CURRICULUM VITAE
MATHEWS JACOB
mjacob@virginia.edu

EMPLOYMENT

Aug 2024-	: Professor	Dept. ECE, Univ. of Virginia
2019-Aug 2024	: Professor	Depts. ECE, BME, Radiation Oncology, Radiology, Univ. of Iowa
2015-2019	: Associate Professor	Depts. ECE, BME, Radiation Oncology, Radiology, Univ. of Iowa
2011-2015	: Assistant Professor	Depts. ECE, BME, Radiation Oncology, Radiology, Univ. of Iowa
2007-2011	: Assistant Professor	Depts. ECE, BME, Radiology, Univ. of Rochester
2003-2006	: Beckman Post-doc Fellow	University of Illinois at Urbana Champaign
1999-2003	: PhD in Biomedical Engineering	Biomedical Imaging Group, Swiss Federal Institute of Technology

ACADEMIC & PROFESSIONAL HONORS

2024	: Finalist, Best Paper Award, IEEE ISBI
2024	: Chair, Biomedical Imaging and Signal Processing TC, IEEE
2022-2024	: Elected Vice Chair, Biomedical Imaging and Signal Processing TC, IEEE
2022	: Senior Author, Runner up, Best Paper Award, IEEE ISBI
2021	: Fellow, IEEE
2021	: Faculty Excellence Award, University of Iowa
2021	: Senior Author, Best Paper Award, IEEE ISBI, 2021
2020	: General Chair, IEEE International Symposium on Biomedical Imaging, 2020
2019	: Senior Author, Best Machine Learning Paper in IEEE ISBI, 2019
2016-2020	: Associate Editor, IEEE Transactions on Computational Imaging
2015	: Senior Author, Best paper Award, IEEE ISBI 2014
2014	: Senior Author, Best paper in the BioImaging & Signal Processing at ICASSP 2014
2011	: American Cancer Society New Investigator Award
2009	: CAREER Award, National Science Foundation
2009-Present	: Associate Editor, IEEE Transactions on Medical Imaging
2008	: Junior Lecturer, IEEE EMBS International Summer School on Biomedical Imaging
2003-2006	: Beckman Fellowship, University of Illinois at Urbana Champaign
1996	: 30th rank in National GATE exams (~40,000 students)
1996	: Second rank in BTech outgoing exams from Calicut University (~240 students)

TEACHING

2024: Instructor: Applied Machine Learning, Machine Learning

2023: Instructor: Applied Machine Learning, Machine Learning

2022: Instructor: Applied Machine Learning, Machine Learning

2021: Instructor: Applied Machine Learning, Machine Learning

2020: Instructor: Linear Systems, Machine Learning

2019: Instructor: Machine Learning, Digital Image Processing

2018: Instructor: Computers in Engineering, Advanced Image Processing, Pattern Recognition

2017: Instructor: Machine Learning

2016: Instructor: Computers in Engineering, Digital Signal processing, Computers in Engineering

2015: Instructor: Pattern Recognition, Advanced Image Processing, Computers in Engineering

2014: Instructor: MR Imaging Systems, Linear Systems 1, Computers in Engineering

2013: Instructor: Pattern Recognition, Computers in Engineering

2012: Instructor: Computers in Engineering

2011: Instructor: Digital Signal Processing

2010: Biomedical Computation

2009: Biomedical Computation

DEPARTMENTAL SERVICE

- 9/13 - present: Graduate committee, Department of ECE, University of Iowa
- 9/12 - 9/13: Undergraduate committee, Department of ECE, University of Iowa
- 9/11 - 9/12: Graduate committee, Department of ECE, University of Iowa
- 9/07- 9/11: Member: Graduate committee, University of Rochester
- 9/07 - 9/11: Member, Graduate Admission Committee, University of Rochester

COLLEGE SERVICE

- 9/21 -Present: Chair, Promotion and Tenure Committee, College of Engineering, University of Iowa
- 9/19 -Present: Deans Advisory Committee, College of Engineering, University of Iowa
- 9/09 -9/11: Outstanding dissertation committee, College of Engineering, Univ. Rochester

UNIVERSITY SERVICE

- 9/16 - Present: Steering Committee, Aging Brain and Mind Initiative
- 9/11 - Present: Research Advisory Committee, Magnetic Resonance Research Facility

