LASITH ADHIKARI

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Research Interests

Machine Learning, Nonconvex Sparse Optimization, Medical Imaging, Deep Learning

Educational Qualifications

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| 2012 – 2017 | **Ph.D. in Applied Mathematics, University of California, Merced, USA**  Thesis:Nonconvex Sparse Recovery Methods  Advisor: Prof. Roummel F. Marcia |
| 2006 – 2010 | **B.Sc. (Special) Degree in Mathematics,**  **University of Sri Jayewardenepura (USJ), Sri Lanka**  GPA: 3.50, First Class Honors |
| 2005 – 2008 | **B.Sc. (Hons) Degree in Information Technology,**  **Sri Lanka Institute of Information Technology (SLIIT), Sri Lanka**  GPA: 3.68, First Class Honors |
| 1996 – 2004 | **Ananda College, Colombo 10, Sri Lanka**  Passed G.C.E. Ordinary Level Examination (2001) with 10 ‘A’s,  Completed G.C.E. Advanced Level Examination (2004) in Mathematics |

Postdoctoral Training

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| 2017 – Present | **Postdoctoral Associate, Department of Medicine, University of Florida, Gainesville, USA**  Advisor: Prof. Azra Bihorac |

Peer-Reviewed Publications

1. L. Adhikari and R. Marcia, *Nonconvex relaxation for Poisson intensity reconstruction*, Proceedings of the 2015 IEEE International Conference on Acoustics, Speech and Signal Processing, 2015.
2. L. Adhikari, D. Zhu, C. Li, and R. Marcia, *Nonconvex reconstruction for low-dimensional fluorescence molecular tomographic Poisson observations*, Proceedings of the 2015 IEEE International Conference on Image Processing, 2015.
3. L. Adhikari and R. Marcia, *p-th power total variation regularization in photon-limited imaging via iterative reweighting*, Proceedings of the 2015 European Signal Processing Conference, 2015.
4. A. Orkusyan, L. Adhikari, J. Valenzuela and R. Marcia, *Analysis of p-norm regularized subproblem minimization for sparse photon-limited image recovery*, Proceedings of the 2016 IEEE International Conference on Acoustics, Speech and Signal Processing, 2016.
5. L. Adhikari, A. Kim and R. Marcia, *Sparse reconstruction for fluorescence lifetime imaging microscopy with Poisson noise*, Proceedings of the 2016 IEEE Global Conference on Signal and Information Processing, 2016.
6. L. Adhikari, A. Kim and R. Marcia, *Nonconvex sparse Poisson intensity reconstruction for time-dependent bioluminescence tomography,* Proceedings of the 2016 International Symposium on Information Theory and Its Applications, 2016.
7. L. Adhikari, J. B. Erway, R. Marcia and R. J. Plemmons, *Trust-region methods for nonconvex sparse recovery optimization*, Proceedings of the 2016 International Symposium on Information Theory and Its Applications, 2016.
8. L. Adhikari and R. Marcia, *Bounded sparse photon-limited image recovery,* Proceedings of the 2016 IEEE International Conference on Image Processing, 2016.
9. M. Banuelos, R. Almanza, L. Adhikari, R. Marcia and S. Sindi, *Constrained variant detection with SPaRC: Sparsity, Parental Relatedness, and Coverage*, Proceedings of the International Conference of the IEEE Engineering in Medicine and Biology Society, 2016.
10. M. Banuelos, R. Almanza, L. Adhikari, R. Marcia and S. Sindi, *Sparse genomic structural variant detection: exploiting parent-child relatedness for signal recovery*, Proceedings of the 2016 IEEE Workshop on Statistical Signal Processing, 2016.
11. M. Banuelos, R. Almanza, L. Adhikari, S. Sindi and R. Marcia, *Sparse signal recovery methods for variant detection in next-generation sequence data*, Proceedings of the 2016 IEEE International Conference on Acoustics, Speech and Signal Processing, 2016.
12. M. Banuelos, L. Adhikari, R. Almanza, A. Fujikawa, J. Sahag, K.Sanderson, M. Spence, S. Sindi and R. Marcia, *Sparse diploid spatial biosignal recovery for genomic variation detection*, Proceedings of the 2017 IEEE International Symposium on Medical Measurements and Apps, 2017.
13. M. Banuelos, L. Adhikari, R. Almanza, A. Fujikawa, J. Sahag, K.Sanderson, M. Spence, S. Sindi and R. Marcia, *Nonconvex regularization for sparse genomic variant signal detection*, Proceedings of the 2017 IEEE International Symposium on Medical Measurements and Applications, 2017.
14. F. Wen, L. Adhikari, L. Piu, R. Marcia, P.Liu and R. Qiu, *Nonconvex regularization based sparse recovery and demixing with application to color image inpainting*, IEEE Access Journal, 5, pp. 11513-11527, 2017.
15. M. Banuelos, R. Almanza, L. Adhikari, S. Sindi, and R. Marcia, *Biomedical signal recovery: Genomic variant detection in family lineages*, Proceedings of 2017 IEEE 5th Portuguese Meeting on Bioengineering, 2017.
16. L. Adhikari, J. Erway, S. Lockhart, and R. Marcia, *Limited memory trust-region methods for sparse relaxation*, Proceedings of SPIE: Wavelets and Sparsity XVII, 2017.
17. L. Adhikari and R. Marcia, *Non-convex Shannon entropy for photon-limited imaging*, Proceedings of SPIE: Wavelets and Sparsity XVII, 2017.
18. O. DeGuchy, L. Adhikari, A. Kim, and R. Marcia, *Photon-limited fluorescence lifetime imaging microscopy signal recovery with known bounds*, Proceedings of 2017 IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing, 2017.
19. L. Adhikari and R. Marcia, *Non-convex sparse optimization for photon-limited imaging*, Proceedings of M.Sc./Ph.D. Forum in the 2017 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2017
20. L. Adhikari, T. Baslanti, P. Thottakkara, A. Ebadi, A. Motaei, P. Rashidi, A. Li, A. Bihorac, *Improved Predictive Models for Acute Kidney Injury with IDEAs: Intraoperative Data Embedded Analytics,* 2018 (in preparation)
21. S. Bandyopadhyay, N. Lysak, L. Adhikari, T. Ozrazgat-Baslanti, L. Sautina, R. Mohandas, M. Lopez, H. Baker, P. Rashidi, M. Segal, A. Bihorac*, Urinary molecular signature of early sepsis: A prospective cohort study, 2018* (in preparation)

