. "Quantitative imaging of three-dimensional fiber

orientation in the human brain via two illumination angles using polarization-sensitive optical coherence tomography." *bioRxiv* [Preprint]. DOI: 10.1101/2023.10.20.563298.

Conference Presentations

R. Jones, C. Maffei, Q. Tian, S. Huang, V. Sundaresan, A. Yendiki. 2022. "In vivo demonstration of generalized anisotropy profiles for resolving boundaries between subcortical gray and white matter." In ISMRM (**oral presentation**, summa cum laude).

R. Jones, G. Grisot, J. Augustinack, D.A. Boas, B. Fischl, H. Wang, B. Bilgic, A. Yendiki. 2019. "Validation of DSI compressed sensing reconstruction in ex vivo human brain." In ISMRM (**oral presentation**).

Conference papers and abstracts

H. Veeraraghavan, **R. Jones**, D. You, N. Tyagi, J.M. Balter. 2024. "Kalman filter-based tracking of abdominal organ motions along the medial axis." In MRinRT.

C. Maffei, G. Girard, K. G. Schilling, D. B. Aydogan, N. Adluru, A. Zhylka, Y. Wu, M. Mancini, A. Hamamci, A. Sarica, D. Karimi, F.-C. Yeh, M.E. Yildiz, A. Gholipour, A. Quattrone, A. Quattrone, P.-T. Yap, A. de Luca, J. Pluim, A. Leemans, V. Prabhakaran, B. B. Bendlin, A. L. Alexander, B. A. Landman, E.J. Canales-Rodríguez, M. Barakovic, J. Rafael-Patino, T. Yu, G. Rensonnet, S. Schiavi, A. Daducci, M. Pizzolato, E. Fischi-Gomez, J.-P. Thiran, G. Dai, G. Grisot, N. Lazovski, S. Puch, M. Ramos, P. Rodrigues, V. Prchkovska, **R. Jones**, J. Lehman, S. Haber, and A. Yendiki. 2021. "New insights from the IronTract challenge: Simple post-processing enhances the accuracy of diffusion tractography." In ISMRM.

M. Kim, D. Pagliaccio, **R. Jones**, A. Henin, S.G. Hofmann, D.A. Pizzagalli, J.D.E. Gabrieli, R.P. Auerbach, S. Whitfield-Gabrieli, A. Yendiki. 2021. "Multivariate associations of brain function, structure, and mental health disorders in adolescents." In OHBM.

R. Jones, C. Maffei, Q. Fan, J. Augustinack, B. Wichtmann, A. Nummenmaa, S. Huang, and A. Yendiki. 2021. "Validation of between-bundle differences and within-bundle continuity of microstructural indices in ex vivo human brain tissue." In ISMRM.

R. Jones, Q. Tian, C. Maffei, J. Augustinack, A. Nummenmaa, S. Huang, and A. Yendiki. 2021. "Generalized anisotropy profiles distinguish cortical and subcortical structures in ex vivo diffusion MRI." In ISMRM.

H. Wang, **R. Jones**, D. Varadarajan, C. Magnain, A. Yendiki, J.R. Polimeni, B. Fischl. 2021. "Optical property revealing vascular network and pathological lesion in human brain tissues with as-PSOCT." In Proc. SPIE BiOS 11629.

A. Yendiki, **R. Jones**, A. Dalca, H. Wang, and B. Fischl. 2020. "Towards taking the guesswork (and the errors) out of diffusion tractography." In ISMRM.

C. Maffei, **R. Jones**, C. Johnson, H. Wang, A. Yendiki. 2020. "Investigating SLFI anatomy using high-resolution dMRI." In ISMRM.

C. Maffei, G. Girard, K. G. Schilling, N. Adluru, D. B. Aydogan, A. Hamamci, F.-C. Yeh, M. Mancini, Y. Wu, A. Sarica, A. Teillac, S. H. Baete, D. Karimi, Y.-C. Lin, F. Boada, N. Richard, B. Hiba, A. Quattrone, Y. Hong, D. Shen, P.-T. Yap, T. Boshkovski, J. S. W. Campbell, N. Stikov, G. B. Pike, B. B. Bendlin, A. L. Alexander, V. Prabhakaran, A. Anderson, B. A. Landman, E. J. Z. Canales-Rodríguez, M. Barakovic, J. Rafael-Patino, T. Yu, G. Rensonnet, S. Schiavi, A. Daducci, M. Pizzolato, E. Fischi-Gomez, J.-P. Thiran, G. Dai, G. Grisot, N. Lazovski, A. Puente, M. Rowe, I. Sanchez, V. Prchkovska, **R. Jones**, J. Lehman, S. Haber, and A. Yendiki. 2020. "The IronTract challenge: Validation and optimal tractography methods for the HCP diffusion acquisition scheme." In ISMRM.

N.A. Hubbard, N. Lo, M. Goncalves, I. Frosch, V. Siless, C.C. Bauer, K. Conroy, E. Cosby, A. Hay, **R. Jones**, M. Pinaire, F. Vaz De Souza, G. Vergara, A. Henin, D. Hirshfeld-Becker, S. Hofmann, D. Pizzagalli, A. Yendiki, R. Auerbach, S. Ghosh, J.D.E. Gabrieli, S. Whitfield-Gabrieli. 2019. "Cognitive control-related brain activation patterns predict adolescent anhedonia symptoms." In APS Annual Convention.

G. Grisot, **R. Jones**, J. Augustinack, D. Boas, B. Fischl, H. Wang, A. Yendiki. 2018. "Validation of high angular resolution diffusion MRI models in the human brain with PS-OCT." In OHBM.

Technical Competencies

- Matlab, Python, Julia, Linux, ImageJ, LaTeX, Word, PowerPoint, Excel

Memberships

International Society for Magnetic Resonance in Medicine (ISMRM)
Trainee Member   *2019 - 2023*

Sigma Xi, The Scientific Research Honors Society
Associate Member, Southern Maine Chapter   *2017*

Training

Computational Machine Learning for Scientists and Engineers
University of Michigan, Continuum Jumpstart   *Winter 2020*
- Cloud-based interactive course on understanding, designing and employing machine learning algorithms and neural networks.

HST.583: Functional Magnetic Resonance Imaging: Data Acquisition and Analysis
Harvard-MIT Health Sciences and Technology   *Fall 2019*
- Graduate-level course on design, conduct and interpretation of fMRI studies in the human brain, including physics of image encoding, mechanisms of anatomical and functional contrasts, and physiological basis of fMRI signals

Diffusion & Microstructure: Fundamentals & Frontiers
Educational Session, ISMRM 27th Annual Meeting, Montreal   *Spring 2019*
- Foundations of diffusion physics and experimental design, overview of image artifacts and diffusion signal models and representations

HST.584: Magnetic Resonance Analytic, Biochemical, and Imaging Techniques
Harvard-MIT Health Sciences and Technology   *Spring 2018*
- Graduate-level course on NMR theory, detailed study of NMR imaging techniques including image reconstruction, image contrast, flow and real-time imaging, and hardware design considerations

Basic Biostatistics for Clinical Research
MGH Division of Clinical Research   *Winter 2018*
- Introduction to biostatistical concepts and applications to issues in clinical investigation

References

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Bruce Fischl, Professor in Radiology
Harvard Medical School
(617)726-4897, fischl@nmr.mgh.harvard.edu

Hui Wang, Assistant Professor in Radiology
Harvard Medical School
(617)726-9338, hwang47@mgh.harvard.edu

Martin Montgomery, Visiting Assistant Professor of Mathematics
Bates College
(207)786-6146, mmontgom@bates.edu