PROFESSIONAL SERVICE

International

- Charter Member, Emerging Imaging Technologies in Neuroscience, NIH, 2023-2027
- Vice Chair and Chair Elect, Biomedical Imaging and Signal Processing TC, IEEE, 2022-Present
- Co-Chair, IEEE Biomedical Imaging and Signal Processing Conference subcommittee, 2021- Present
- Member of Steering Committee, IEEE International Symposium on Biomedical Imaging, 2021-Present
- Guest Editor, IEEE Transactions on Medical Imaging, Special issue on Deep Learning for Image Reconstruction
- Member of Steering Committee, IEEE Transactions on Medical Imaging, 2020-2022
- General Chair, IEEE International Symposium on Biomedical Imaging, 2020, Iowa City
- Lead Guest Editor, IEEE Signal Processing Magazine, 2020, Special Issue on Computational MRI
- Steering Committee Member, IEEE Transactions on Medical Imaging, 2017-present
- Associate Editor, IEEE Transactions on Computational Imaging, 2012-present
- Associate Editor, IEEE Transactions on Medical Imaging, 2009-present
- Member, IEEE Special Interest Group on Computational Imaging, 2016-present
- Member, IEEE TC on Bioimaging and Signal Processing, 2010-2016
- Technical Program Committee, ISBI 2016, Prague
- Technical Program Committee, ICSSP 2011, Calicut, India
- Organizer, Special Session on MR imaging at Wavelets and Sparsity, 2017,2015, 2013
- 2010-present Track Chair, IEEE International Conf. Image Processing (ICIP)
- Track Chair, IEEE International Conference on Image Processing (ICIP) 2010, Hongkong
- Associate Editor, Invited Sessions, IEEE EMBS, 2010, Minneapolis
- Panel Member, Neuroscience and Opthalmic Imaging Technologies, National Institute of Health

Study sections

- Charter Member, Emerging Imaging Technologies in Neuroscience, NIH, 2023-2027
- NIH Emerging Imaging Technologies in Neuroscience, Feb 2021,Jun 2022,Oct 2022
- NIH P41 review panel, 2021
- NIH P41 review panel, 2020
- NIH study section, Feb 2019
- National competence center for Biomedical Imaging, Switzerland, 2010
- Image and Signal Processing panel, NSF-CCF, 2010
- Fondecyt (National Fund for Science & Technology, Chile), 2009
- Sensing and Biomedical Engineering panel, NSF-CBET, 2009
- MRI-R2 panel, NSF-CBET, 2009

Regular reviewer of

IEEE Transactions on Medical Imaging (TMI), Image Processing (T-IP), Signal Processing (T-SP), Pattern Analysis and Machine Intelligence (TPAMI), Biomedical Engineering (TBME), IEEE Signal Processing Letters, Magnetic Resonance

in Medicine (MRM), Signal Processing, International Journal of Computer Vision (IJCV), Journal of Mathematical Imaging and Vision (JMIV) Advances in Computational Mathematics (ACM)

JUNIOR FACULTY AND POST-DOC MENTORING

1. **Dr. Prashant Nagpal, MD** (Resident & Asst Prof), Currently Section Chief, Cardiovascular MRI, Univ. Wisconsin
2. **Dr. Sarv Priya, MD,** (Resident & Asst Prof), Currently Assistant Professor of Radiology, University of Iowa
3. **Dr. Qing Zou, PhD** (Post-doc), Currently Tenure Track Assistant Professor, Univ. Texas South Western
4. **Dr. Sajan Lingala, PhD** (Grad. student & Assistant Prof), Currently Tenure Track Assistant Professor, Univ. Iowa
5. **Dr. Hemant Aggarwal, PhD** (Post-doc), Currently Senior Scientist, GE research
6. **Dr. Abdul Ahmed, PhD** (Post-doc), Currently MRI Development Engineer, Philips Medical Systems
7. **Dr. Ankit Parekh, PhD** (Post-doc), Currently Assistant Professor, Icahn School of Medicine, Mt Sinai
8. **Dr. Ramin Eslami, PhD** (Post-doc), Currently at Sony Electronics

PHD DISSERTATIONS SUPERVISED

1. **Yan Chen**, expected in Fall 2025
2. **Joseph Kettlekamp**, expected in Fall 2025
3. **Nima Yaghoobi**, expected in Fall 2026
4. **Fathima Most,** expected in Fall 2026
5. **Qing Zou**, 2021, Currently Tenure Track Assistant Professor, Univ. Texas South Western, Best Paper award, ISBI 2021, Runner up 2022.
6. **Aniket Pramanik**, expected in Fall 2023
7. **Sampurna Biswas**, 2018, Currently Scientist at KLA Tencor
8. **Yasir Mohsin,** 2018, Currently Lead Engineer, Morteson Construction
9. **Sunrita Poddar**, 2018: Currently Scientist at Analog Devices, Best student paper in BISP, ICASSP 2014
10. **Arvind Balachandrasekaran:** 2018, Currently post-doc in MGH
11. **Ipshita Bhattacharya: 2017**, Currently Currrently Senior Imaging and Algorithms Scientist, Roche Diagnostics
12. **Cui Chen,** 2017: Currently post-doc at MGH Runner up in ISMRM fat-water decomposition challenge, 2012
13. **Gregory Ongie,** 2016: Currently Assistant Professor, Department of Mathematics, Marquette University, IEEE ISBI best paper award, 2015, Best thesis award, Univ Iowa
14. **Sampada Bhave, 2016**: Currently Currently Research Scientist at Canon Medical Research, Finalist for student paper award at IEEE-EMBC 2014
15. **Sajan Lingala,** 2013: Currently Tenure Track Asst. Prof. Univ. Iowa, 2016 Rex Montgomery best dissertation prize, Recipient of AHA pre-doctoral award, ISMRM Junior Fellow 2016, ISMRM magna cum laude 2011
16. **Yue Hu, 2013:** Currently Associate Professor, Harbin Institute of Technology, China,
17. **Zhili Yang**, 2013: Currently with BigData Analytics.

