Deepti Bathula

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Education

May 2009	**Ph.D. in Biomedical Engineering**	*Yale University, USA*
May 2006	**M.Phil. in Biomedical Engineering**	*Yale University, USA*
Dec 2004	**M.S. in Biomedical Engineeringg**	*Yale University, USA*
May 2002	**B.E. in Computer Systems Engineering**	*University of Auckland, NZ*

Work Experience

Apr 2022 - Present	**Associate Professor** Department of Computer Science & Engineering	*Indian Institute of Technology Ropar* *Punjab, India*
Apr 2011 - Mar 2022	**Assistant Professor** Department of Computer Science & Engineering	*Indian Institute of Technology Ropar* *Punjab, India*
May 2009 - Jan 2011	**Research Associate** Department of Psychiatry	*Oregon Health & Science University* *Portland, OR, USA.*
Aug 2003 - Apr 2009	**Graduate Research Assistant** Department of Biomedical Engineering	*Yale University* *New Haven, CT, USA.*
Aug 2005 - May 2008	**Teaching Assistant** Department of Biomedical Engineering	*Yale University* *New Haven, CT, USA.*
Summer 2008	**Research Intern** Health Informatics	*IBM Almaden Research Center* *San Jose, CA, USA.*
Summer 2005, 2006	**Software Programmer** Department of Neurology	*Yale University* *New Haven, CT, USA.*
Jan 2002 - Jul 2003	**Software Engineer** Symphonia	*Orion Health* *Auckland, New Zealand*

Doctoral Thesis

Title *Functional MRI Analysis Using Training-Based Prior Models of Activation Patterns*

Advisor Professor James S. Duncan

Description Project introduces statistical activation priors to functional Magnetic Resonance Imaging (fMRI) data analysis. This novel idea involves learning brain activation patterns from previously conducted multi-subject fMRI studies to define functionally informed priors. These priors provide improved analyis by compensating for low SNR by inducing sensitivity to task-related regions of the brain.

Grants

2023 - 2028 Pratiksha Trust EMSTAR Grant *Awaiting Financial Approval*
Co-PI *Understanding Progression of Patients with Atypical Parkinsonism (ATPARK)*

2023 - 2026 DST - Fund for Improvement of S&T Infrastructure (FIST) *Rs. 158 Lakhs*
Co-PI *Enhancement of Infrastructure to Facilitate Innovation in Digital Health*

2023 - 2026 DST - Core Research Grant (CRG) *Rs. 31 Lakhs*
PI *Characterization of Perfusion Deficit in Stroke Using Resting-State fMRI*

2021 - 2023 DST - Cognitive Science Research Initiative (CSRI) *Rs. 22 Lakhs*
PI *Understanding Depression: A Multi-Site Machine Learning Approach*

2018 - 2020 DST (Biomedical Instruments and Devices Hub, PGIMER) *Rs. 48 Lakhs*
Co-PI *Designing and Validating a Point Of Care Device for Rapid Platelet Count*

2016 - 2019 Bio-X Consortium (IIT Ropar, IIT Mandi, PGIMER) *Rs. 40 Lakhs*
Co-PI *Development of Low-Cost MRI for Point of Care Testing and associated CAD system*

2014 - 2017 Department of Science & Technology (DST-SERB) *Rs. 18 Lakhs*
PI *Neuroimaging - Towards Integrated Analysis of Multi-site Functional MRI Data*

2011 - 2013 Institute Scheme for Innovation Research & Development (ISIRD) *Rs. 10 Lakhs*
PI *Development of Neuroimage Processing & Analysis Techniques*

