

Mohan Lal Jayatilake

CURRENT EMPLOYMENT	University of Peradeniya , Peradeniya, Sri Lanka <i>Senior Lecturer II</i>	2013 - Present
	Department of Radiography and Radiotherapy Faculty of Allied Health Sciences <i>Office : 0812387500</i> <i>E-mail : jayatiml@gmail.com</i>	
EDUCATION	University of Cincinnati , Cincinnati, Ohio Ph.D., Physics, September 2011 <ul style="list-style-type: none">Dissertation Topic: "Optimization and construction of passive shim coils for human brain at high-field MRI" M.S., Physics, May 2007	
	University of Peradeniya , Peradeniya, Sri Lanka B.Sc (First Class Hons.), Physics, December, 2003	
TEACHING EXPERIENCE	Department of Physics, University of Cincinnati , Cincinnati, Ohio <i>Teaching Assistant</i>	2005 - 2007
	Department of Physics, University of Peradeniya , Peradeniya, Sri Lanka <i>Lab demonstrator</i>	2003 - 2004
	Department of Physics, University of Peradeniya , Peradeniya, Sri Lanka <i>Assistant lecturer</i>	June 2004 - December 2004
PROFESSIONAL EXPERIENCE	Nuclear Medicine Unit, University of Peradeniya , Peradeniya, Sri Lanka <i>Radiation protection officer</i>	2004 - 2005
RESEARCH EXPERIENCE	Oregon Health and Science University , Portland, Oregon USA <i>Postdoctoral Research fellow</i> Completed Projects <ul style="list-style-type: none"><i>Early Prediction of Breast Cancer Therapeutic Response and Evaluation of Residual Disease Using Quantitative DCE-MRI</i> I perform DCE-MRI data collections from breast cancer patients who undergo neoadjuvant chemotherapy before surgeries, and data analyses using a novel Shutter-Speed pharmacokinetic model to extract kinetic parameters on the tumor ROI and pixel-by-pixel (within the ROI) bases. These imaging biomarkers are correlated with pathology endpoints to determine good markers for early prediction of treatment response and accurate assessment of residual disease.<i>Quantitative DCE-MRI as a predictor of therapeutic response in acute leukemia</i> I perform DCE-MRI data collections from newly diagnosed acute myelogenous leukemia patients before they undergo standard induction therapy, and data analyses using the pharmacokinetic model to extract kinetic parameters in the vertebral bodies of L2, L3, L4 and the iliac crest on the ROI and pixel-by-pixel (within the ROI) bases. These parameters are correlated with clinical and pathological endpoints to investigate if baseline bone marrow DCE-MRI can predict complete remission following standard therapy for acute leukemia.	2012 - 2013

University of Cincinnati, Cincinnati, Ohio USA

Graduate research assistant and Postdoctoral Research fellow

2007 - 2012

Completed Projects

- *Development of a third-order passive shim system*

I developed a novel third-order passive shim system for use with second-order active shimming to improve the homogeneity within the human brain. B_0 field maps were obtained on a 4T Varian INOVA whole-body MRI and analyzed using AFNI and custom MATLAB software. Average third-order field distribution were computed and used to design a passive shim insert. This technique improves B_0 homogeneity significantly over the entire human brain especially in the prefrontal lobe.

- *Development of a localized passive shim system for orbito frontal cortex (OFC) shimming*

I developed a novel localized passive shim system for improving B_0 field homogeneity within the orbitofrontal cortex (OFC). Custom MATLAB software was used to reconstruct in vivo 4T data and compute inhomogeneity within subjects brain and OFC. The magnetic properties and geometry of shim inserts were derived using MATLAB. When combined with second-order active shimming, the passive shim device reduced B_0 inhomogeneity considerably over the sinus region within human brain especially in the OFC.