MS DISSERTATIONS SUPERVISED

1. X. Zhou, 2013
2. K. Satyananda 2010
3. S. Bora 2010
4. R. Shanker 2010

PEER REVIEWED JOURNAL PAPERS

1. M. John, J.R. Chand, M. Jacob, Local monotone operator learning using non-monotone operators: MnM-MOL, IEEE Transactions on Computational Imaging, in press

2. Q. Zou, S.Priya, P.Nagpal,. M.Jacob, Joint Cardiac T1 Mapping and Cardiac Cine Using Manifold Modeling, MDPI, Special Issue on Machine Learning, in press.

3. J Yi, S Dasgupta, JF Cai, M Jacob, J Gao, M Cho, W Xu, Separation-free super-resolution from compressed measurements is possible: an orthonormal atomic norm minimization approach, Information and Inference: A Journal of the IMA, 2023.

4. A. Pramanik, S. Bhave, S. Sajib, S. D. Sharma, M. Jacob, Adapting model-based deep learning to multiple acquisition conditions: Ada-MoDL, Magnetic Resonance in Medicine, in press.

5. A. Pramanik, M. B. Zimmerman, M. Jacob, Memory-efficient model-based deep learning with convergence and robustness guarantees, IEEE Transactions on Computational Imaging, in press

6. H.K. Aggarwal, A. Pramanik, M. Jacob, ENSURE: A General Approach for Unsupervised Training of Deep Image Reconstruction Algorithms, IEEE Transactions on Medical Imaging, in press.

7. Q. Zou, A. Ahmed, P. Nagpal, S. Priya, R. Schulte, M. Jacob, Variational manifold learning from incomplete data: application to multi-slice dynamic MRI, IEEE Transactions on Medical Imaging, in press.

8. Q. Zou, L. Torres, S.Fain, N. Higano, A. Bates, M.Jacob, Dynamic imaging using Motion-Compensated SmooThness Regularization on Manifolds (MoCo-SToRM), Physics in Medicine and Biology, special issue "Focus on Machine Learning Models in Medical Imaging",2022

9. A. Ahmed, Q. Zou, P. Nagpal, M. Jacob, Dynamic Imaging using Deep Bi-linear Unsupervised Representation (DEBLUR), IEEE Transactions on Medical Imaging, 2693-2703 (2022).

10. M. Mani, B. Yang, G. Bathla, V. Magnotta, M. Jacob, Multi-band and In-plane Accelerated Diffusion MRI Enabled by Model-based Deep Learning in q-space And its Extension to Learning in the Spherical Harmonics Domain, Magnetic Resonance in Medicine, 2022 Apr;87(4):1799-1815

11. Q. Zou, A. Ahmed, P. Nagpal, S. Kruger, M. Jacob, Dynamic imaging using deep generative SToRM (Gen-SToRM) model, IEEE Transactions on Medical Imaging, special issue on Deep Learning for Image Reconstruction, 40(11): 3102-3112 (2021).

12. Sarv Priya, Tanya Aggarwal, Caitlin Ward, Girish Bathla, Mathews Jacob, Alicia Gerke, Eric Hoffman, Prashant Nagpal, Radiomics side experiments and DAFIT approach in identifying pulmonary hypertension using Cardiac MRI derived radiomics based machine learning models, Scientific Reports, ,2021

13. Ge Wang, Mathews Jacob, Xuanqin Mou, Yongyi Shi, Yonina C Eldar, Deep Tomographic Image Reconstruction: Yesterday, Today, and Tomorrow - Editorial for the 2nd Special Issue "Machine Learning for Image Reconstruction". IEEE Trans. Medical Imaging, 2956-2964,2021

14. Q. Zou, M. Jacob, Recovery of surfaces and functions in high dimensions: sampling theory and links to neural networks, SIAM Journal on Imaging Sciences, Volume: 14, Issue: 2, 2021, pp 580 - 619

15. Sarv Priya, Tanya Aggarwal, Caitlin Ward, Girish Bathla, Mathews Jacob, Alicia Gerke, Eric Hoffman, Prashant Nagpal, Radiomics Detection of Pulmonary Hypertension via Texture-based Assessments of Cardiac MRI: A Machine-learning Model Comparison, Journal of Clinical Medicine, J Clin Med. 2021

16. M.Mani, M. Jacob, V. Magnotta, qModeL: A Plug-and-Play Model-based Reconstruction for Highly Accelerated Multi-shot Diffusion MRI Using Learned Priors, Magnetic Resonance in Medicine, 2021 Aug;86(2):835-851.

17. A. Joy, M. Jacob, J. Paul, Compressed sensing MRI using an interpolation-free non-linear diffusion model, Magnetic Resonance in Medicine, 2021 Mar;85(3):1681-1696. A.H. Ahmed, Y. Mohsin, R. Zhao, Y. Yang, M. Salerno, P. Nagpal, M. Jacob, Free-breathing and ungated cardiac cine using navigator-less spiral SToRM, IEEE TMI, Dec 2020, 39(12):3933-3943.

18. A. Pramanik, H. K. Aggarwal, M. Jacob, Deep Generalization of Structured Low-Rank Algorithms (Deep-SLR), IEEE TMI, 4186 - 4197, Vol 39, Issue 12, Dec 2020.