Consultancy Projects

2019 Dept. of Women's Health, Uppsala University (Phase-I), Sweden *Rs. 3.8 Lakhs*

2020 Dept. of Women's Health, Uppsala University (Phase-II), Sweden *Rs. 4.1 Lakhs*

2020 Broadridge - NHO Program (Phase I), Hyderabad, India *Rs. 10.5 Lakhs*

2020 Broadridge - NHO Program (Phase II), Hyderabad, India *Rs. 8.0 Lakhs*

2021 Dept. of Women's Health, Uppsala University (Phase-III), Sweden *Rs. 2.1 Lakhs*

2021 Broadridge - NHO Program (Phase III), Hyderabad, India *Rs. 11.4 Lakhs*

2022 Broadridge - NHO Program (Phase IV), Hyderabad, India *Rs. 7.5 Lakhs*

Publications

Journal Articles

[1] A. Sikka, S. V. Peri, J. S. Virk **D. R. Bathula**, MRI to PET Cross-Modality Translation using Globally and Locally Aware GAN (GLA-GAN) for Multi-Modal Diagnosis of Alzheimer's Disease. *Submitted to Computers in Biology & Medicine (arXiv preprint arXiv:2108.02160)*

[2] U. Niyaz, **D. R. Bathula**, Leveraging Different Learning Styles for Improved Knowledge Distillation, *Computers in Biology & Medicine*, 168, 2024.

[3] A. S. Sambyal, U. Niyaz, N. C. Krishnan, **D. R. Bathula**, Understanding Calibration of Deep Neural Networks for Medical Image Classification, *Computer Methods and Programs in Biomedicine*, 242, 2023.

[4] S. Gallo, A. ElGazzar, P. Zhutovsky, R. M. Thomas, N. Javaheripour, M. Li, **D. R. Bathula**, G. van Wingen, Thalamic hyperconnectivity as neurophysiological signature of major depressive disorder in two multicenter studies. *Molecular Psychiatry*, 2023.

[5] S. Bagchi, **D. R. Bathula**, EEG-ConvTransformer for Single-Trial EEG based Visual Stimuli Classification. *Pattern Recognition,* 129, 2022.

[6] S. Andersson, **D. R. Bathula**, S. I Iliadis, M. Walter, A. Skalkidou, Predicting women with depressive symptoms postpartum with machine learning methods. *Scientific Reports*, 11 (1), 1-15, April 2021.

[7] A. Sikka, H. Jamalabadi, M. Krylova, S. Alizadeh, J. N. van der Meer, L. Danyeli, M. Deliano, P. Vicheva, T. Hahn, T. Koenig, **D. R. Bathula**, M. Walter, Investigating the temporal dynamics of electroencephalogram (EEG) microstates using recurrent neural networks. *Human Brain Mapping*, February 2020, Article 24949.

[8] J. I. Orlando, H. Fu, J. B. Breda, K. Keer, **D. R. Bathula**, A. Diaz-Pinto, R. Fang, P. Heng, J. Kim, J. Lee, J. Lee, X. Li, P. Liu, S. Lu, B. Murugesan, V. Naranjo, S. R. Phaye, S. M. Shankaranarayana, H. Bogunovic, A. Sikka, REFUGE Challenge: A unified framework for evaluating automated methods for glaucoma assessment from fundus photographs. *Medical Image Analysis*, Volume 59, January 2020, Article 101570.

[9] D. A. Fair, J. T. Nigg, S. Iyer, **D. R. Bathula**, K. L. Mills, N. U. Dosenbach, B. L. Schlaggar, M. Mennes, D. Gutman, S. Bangaru, J. K. Buitelaar, D. P. Dickstein, A. Di Martino, D. N. Kennedy, C. Kelly, B. Luna, J. B. Schweitzer, K. Velanova, Y. F. Wang, S. Mostofsky, F. X Castellanos, M. P. Milham, Distinct neural signatures detected for ADHD subtypes after controlling for micro-movements in resting state functional connectivity MRI data, *Frontiers in Systems Neuroscience*, February 2013.