- *Development of a RF passive shim model*

Optimal image quality for MRI at high field requires a uniform RF (B_1) field. I developed a theoretical framework for determining the requisite material properties for the passive shim material for brain imaging at 4T. Using Mathematica, a characteristic equation was derived by applying boundary conditions to wave solutions in each region of a modeled brain, coil and RF shield. Custom MATLAB software was used to determine the appropriate dielectric constant. Simulations of RF field maps were computed using MATLAB software to validate the derived dielectric constant using the proposed model.

- *Calibration of first and second order shims for active shimming*

Calibration tables for 1st and 2nd order spherical harmonic coefficients vs. shim currents on a 4T Varian INOVA imager were determined for use in global and localized active shimming. Data was acquired for a phantom while varying applied shim currents and reconstructed as B_0 field maps using custom MATLAB software. The slopes and linear regressions for 1st and 2nd -order spherical harmonics vs. shim current steps were computed to update the scanner's calibration tables. The improvement of field homogeneity and related full width at half maximum (FWHM) were computed using MATLAB with new active shim technique.

University of Peradeniya, Peradeniya, Sri Lanka

Undergraduate student

2003 - 2003

Completed Project

- High frequency gamma radiation causes damage throughout the body and increases incidence of cancer. Analysis of patient data suggested that people in the Central Sri Lanka were at increased risk for developing cancer. Rock samples were collected and analyzed using a NaI (TI) scintillation Detector to reveal increased environmental exposure to radioactive isotopes particularly thorium.

PUBLICATIONS

- **Mohan L Jayatilake**, Judd Storrs, and Jing-Huei Lee, PhD., Construction of an optimized local third-order passive shim insert for human brain imaging at 4T". *Peer Review, Magn Reson Mater Phys Biol Med.* 2013.

CONFERENCE
PRESENTATIONS

- **Mohan L Jayatilake**, Judd Storrs, Wen-Jang Chu, PhD and Jing-Huei Lee, PhD., “Determination of the dielectric constant for passive RF shimming at high field” (Submitted manuscript, *Magn. Reson. Med.*)
- **Mohan Jayatilake**, Xin Li, Alina Tudorica, Karen Oh, Nicole Roy, Stephen Chui, and Wei Huang.
Quantitative DCE-MRI Assessment of Breast Cancer Therapeutic Response: How Long Is the Acquisition Time Necessary?
Proc. Int. Soc. Magn. Reson. Med. **21**, (2013).
Twenty First Annual Meeting of the International Society for Magnetic Resonance in Medicine; Salt Lake City, USA, 2013.
- **Mohan Jayatilake**, Aneela Afzal, Xin Li, Yiyi Chen, William J Woodward, Tibor J Kovacsics, William H Fleming, and Wei Huang.
Quantitative DCE-MRI as a Predictor of Acute Leukemia Response to Therapy.
Proc. Int. Soc. Magn. Reson. Med. **21**, (2013).
Twenty First Annual Meeting of the International Society for Magnetic Resonance in Medicine; Salt Lake City, USA, 2013.
- Alina Tudorica, Karen Y Oh, Stephen Y-C Chui, Nicole Roy, Megan L Troxell, Yiyi Chen, Arpana Naik, Ariel Lopez-Chavez, Megan L Holtorf, Aneela Afzal, **Mohan Jayatilake**, Zunqiu Chen, Charles S Springer, Xin Li, and Wei Huang.
Early Prediction of Breast Cancer Therapeutic Response and Evaluation of Residual Disease Using Quantitative DCE-MRI.
Proc. Int. Soc. Magn. Reson. Med. **21**, (2013).
Twenty First Annual Meeting of the International Society for Magnetic Resonance in Medicine; Salt Lake City, USA, 2013.
- Martin M. Pike, **Mohan L. Jayatilake**, Xiaoyan Wang, Merryl R. Lobo, Xin Li, Matthias C. Schabel, William D. Rooney, Dale J. Christensen, Jerry D. Glickson, Rosalie C. Sears, Wei Huang and Charles S. Springer
Does DCE-MRI Have a Metabolic Dimension?.
Proc. Int. Soc. Magn. Reson. Med. **21**, (2013).
Twenty First Annual Meeting of the International Society for Magnetic Resonance in Medicine; Salt Lake City, USA, 2013.
- **M Jayatilake**, J Storrs, W-J Chu, and J-H Lee.
Theoretical determination of the dielectric constant for passive RF shimming at high field.
Proc. Int. Soc. Magn. Reson. Med. **19**, 4403 (2011).
Nineteenth Annual Meeting of the International Society for Magnetic Resonance in Medicine; Montreal, Canada, May 7-13, 2011.
- **M Jayatilake**, J Storrs, J Osterhage, and J-H Lee.
Construction and optimization of local 3rd order passive shim system for human brain imaging at 4T MRI. *Proc. Int. Soc. Magn. Reson. Med.* **19**, 4398 (2011).
Nineteenth Annual Meeting of the International Society for Magnetic Resonance in Medicine; Montreal, Canada, May 7-13, 2011.
- J Storrs, **M Jayatilake**, W-J Chu and J-H Lee.
Grid-based shimming of single-voxel MRS.
Proc. Int. Soc. Magn. Reson. Med. **19**, 2086 (2011).
Nineteenth Annual Meeting of the International Society for Magnetic Resonance in Medicine; Montreal, Canada, May 7-13, 2011.