19. H. K. Aggarwal, M. Jacob, J-MoDL: Joint Model-Based Deep Learning for Optimized Sampling and Reconstruction, Journal of Selected Topics in Signal Processing, in press

20. Q. Zou, S. Poddar, M. Jacob, Sampling of Planar Curves: Theory and Fast Algorithms, IEEE Transactions on Signal Processing, in press

21. M. Jacob, M. Mani, J.C. Ye, Structured Low-Rank Algorithms, Theory, MR Applications, and Links to Machine Learning, IEEE Signal Processing Magazine, in press.

22. M.Jacob, J.C.Ye, M. Doneva, L. Ying, Computational MRI: Compressive Sensing and Beyond, IEEE Signal Processing Magazine, Editorial, Jan 2020.

23. M. Mani, H. Aggarwal, V. Magnotta, M. Jacob, Improved MUSSELS reconstruction for high-resolution multishot diffusion weighted imaging, Magnetic Resonance in Medicine, in press

24. H.K. Aggarwal, M. Mani, M. Jacob, MoDL-MUSSELS: Model-Based Deep Learning for Multi-Shot Sensitivity Encoded Diffusion MRI, IEEE Transactions on Medical Imaging, in press

25. S. Poddar, M. Jacob, Clustering of Data with Missing Entries using Non-convex Fusion Penalties, IEEE Transactions on Signal Processing, in press.

26. Y. Hu, X. Li, Y. Gu, M. Jacob, Hyperspectral Image Recovery using Nonconvex Sparsity and Low-Rank Regularizations, IEEE Transactions on Geoscience and Remote Sensing, in press.

27. M.Mani, M. Jacob, G. McKinnon, B. Yang, B. Rutt, V. Magnotta, SMS MUSSELS: A Navigator-free Reconstruction for Simultaneous Multislice Accelerated Multi-shot Diffusion Weighted Imaging, Magnetic Resonance in Medicine, in press.

28. J. Humston, I. Bhattacharya, M. Jacob, and C. Cheatum,. Optimized Reconstructions of Compressively Sampled Two-Dimensional Infrared Spectra, Journal of Chemical Physics, in press.

29. A. Joy, M. Jacob, J. Paul, Directionality Guided Non-Linear Diffusion Compressed Sensing MR Image Reconstruction, Magnetic Resonance in Medicine, in press.

30. R. Zhou, Y. Yang, R.C. Mathew, J.M. Mugler, D.S. Weller, C.M. Kramer, A.H.A. Ahmed, M. Jacob, M. Salerno, Free Breathing Cine Imaging with Motion-Corrected Reconstruction at 3T Using SPiral Acquisition with Respiratory correction and Cardiac Self-gating (SPARCS), Magnetic Resonance in Medicine, in press.

31. S. Biswas, H. Aggarwal, M. Jacob, Dynamic MRI using model-based deep learning and SToRM priors: MoDL-SToRM, Magnetic Resonance in Medicine, 2019.

32. Y. Hu, X. Liu, M. Jacob, A Generalized Structured Low-Rank Matrix Completion Algorithm for MR Image Recovery, IEEE Transactions on Medical Imaging, in press.

33. Y. Mohsin, S. Poddar, M. Jacob, Free-breathing & ungated cardiac MRI using iterative SToRM (i-SToRM), IEEE Transactions on Medical Imaging, in press.

34. S. Poddar, Y. Mohsin, A. Deidra, B. Thattayilath, R. Ashwath, M. Jacob, Manifold recovery using kernel low-rank regularization: application to dynamic imaging, IEEE Transactions on Computational Imaging, in press.

35. A. Balachandrasekaran, M. Mani, M. Jacob, Calibration-free B0 correction of EPI data using structured low rank matrix recovery, IEEE Transactions on Medical Imaging, in press.

36. H.K. Aggarwal, M.P. Mani, M. Jacob, MoDL: Model Based Deep Learning Architecture for Inverse Problems, IEEE Transactions on Medical Imaging,Vol. 38, No. 2, February 2019.

37. R.H. Blair, E.Eichen, M. Jacob, D. Gotz, Bootstrapping estimates of stability for clusters, observations and model selection, Computational Statistics, 2019.

38. M. Mani, V. Magnotta, M. Jacob, A General Algorithm for Compensation of Trajectory Errors: Application to Radial Imaging, Magnetic Resonance in Medicine, in press, 2018

39. G. Ongie, S. Biswas, M. Jacob, Convex recovery of continuous domain piecewise constant images from non-uniform Fourier samples, IEEE Transactions on Signal Processing, Jan 2018, pp 236 - 250.

40. I. Bhattacharya, J. Humston, C. Cheatum, M. Jacob, Acceleratating two-dimensional infrared spectroscopy while preserving lineshapes using GIRAF, Optics Letters, Nov 2017,4573-4576.

41. A. Balachandrasekaran, V. Magnotta, M. Jacob, Recovery of damped exponentials using structured low rank matrix completion, IEEE Transactions on Medical Imaging, July 2017, pp. 2087 - 2098

42. Ongie, M. Jacob, GIRAF: A Fast Algorithm for Structured Low-Rank Matrix Recovery, IEEE Transactions on Computational Imaging, Dec 2017, pp. 535 - 550.