Presentations

1. *Improved Predictive Models for Acute Kidney Injury using Intraoperative Physiological Data,* 2018 Celebration of Research, College of Medicine, University of Florida, Gainesville, USA on February 19, 2018
2. *Non-convex sparse optimization for photon-limited imaging,* IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), New Orleans, LA, USA on March 6, 2017
3. *Sparse reconstruction for fluorescence lifetime imaging microscopy with Poisson noise*, IEEE Global Conference on Signal and Information Processing (GlobalSIP), Washington, DC, USA on December 8, 2016.
4. *Trust-region methods for nonconvex sparse recovery optimization*, International Symposium on Information Theory and Its Applications (ISITA 2016), Monterey, USA on November 1, 2016.
5. *Nonconvex sparse Poisson intensity reconstruction for time-dependent bioluminescence tomography*, International Symposium on Information Theory and Its Applications (ISITA 2016), Monterey, USA on November 1, 2016.
6. *Bounded sparse photon-limited image recovery*, IEEE International Conference on Image Processing (ICIP 2016), Phoenix, Arizona, USA on September 28, 2016.
7. *Limited-memory trust-region methods for sparse reconstruction*, International Conference on Continuous Optimization (ICCOPT 2016), Tokyo, Japan on August 8, 2016.
8. *Nonconvex relaxation for Poisson intensity reconstruction*, Central Valley Regional SIAM Student Conference at UC Merced, Merced, USA on April 29, 2016.
9. *Analysis of p-norm regularized subproblem minimization for sparse photon-limited image recovery*, IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2016), Shanghai, China on March 22, 2016.
10. *Fluorescence-lifetime imaging microscopy (FLIM) with Poisson noise*, Applied Math Optimization Seminar at UC Merced, Merced on May 11, 2016.
11. *Nonconvex relaxation for Poisson intensity reconstruction*, Central Valley SIAM Regional Conference at UC Merced, Merced, USA on April 29, 2016.
12. *Time-independent and time-dependent fluorescence optical tomography*, Applied Math Optimization Seminar at UC Merced, Merced, USA on Nov 16, 2015.
13. *Nonconvex reconstruction for low-dimensional fluorescence molecular tomographic Poisson observations*, 2015 IEEE International Conference on Image Processing (ICIP 2015), Quebec City, Canada on Sep 29, 2015.
14. *Nonconvex reconstruction for low-dimensional fluorescence molecular tomographic Poisson observations*, SAMPLe talk at UC Merced SIAM student chapter, USA on Sep 23, 2015.
15. *p-th power total variation regularization in photon-limited imaging via iterative reweighting*, European Signal Processing Conference (EUSIPCO 2015), Nice, France on Sep 03, 2015.
16. *Nonconvex relaxation for photon-limited sparse optimization*, International Symposium on Mathematical Programming (ISMP 2015), Pittsburgh, USA on July 16, 2015.
17. *Nonconvex relaxation for photon-limited sparse optimization*, SAMPLe talk at UC Merced SIAM student chapter, Merced, USA on July 8, 2015.
18. *Nonconvex optimization for photon-limited imaging*, SAMPLe talk at UC Merced SIAM student chapter, Merced, USA on March 18, 2015.
19. *Introduction to the mathematics of medical imaging*, Applied Math Optimization Seminar at UC Merced, Merced, USA on Dec 1 and Dec 8, 2014.