[10] T. G. Costa Dias, V. B. Wilson, **D. R. Bathula**, S. P. Iyer, K. L. Mills, B. L. Thurlow, C. A. Stevens, E. D. Musser, S. D. Carpenter, D. S. Grayson, S. H. Mitchell, J. T. Nigg, D. A. Fair, Reward circuit connectivity relates to delay discounting in children with attention-deficit/hyperactivity disorder, *European Neuropsychopharmacology*, 23(1):33-45, January 2013.

[11] D. A. Fair, **D. R. Bathula**, M. A. Nikolas and J. T. Nigg, Distinct neuropsychological subgroups in typically developing youth inform heterogeneity in children with ADHD, *Proceedings of the National Academy of Sciences*, 109(17):6769-6774, April 2012.

[12] K. L. Mills, **D. R. Bathula**, T. G. Dias, S. P. Iyer, M. C. Fenesy, E. D. Musser, C. A. Stevens, B. L. Thurlow, S. D. Carpenter, B. J. Nagel, J. T. Nigg and D. A. Fair, Altered Cortico-Striatal-Thalamic Connectivity in relation to Spatial Working Memory Capacity in Children with ADHD, *Frontiers in Psychiatry*, January 2012.

[13] B. J. Nagel, **D. R. Bathula**, M. Herting, C. Schmitt, C. D. Kroenke, D. A. Fair and J. T. Nigg, Altered White Matter Microstructure in Children with ADHD, *Journal of the American Academy of Child and Adolescent Psychiatry*, 50(3):283-92, March 2011.

[14] D. A. Fair, J. Posner, B. J. Nagel, **D. R. Bathula**, T. G. Dias, K. L. Mills, M. S. Blythe, A. Giwa, C. F. Schmitt and J. T. Nigg, Atypical Default Network Connectivity in Youth with ADHD, *Biological Psychiatry*, 68(12):1084-91, December 2010.

[15] D. A. Fair, **D. R. Bathula**, K. L. Mills, T. G. Dias, M. S. Blythe, D. Zhang, A. Z. Snyder, M. E. Raichle, A. A. Stevens, J. T. Nigg and B. J. Nagel, Maturing thalamocortical functional connectivity across development, *Frontiers in Systems Neuroscience*, 4:10, May 2010.

Peer-Reviewed Conference Articles

[1] U. Niyaz, A. S. Sambyal, **D. R. Bathula**, Wavelet-Based Feature Compression for Improved Knowledge Distillation, *IEEE 21st Int. Sym. on Biomedical Imaging (ISBI)*, May 2024.

[2] A. Chaudhuri, A. S. Sambyal, **D. R. Bathula**, Mutually Exclusive Multi-Modal Approach for Parkinson's Disease Classification, *11th International Conference on Bioimging*, February 2024.

[3] J. S. Virk, D. Mahapatra, **D. R. Bathula**, Medical VQA: MixUp Helps Keep it Simple,. *The 37th International Conference on Image and Vision Computing New Zealand (IVCNZ)*, November 2022.

[4] U. Niyaz, **D. R. Bathula**, Augmenting Knowledge Distillation With Peer-To-Peer Mutual Learning For Model Compression, *IEEE 19th Int. Sym. on Biomedical Imaging (ISBI)*, March 2022.

[5] A. S. Sambyal, N. C. Krishnan, **D. R. Bathula**, Towards Reducing Aleatoric Uncertainty for Medical Imaging Tasks, *IEEE 19th Int. Sym. on Biomedical Imaging (ISBI)*, March 2022.

[6] R. R. Chowdhury, **D. R. Bathula**, Influential Prototypical Networks for Few Shot Learning: A Dermatological Case Study. *IEEE 19th Int. Sym. on Biomedical Imaging (ISBI)*, March 2022.

[7] A. J. Thomas, **D. R. Bathula**, 3D Multi-voxel pattern based machine learning for multi-center fMRI data normalization. 6^{th} *IAPR International Conference on Computer Vision & Image Processing (CVIP)*, December 2021.