43. C. Chen, A. Shah, X. Wu, M. Jacob, A Rapid 3D fat-water decomposition method using GlObally Optimal Surface Estimation (R-GOOSE), Magnetic Resonance in Medicine, July 2017, pp 2401-2407.

44. I. Bhattacharya, M. Jacob, Compartmentalized low-rank recovery for high resolution lipid unsuppressed MRSI, Magnetic Resonance in Medicine, Oct 2017, pp 1267-1280.

45. M. Mani, M. Jacob, D. Kelley, V. Magnotta, Multishot sensitivity encoded diffusion data recovery using structured low rank matrix completion (MUSSELS), Magnetic Resonance in Medicine, Volume 78, Issue 2,2017 pp 494–507.

46. J. Humston, I. Bhattacharya, M. Jacob, C. Cheatum, Compressively Sampled Two-Dimensional Infrared Spectroscopy That Preserves Lineshape Information, Journal of Physical Chemistry A, 2017, 121 (16), pp 3088–3093.

47. S. Biswas, S. Dasgupta, R. Mudumbai, M. Jacob, Subspace aware recovery of low-rank and jointly sparse signals, IEEE Transactions on Computational Imaging,Volume: 3, Issue: 1, March 2017, pp 22-35

48. H. Achanta, S. Biswas, S. Dasgupta, B. Dasgupta, M. Jacob, R. Mudumbai, The Spark of Fourier Matrices: Connections to Vanishing Sums and Coprimeness, Digital Signal Processing, Volume 61, February 2017, Pages 76–85.

49. Y. Mohsin, S.G Lingala, E. DiBella, M.Jacob, Accelerated dynamic MRI Using Patch Regularization for Implicit motion CompEnsation (PRICE), Magnetic Resonance in Medicine,77:1238–1248, 2017. [Software]

50. C. Liao, C. Ying, X. Cao, C. Song, H. He, M. Mani, M. Jacob, V. Magnotta, J. Zhong, Efficient Parallel Reconstruction for High Resolution Multi- shot Spiral Diffusion Data with Low Rank Constraints, Magnetic Resonance in Medicine, 2017 Mar;77(3):1359-1366

51. G. Ongie, M. Jacob, Off-the-Grid Recovery of Piecewise Constant Images from Few Fourier Samples, SIAM Journal on Imaging Sciences, 2016, pp. 1004–1041.

52. S. Bhave, S.G Lingala, J. Newell, S. Nagle, M.Jacob, Blind Compressed Sensing Enables 3D Dynamic Free Breathing MR Imaging of Lung Volumes and Diaphragm Motion, Investigative Radiology, 2016 Jun;51(6):387-99

53. S. Poddar, M.Jacob, Dynamic MRI using Smoothness Regularization on Manifolds (SToRM), IEEE Transactions on Medical Imaging, vol 35, no 4, April 2016.

54. S. Bhave, S.G. Lingala, C.P. Johnson, V.A. Magnotta, M. Jacob, "Accelerated whole-brain multi-parameter mapping using blind compressed sensing, Magnetic Resonance in Medicine, 2016 Mar;75(3):1175-86

55. S. Biswas, H. Achanta, M. Jacob, S. Dasgupta, R. Mudumbai, Recovery of Low Rank and Jointly Sparse Matrices with Two Sampling Matrices, IEEE Signal Processing Letters, 22 (11), pp 1945 - 1949, 2015.

56. G. Ongie, M. Jacob, Recovery of discontinuous signals using group sparse higher degree total variation, IEEE Signal Processing Letters, 22 (9), pp 1414 - 1418, 2015.

57. Y. Mohsin, G. Ongie, M. Jacob, Iterative shrinkage algorithm for patch smoothness regularized medical image recovery, IEEE Trans. Medical Imaging, 34(12), pp 2417-28, 2015.

58. S.G. Lingala, E. DiBella, M. Jacob, Deformation corrected compressed sensing (DC-CS): a novel framework for accelerated dynamic MRI, IEEE Transactions on Medical Imaging, 34(1):72-85, 2015. (supplementary videos)

59. M. Mani, M. Jacob, V. Magnotta, J. Zhong, Fast iterative algorithm for the reconstruction of multi-shot non-Cartesian diffusion data, Magnetic Resonance in Medicine, 74 (4), pp 1086–1094, 2015.

60. M. Mani, M. Jacob, A. Guidon, V. Magnotta, J. Zhong, Acceleration of high angular and spatial resolution diffusion imaging using compressed sensing with multichannel spiral data, Magnetic Resonance in Medicine, 73, pp 126–138, 2015.