- **M Jayatilake**, J Storrs and J-H Lee.
A novel localized passive shim technique for optimizing magnetic field of the human orbitofrontal cortex at high field.
Proc. Int. Soc. Magn. Reson. Med. **18**, 1541 (2010).
Eighteenth Annual Meeting of the International Society for Magnetic Resonance in Medicine; Stockholm, Sweden, May 1-7, 2010.
- **M Jayatilake**, J Storrs and J-H Lee.
Design of a cylindrical passive shim insert for human brain imaging at high field.
Proc. Int. Soc. Magn. Reson. Med. **17**, 776 (2009).
Seventeenth Annual Meeting of the International Society for Magnetic Resonance in Medicine; Hawaii, USA, April 18-24, 2009.(Oral presentation).

LOCAL
CONFERENCE
PRESENTATIONS

- **Mohan L Jayatilake**, Judd Storrs, Jeff Osterhage and Jing-Huei Lee, PhD., “Construction of a passive 3rd-order shim for 4T human brain MRI” , Graduate Poster Forum, University of Cincinnati, 2011.
- **Mohan L Jayatilake**, Judd Storrs, Wen-Jang Chu, PhD and Jing-Huei Lee, PhD., “Evaluation of the dielectric constant for RF shimming at high field MRI”, 2010 Joint Meeting of the APS Ohio-Region Section.
- **Mohan L Jayatilake**, Judd Storrs, and Jing-Huei Lee, PhD., “A novel localized passive shim technique for optimizing magnetic field of the human orbitofrontal cortex at high field” , Graduate Poster Forum, University of Cincinnati, 2010.
- **Mohan L Jayatilake**, Judd Storrs and Jing-Huei Lee, PhD., “A method for constructing a desired passive shim coil” , Graduate Poster Forum, University of Cincinnati, 2009.
- **Mohan L Jayatilake**, Judd Storrs and Jing-Huei Lee, PhD., “Comparison of FASTMAP and B_0 field map shimming at 4T MRI” , Graduate Poster Forum, University of Cincinnati, 2008.

AWARDS AND
SCHOLARSHIPS

- Prof.A.W.Wolfendale memorial prize for best performance in Physics, University of Peradeniya, Sri Lanka, 2002.
- Dr.C.A. Hevavitharana Memorial Prize for best performance in Physics, University of Peradeniya, Sri Lanka, 2003.
- University Scholarship for First Class honors, University of Peradeniya, Sri Lanka, 2003.
- Best in Physical Science and Engineering poster forum award, Graduate poster forum, University of Cincinnati, 2010.
- Best in Physical Science and Engineering poster forum award, Graduate poster forum, University of Cincinnati, 2011.

PROFESSIONAL
AFFILIATIONS

International Society of Magnetic Resonance in Medicine
American Physical Society.