[8] S. Bagchi, **D. R. Bathula**, Adequately Wide 1D CNN facilitates improved EEG based Visual Object Recognition. 29^{th} *European Signal Processing Conference (EUSIPCO)*, 1276-1280, August 2021.

[9] J. S. Virk, **D. R. Bathula**, Domain-Specific, Semi-Supervised Transfer Learning for Medical Imaging. *ACM International Joint Conference on Data Science and Management of Data (CODS-COMAD), January 2021*

[10] S. Bagchi, A. Banerjee, **D. R. Bathula**, Learning a meta-ensemble technique for skin lesion classification and novel class detection. *IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, June 2020.

[11] A. Sikka, S. S. R. Phaye, A. Dhall, **D. R. Bathula**, Multi-level Dense Capsule Networks, *Asian Conference on Computer Vision (ACCV)*, December 2018.

[12] A. Sikka, S. V. Peri, **D. R. Bathula**, MRI to FDG-PET: Cross-Modal Synthesis Using 3D U-Net For Multi-Modal Alzheimer's Classification, *Medical Image Computing and Computer Assisted Intervention (MICCAI) - Simulation and Synthesis in Medical Imaging (SASHIMI) Workshop*, September 2018.

[13] Sikka, G. Mittal, **D. R. Bathula**, N. C. Krishnan, Supervised deep segmentation network for brain extraction, *International Conference on Computer Vision, Graphics and Image Processing (ICVGIP)*, December 2016.

[14] G. Bansal, P. Gera and **D. R. Bathula**, Template based Classification of Cardiac Arrhythmia in ECG Data, *IEEE International Conference on Recent Trends in Information Systems (ReTIS-15)*, July 2015.

[15] A. J. Thomas and **D. R. Bathula**, Reducing Inter-Scanner Variability in Multi-Site FMRI Activations Using Correction Functions: A Preliminary Study, *IEEE International Conference on Computing, Communication and Automation (ICCCA)*, May 2015.

[16] A. J. Thomas and **D. R. Bathula**, Reducing inter-scanner variability in multi-site fMRI data: Exploring choice of reference activation map and use of correction functions, *IEEE Winter Workshop on Machine Intelligence and Signal Processing (MISP)*, December 2014.

[17] **D. R. Bathula**, L. H. Staib, H. D. Tagare, X. Papademetris, R. T. Schultz and J. S. Duncan, Multi-Group Functional MRI Analysis Using Statistical Activation Priors, *MICCAI Workshop on fMRI Analysis*, September 2009.

[18] **D. R. Bathula**, H. D. Tagare, L. H. Staib, X. Papademetris, R. T. Schultz and J. S. Duncan, Bayesian Analysis of fMRI Data with ICA Based Spatial Prior, *Int. Conf. on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, Part II: 246 - 254, September 2008.

[19] **D. R. Bathula**, X. Papademetris and J. S. Duncan, Level Set-Based Clustering of Active Regions in Functional MRI, *IEEE Int. Sym. on Biomedical Imaging (ISBI)*, 416 - 419, April 2007.

Extended Abstracts/Posters

[1] P. Madaan, **D. R. Bathula**, P. Dhir, S. Negi, N. Sankhyan, S. Vyas, J. Sahu, Resting-state functional MRI-based connectivity analysis in infantile epileptic spasms syndrome, *International Child Neurology Conference (ICNC)*, May 2024, Cape Town, South Africa.

[2] A. Bilal, **D. R. Bathula**, E. Bränn, E. Fransson, J. S. Virk, F. Papadopoulos, A. Skalkidou, Mom2B: a study of perinatal health via smartphone application and machine learning methods, 65(S1), S574-S575, *European Psychiatry*, 2022.

[3] M. Li, N. Sharma, L. Danyeli, L. Colic, N. Opel, T. Chand, W. Qin, **D. R. Bathula**, M. Goswami, B. Zhang, Z. Duygu Sen, M. Walter, Ketamine-Induced Ego Dissolution is Related to the Functional Connectivity Reconfiguration of the Posteromedial Cortex, 93(9), S93, *Biological Psychiatry*, 2023.