61. C. Cui, X. Wu, J. Newell, M. Jacob, Fat water decomposition using GlObally Optimal Surface Estimation (GOOSE) algorithm, Magnetic Resonance in Medicine, Volume 73, Issue 3, pages 1289–1299, 2015. [software] (ISMRM challenge: team name KongfuPanda)

62. Y. Hu, G. Ongie, M. Jacob, Generalized Higher Degree Total Variation (HDTV) Regularization, IEEE Transactions on Image Processing, vol 23 (6), pp 2423-2435, 2014. [software]

63. Z. Yang, M. Jacob, Mean square optimal NUFFT approximation for efficient non-Cartesian MRI reconstruction , Journal of Magnetic Resonance, vol 242, pp 126-135, May 2014. [software]

64. A. Daducci,E. Rodrıguez, M. Descoteaux, E. Garyfallidis, Y. Gur, Y. Lin, M. Mani, S. Merlet, M. Paquette, A. Manzanares, M. Reisert, P. Rodrigues, F. Sepehrband, E. Caruyer, J. Choupan, R. Deriche, M. Jacob, G. Menegaz, V. Prckovska, M. Rivera, Y. Wiaux, J. Thiran, Quantitative comparison of reconstruction methods for intra-voxel fiber recovery from diffusion MRI, IEEE Transactions on Medical Imaging, vol 33 (2), 384-399, 2014.

65. S. Bhave, R. Eslami, M. Jacob,"A sparse spectral deconvolution algorithm for non-Cartesian MRSI", Magnetic Resonance in Medicine, pages 469–476, Feb 2014

66. S. G. Lingala, M. Jacob, Blind Compressed Sensing Dynamic MRI", IEEE Transactions on Medical Imaging, pp 1132-1145, vol.32(6), June 2013. [software]

67. S. G. Lingala, E.DiBella, G. Adluru, C. McGann,M. Jacob, Accelerating free breathing myocardial perfusion MRI using multi coil radial k-t SLR, Physics in Biology and Medicine, vol.58(20), pp. 7309-7327, Sep 2013. (link to supplementary material). [software]

68. Z. Yang, M. Jacob,"Nonlocal regularization of inverse problems: a unified variational framework", IEEE Trans. Image Processing, pp: 3192-203, vol.22(8), Aug 2013.

69. Y. Hu, M. Jacob,"Higher degree total variation (HDTV) regularization for image recovery", IEEE Trans. Image Processing, pp 2559-2571, Vol 21, No 5, May 2012. [software]

70. Y. Hu, S. G. Lingala, M. Jacob, "A fast majorize-minimize algorithm for the recovery of sparse and low rank matrices", IEEE Trans. Image Processing, pp 742-753, Vol 21, No 2, Feb 2012.

71. S. G. Lingala, Y. Hu, E. DiBella, M. Jacob, "Accelerated dynamic MRI exploiting sparsity and low-rank structure", IEEE Trans. Medical Imaging, pg 1042-1054, vol 30, May 2011. [software]

72. K. Satyananda, M. Jacob,"Non-iterative regularized reconstruction algorithm for non-Cartesian MRI", Magnetic Resonance Imaging, Feb 2011.

73. R. Eslami, M. Jacob, "Robust Reconstruction of MRSI Data Using a Sparse Spectral Model and High Resolution MRI Priors", IEEE Transactions on Medical Imaging, June 2010, vol 29, issue 6, pp 1297-309

74. Y. Lin, T. Gu, C. Zhong, S. Kennedy, M. Jacob, J. Zhong, "High-resolution MRS in the presence of field inhomogeneity via intermolecular double-quantum coherences on a 3T whole-body scanner", Magnetic Resonance in Medicine, Jan 2010.

75. M. Jacob, "Optimized least square non uniform fast Fourier transform (OLS-NUFFT)" , IEEE Transactions of Signal Processing, vol. 57, issue 6, pp. 2165-2177, Feb 2009

76. R. Frazin, M. Jacob, M. Wakin, H. Morgan, "Toward reconstruction of coronal mass ejection density from only three points of view", Astrophysical Journal, April 2009, pp 636-641.

77. M. Jacob, B. Sutton, "Algebraic decomposition of water and fat in MRI", IEEE Transactions of Medical Imaging, Feb 2009, pp 173-84.

78. M. Jacob, X. Zhu, A. Ebel, N.Schuff, and Z.P. Liang, "Improved model-based magnetic resonance spectroscopic imaging", IEEE Transactions of Medical Imaging, Oct 2007, 1305-18.

79. I. Khalidov,D. Van De Ville,M.Jacob, F. Lazeyras, M. Unser, "BSLIM: Spectral localization by imaging with explicit B0 field inhomogeneity compensation", IEEE Transactions on Medical Imaging, Feb 2007, 990-1000.

80. N. Cao, A. Neharoi, M.Jacob, "Image reconstruction for diffuse optical tomography using sparsity regularization and expectation-maximization algorithm", Optics Express,2007,pp 13695-13708

81. M. Jacob, Y. Bresler, V. Toronov, X. Zhang, and A. Webb, "A level-set algorithm for the reconstruction of functional activation in near-infrared spectroscopic imaging", Journal of Biomedical Optics, Dec 2006, 064029.

82. A. Amzallag, C. Vaillant, M.Jacob, M. Unser, J.Bednar, JD. Kahn, J.Dubochet, A. Stasiak, JH. Maddocks, "3D reconstruction and comparison of shapes of DNA minicircles observed by cryo-electron microscopy,Nucleic Acids Res, Sept. 2006.

83. M. Jacob, T.Blu, C.Vaillant,J.Maddocks and M. Unser, "3-D shape estimation of DNA from stereo cryo-electron micro-graphs using a projection-steerable snake", IEEE Transactions on Image Processing, 214-27, Jan 2006.