[4] H. Jamalabadi*, A. Sikka*, S. Alizadeh, M. Krylova, J. Van der Meer, **D. R. Bathula**, M. Walter, Deep networks can learn subject-invariant electroencephalography microstate sequences. *Organization for Human Brain Mapping (OHBM)*, June 2018, Singapore.

[5] K. L. Mills, **D. R. Bathula**, et. al. Altered cortico-striatal-thalamic connectivity in relation to spatial working memory capacity in children with ADHD, *Neuroscience (SFN)*, November 2011, Washington, D.C., USA.

[6] D. A. Fair, **D. R. Bathula**, Joel Nigg, et. al. Using resting-state fcMRI to characterize the developmental course of subjects with ADHD, *Human Brain Mapping (HBM)*, June 2011, Québec City, Canada.

[7] T. Costa Dias, E. Musser, V. Wilson, **D. R. Bathula**, et. al. Reward circuit connectivity relates to delay discounting in children with ADHD, *Human Brain Mapping (HBM)*, June 2011, Québec City, Canada.

[8] K. L. Mills T. Costa Dias,, M. S. Blythe, **D. R. Bathula**, et. al. Atypical thalamocortical connectivity in ADHD youth, *Neuroscience (SFN)*, November 2010, Washington, D.C., USA.

[9] **D. R. Bathula**, D. A. Fair, K. L. Mills T. Costa Dias,, M. S. Blythe, J. T. Nigg, B. J. Nagel, Differential relations between functional and structural thalamocortical connectivity across development, *Neuroscience (SFN)*, November 2010, Washington, D.C., USA.

[10] **D. R. Bathula**, X. Papademetris and J. S. Duncan, Anatomically-Informed Clustering of Functional MRI Data, *Proc. of the Biomedical Engineering Society Annual Fall Meeting (BMES)*, October 2006, Chicago, USA.

Invited Talks / Seminars

Mar 2023 Machine Learning for NeuroImaging & Diagnostics

Workshop on Computational Neuroscience & Artificial Intelligence, IIT Delhi, India.

Sep 2022 Medical Image Processing & Analysis

Workshop for iHub and HCI Foundation, IIT Mandi, India.

Apr 2022 Deep Learning for Medical Imaging: Challenges & Opportunities

Keynote Speaker, International Conference on Ambient Intelligence in Health Care (ICAIHC-2022), Siksha 'O' Anusandhan, India.

Mar 2022 Applications of AI: Opening new avenues for Medical Image Analysis of NeuroImaging Data

Expert Talk, High-End workshop (Karyashala) on Role of Artificial Intelligence in Bio-Medical and Health Informatics (RAIBHI-2022), NIT Silchar, India.

Sep 2019 Medical Imaging Meets Machine Learning

Expert Talk, STC on Pattern Recognition and Cyber Security Applications, NIT Kurukshetra, India.

Jan 2019 Breaking Boundaries of Interdisciplinary Collaboration - Linking Medicine with Engineering

Invited Speaker, Institutional Research Day Celebrations, Dayanand Medical College (DMC) Ludhiana, Punjab, India

Jan 2019 Frontiers of Machine Learning in Medical Imaging

Speaker, TEQIP Workshop on Deep Learning and Internet of Things (IoT), UIET, Kurukshetra University, India

Jul 2016 Machine Learning for Medical Imaging

Expert Session, TEQIP Sponsored Workshop on"Image Processing and Machine Learning for Pattern Recognition", UIET, Punjab University, Chandigarh, India

Apr 2015 MRI Modalities: Emerging tools for studying brain development

Speaker, Industry Institute Interaction Week, PEC University of Technology, Chandigarh, India

Mar 2015 Medical Image Analysis: Role of Image Segmentation

Expert Lecture, IETE Student Chapter, Chitkara University, Rajpura, Punjab, India

Oct 2014 An Introduction to the exciting field of NeuroImaging!