84. M. Jacob, M. Unser, "Design of steerable filters for feature detection using Canny-like criterion", IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 26, no. 8, pp. 1007-1019, Aug. 2004.

85. E.Meijering, M. Jacob, J. C. F. Sarria, P. Steiner, H. Hirling and M. Unser, "Design and validation of a tool for neurite tracing and analysis in fluorescence microscopy", Cytometry, vol. 58A, no. 2, pp. 167-176, April 2004.

86. M. Jacob, T. Blu, M. Unser, "Efficient energies and algorithms for parametric snakes", IEEE Transactions on Image Processing, vol. 13, no. 9, pp. 1231-1244, Sep. 2004.

87. M. Jacob, T. Blu, M. Unser, "Sampling of Periodic Signals: A Quantitative Error Analysis", IEEE Transactions on Signal Processing, vol. 50, no. 5, pp. 1153-1159, May 2002.

88. M. Jacob, T. Blu, M. Unser, "An Exact Method for Computing the Area Moments of Wavelet and Spline Curves, IEEE Transactions on Pattern Analysis and Machine Intelligence", vol. 23, no. 6, pp. 633-642, June 2001.

PEER REVIEWED CONFERENCE PAPERS

1. A. Pramanik, M. Jacob, Improved Model Based Deep Learning Using Monotone Operator Learning (MOL), ISBI 2022.

2. Q. Zou, L. Torres, S.Fain, M.Jacob, Dynamic imaging using motion-compensated smoothness regularization on manifolds (MoCo-SToRM), ISBI 2022.

3. Q. Zou, A. Ahmed, P. Nagpal, S. Priya, R. Schulte, M.Jacob, Joint alignment and reconstruction of multislice dynamic MRI using variational manifold learning, ISBI 2022.

4. A. Ahmed, P. Nagpal, S. Kruger, M. Jacob, Dynamic Imaging Using Deep Bilinear Unsupervised Learning (DEBLUR), ISBI 2021.

5. Q. Zou, A. Ahmed, P. Nagpal, S. Kruger, M. Jacob, Deep Generative SToRM model for dynamic imaging, ISBI 201

6. A Pramanik, M. Jacob, Reconstruction and Segmentation of Parallel MR Data using Image Domain Deep-SLR, ISBI 2021

7. H.K. Aggarwal, A. Pramanik, M. Jacob. ENSURE: Ensemble Stein's Unbiased Risk Estimator for Unsupervised Learning, IEEE ICASSP, 2021

8. A. Pramanik, H. K. Aggarwal, M. Jacob, Calibrationless Parallel MRI using Model-Based Deep Learning (C-MODL), IEEE ISBI 2020

9. Q. Zou, M. Jacob, Sampling of Surfaces and Learning Functions in High Dimensions, ICASSP 2020

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11. H.K. Aggarwal, M. P. Mani, M. Jacob, Multi-Shot Sensitivity-Encoded Diffusion MRI using Model-Based Deep Learning (MODL-MUSSELS), ISBI 2019

12. Y. Mohsin, S. Poddar, B. Thattayilath, D. Ansah, and M. Jacob, Navigator-less manifold recovery of cardiac data using iterative SToRM, ISMRM-ESMRMB Conference, Paris, France 2018.

13. S. Poddar, M.Jacob, Recovery of Noisy Points on Band-limited Surfaces: Kernel Methods Re-explained, ICASSP 2018

14. S. Poddar, M. Jacob, Clustering of Data with Missing Entries, ICASSP 2018.

15. S. Biswas, H.K. Aggarwal, S. Poddar, and M. Jacob, Model-based free-breathing cardiac MRI reconstruction using deep learned & STORM priors: MoDL-STORM, ICASSP 2018.

16. S. Poddar, M. Jacob, Recovery of Point Clouds on Surfaces: Application to Image Reconstruction, ISBI 2018.

17. Y. Hu, X. Liu, M. Jacob, Adaptive structured low-rank algorithm for MR image recovery, ISBI 2018.

18. H.K. Aggarwal, M. Mani, and M. Jacob, Model Based Image Reconstruction using Deep Learned Priors (MoDL), ISBI 2018.

19. I. Bhattacharya, M. Jacob, Denoising and Deinterleaving of EPSI Data using Structured low-Rank Matrix Recovery, ISBI 2018

20. H.K. Aggarwal, M. Mani, and M. Jacob, MoDL: Model based Deep Learning Architecture for Image Recovery with Prior Information, ISMRM 2018

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36. G. Ongie, S. Biswas, M. Jacob, Structured matrix recovery of piecewise constant signals with performance guarantees, International Conference on Image Processing, 2016.

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38. S. Poddar, M. Jacob, Convex clustering and recovery of partially observed data, International Conference on Image Processing, 2016.

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40. M. Mani, V. Magnotta, D. Kelley, M. Jacob, Comprehensive reconstruction of multishot multichannel diffusion data using MUSSELS, Annual Conference of IEEE Engineering in Biology and Medicine Society (EMBC), 2016.

41. I. Bhattacharya, M. Jacob, Low-rank based compartmentalized reconstruction algorithm for high resolution MRSI without lipid suppression methods, International Society for Magnetic Resonance in Medicine (ISMRM), Singapore, May 2016.