Expert Lecture, WIE/ACM-W/IEEE Chapters, Thapar University, Patiala, Punjab, India

Nov 2013 NeuroImaging with MRI: An Insight Into Brain Structure & Function

Speaker, Symposium on Image Processing & Pattern Recognition, SAU, New Delhi, India

Oct 2013 Brain Connectivity Analysis Using Resting State Functional MRI

Expert Lecture, Panjab University (PU), Chandigarh, India

Aug 2011 Functional MRI Analysis Using Training Based Prior Models of Activation Patterns

Invited Talk, National Brain Research Center, Manesar, Haryana, India

Honors & Awards

2009	Harding Bliss Prize for excellence in Engineering research	*Yale University*
2003	Frederick M. Adler Graduate Research Fellowship	*Yale University*
2003	Employee of the Quarter Award	*Orion Health*
2001	Senior Project Prize in Digital Systems Design	*University of Auckland*
2000 - 2001	Access Award	*University of Auckland*

1999 - 2001	Dean's Honor List Nominee, School of Engineering	*University of Auckland*
1999 - 2001	Senior Prize in Computer Systems Engineering	*University of Auckland*
1997	"Academic Dux" Award for best performance	*Lynfield College*

Professional Service / Activities

Member

- Institute of Electrical and Electronics Engineers (IEEE)
- IEEE Engineering in Medicine and Biology Society (EMBS)
- IEEE Women in Engineering (WIE)
- Institute of Professional Engineers New Zealand (IPENZ)

Program Committee Member

- International Conference on Signal, Image and Video Processing (ICSIVP)
- Nat'l. Conf. on Computer Vision, Pattern Recognition, Image Processing & Graphics (NCVPRIPG)

Reviewer

- Journal – Medical Image Analysis Journal (Elsevier)
- Journal – IEEE Transactions of Medical Imaging (IEEE-TMI)
- Journal – IEEE Transactions on Image Processing (IEEE-TIP)
- Journal – IEEE Transactions on Radiation and Plasma Medical Sciences (IEEE-TRPMS)
- Journal - Multimedia Tools and Applications (Springer)
- Journal - Computers in Biology and Medicine (Elsevier)
- Journal - Computer Methods and Programs in Biomedicine (Elsevier)
- Journal - Pattern Recognition Letters (Elsevier)
- Journal - Nature Scientific Reports (Springer)
- Journal - Neural Networks (Elsevier)
- Journal - Engineering Applications of Artificial Intelligence (Elsevier)
- Review Editor on the Frontiers Editorial Board of Brain Imaging Methods (specialty section of Frontiers in Neuroscience and Frontiers in Neurology)
- Conference – Int. Symp. on Biomedical Imaging (ISBI)
- Conference – Int. Conf. on Computer Vision, Graphics and Image Processing (ICVGIP)
- Conference – Int. Conf. on Signal, Image and Video Processing (ICSIVP)
- Conference – Int. Conf. on Medical Image Computing & Computer-Assisted Intervention (MICCAI)

Teaching

Undergraduate Courses

2011-2024

CS201 – Data Structures
CS202 – Programming Paradigms and Pragmatics
CS307 – Computer Graphics
CS402 – Digital Image Analysis
CS404 – Computer Vision
GE101 – Technology Museum Lab

Graduate Courses

2011-2024

BML609 – Physics of Medical Imaging
CSL715 – Biomedical Image Processing & Analysis
CSL771 – Advanced Image Processing & Analysis
CSL631 – Physics of Medical Imaging

Computer Skills

Operating Systems Unix/Linux, Microsoft Windows, DOS

Programming Languages MatLab, C, C++, Java, Visual Basic, Delphi, Perl, Python, Tcl/Tk, Assembly

Other Software	Mathematica, LabView, VTK/ITK, R, SPSS, SYSTAT, TEX, LATEX