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61. S. Poddar, M. Jacob, Low rank recovery with manifold smoothness prior: theory and application to accelerated MRI, IEEE ISBI, New York City, USA, 2015.

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94. M.Jacob, H. Le-houllier, S. Bora, S. McAleavey, D. Dalecki, J. McDonough,"The use of speckle tracking for the recovery of displacement and velocity information from sequences of ultrasound images of the tongue", International Seminar on Speech Production, Proceedings of ISSP 2008.

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RESEARCH SUPPORT

Current

R01AG087159   **Magnotta, Jacob, Li (MPIs)**   05/2024 – 04/2029
Agency: NIH/NIA
Total Costs: 3,906,000
Title: High Resolution MRSI for Alzheimer's Disease and Related Dementias

5R01EB019961   **Jacob (PI)**   07/2023 - 10/2027
Agency: NIH/NIBIB
Total Costs: 2,895,528
Title: Novel Computational Framework for Free-Breathing & Ungated Dynamic MRI

R01 AG067078   **Jacob (PI)**   02/2020 – 03/2025
Agency: NIH/NIA
Total Costs: 3,403,056
Title: Model Based Deep Learning Framework for Ultra-High-Resolution Multi-Contrast MRI

Canon Medical Systems   **Jacob (PI)**   09/2021 – 06/2024
Total Costs: 210,000
Title: Evaluation of Model Based Deep Learning Framework on Canon MRI Scanners

1 R01 EB031169   **Mani (PI)**   06/2021 – 02/2025
Agency: NIBIB
Total Costs: 1,403,056
Title: Fast Multi-dimensional Diffusion MRI with Sparse Sampling and Model-Based Deep Learning Reconstruction

R01HL169765   **Fain (PI)**   07/2023 – 06/2027
Agency: NHLBI
Total Costs: 3,817,560
Title: Dynamic Imaging of Lung Ventilation and Perfusion Using CT and MRI

R01HL173483   **Lingala (PI)**   04/2024 – 03/2029
Agency: NIBIB
Total Costs: 2,165,589
Title: Novel 3D Quantitative Dynamic MRI to Characterize Obstructive Sleep Apnea

Completed

R01 HL146689   **Woods (PI)**   06/2021 – 02/2025
Agency: NIH
Total Costs: 2,335,917
Title: MRI Phenotyping of Early BPD and Prediction of Outcomes

1R01EB019961   **Jacob (PI)**   04/2016 - 03/2021
Agency: NIH/NIBIB
Total Costs: 2,144,993
Title: Novel Computational Framework for Free-Breathing & Ungated Dynamic MRI

R01 EB019961-02S1   **Jacob(PI)**   4/1/17-3/31/19
Agency: NIH/NIBIB
Total Costs: $152,000
Title: High-resolution acidosis biomarker in early Alzhiemers disease (Administrative Supplement)

R01 EB019961-02S2   **Jacob(PI)**   4/1/17-3/31/19
NIH/NIBIB
Total Costs: $354,000
Title: High-Resolution J-Resolved MRSI for Metabolic Imaging in Alzhiemers disease

ONR: 11231001   **Jacob(PI)**
01/2013-12/2017
Agency: Office of Naval Research
Total Costs: $875,000
Title: CIF: Multi-Image Co-prime Sensing: Theory and Applications to MRI

1 R01 EB022019-01A1   **Magnotta (PI)**   04/2016 - 03/2020
Agency: NIH/NIBIB
Title: Characterization and Enhancement of Functional T1rho Imaging

CCF: 1116067   **Jacob(PI)**   08/2011 – 07/2016
Agency: NSF/CCF
Total Costs: $433,897
Title: CIF: Adaptive signal representation for accelerated multidimensional imaging

RSG-11-267-01-CCE   **Jacob(PI)**   01/2011-07/2016
Agency: American Cancer Society
Total Costs: $720,000
Title: Improved MR spectroscopic imaging for glioma treatment planning

DMS 1557593   Jacob(PI: Iowa component)   01/2016-12/2016
Agency: National Science Foundation
Total Costs: $100,000
Title: QuBBD: Collaborative Proposal: Interactive Ensemble Clustering for Mixed Data with Application to Mood Disorders

Univ. Iowa, Aging of the Brain & Mind **(PIs: Voss & Jacob)**   1/16-1/17
Direct Costs: $25,000
Title: Probing the molecular mechanisms in cognitive aging & protective factors with novel quantitative MR imaging

1R21HL109710-01A1 Jacob(PI)   01/2012-12/2013
Agency: NIH/NHLBI
Total Costs: $427,611
Title: Novel algorithm for contrast enhanced myocardial perfusion MRI

CCF-0844812   Jacob (PI)   07/2009 - 06/2014
Agency: National Science Foundation
Total Costs: $399,600
Title: CAREER: Efficient Image Sparsifying Operators: Theory, Algorithms and Applications

Univ. Iowa Neuroscience Institute   Jacob (PI)   12/2022 – 11/2023
Total Costs: 50,000
Title: Ultrahigh-resolution whole-brain functional MRI

Univ. Iowa IIAI Pilot   **Jacob (PI)**   10/2022 – 09/2023
Total Costs: 25,000
Title: Acceleration of free-breathing LGE MRI of the right ventricle