Work Experiences

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| Present | **Postdoctoral Associate** at Department of Medicine, University of Florida |
| 2016 Summer | **Industrial Mathematical and Statistical Modeling Workshop** at Statistical and Applied Mathematical Sciences Institute (SAMSI), NCSU, NC |
| 2014 - 2017 | **Graduate Student Researcher** at Department of Applied Mathematics, UC Mercedin Spring 2014 and Summer 2014, 2015, 2016 |
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| 2012 - 2015 | **Teaching Assistant** at Applied Mathematics, UC Merced  Calculus 1 – Fall 2012, Math 32: Probability and Statistics – Spring 2013,  Mathematical Methods for Optimization – Fall 2013, Introduction to Linear Algebra & Differential Eq. – Fall 2014, Numerical Analysis I – Spring 2015 |
| 2011 Sep - 2012 April | **Computer Technology Instructor** at Department of Mathematics, University of Sri Jayewardenepura (USJ), Nugegoda, Sri Lanka  Computer Programming (C++), Visiting Lecturer to conduct Mathematics Lab session, Faculty of Medical Sciences, USJ, Sri Lanka |
| 2010 Sep – 2011 Aug | **Instructor at Department of Mathematics**, University of Sri Jayewardenepura, Nugegoda, Sri Lanka  Calculus I/II, Numerical Methods I/II, Abstract Algebra, Optimization 1, Applicable Mathematics |
| 2009 | Underwent **one-month training at Ansell Lanka (Pvt) Ltd**, Biyagama Export Processing Zone, Sri Lanka |

Mentoring Experiences

* Mentoring Sabyasachi Bandyopadhyay, PhD student, Department of Biomedical Engineering, University of Florida, 2017 Summer to Present
* Mentored participants in Sparse Optimization for the Research Experience for Undergraduates (REU) ARCHIMEDES program at UC Merced, Summer, 2016
* Mentored Joanna Valenzuela in MATLAB programming and medical imaging for the Undergraduate Research and Mentoring (URM) program, 2014
* Mentored participants in Medical Imaging for the Research Experience for Undergraduates (REU) ARCHIMEDES program at UC Merced, Summer, 2014

Project Experiences

* Developed and tested 7 novel sparsity-promoting algorithms with applications to medical imaging and signal processing during the PhD program.
* *Title:* Inverting for Near Shore Bathymetry from Surface Wave Properties (*IMSM 2016 program group project at NCSU with U.S. Army Corps of Engineers).*
* *Title:* Fourier Transform based Image Reconstruction using Filtered Back-Projection Formula (*Numerical Analysis course project at UC Merced).*
* *Title:* Discrete Image Reconstruction using Parallel Beam Geometry *(Scientific Computing course project at UC Merced)*
* *Title:* Apartment Complex Surveillance Investigator *(4th year group project at SLIIT)* It is an innovative system to ensure security of an apartment complex using wireless technology with a group of five members. Selected for the National Best Quality Software Awards Competition.
* *Title:* Student Attendance System for SLIIT *(3rd Year group project at SLIIT)*

The project was implemented using C#.Net 2005 and Microsoft Access.

* *Title:* Hotel Reservation and Management System *(2nd year group project at SLIIT)*

This system was developed using C#.net, ASP.net and SQL Server 2000.

* *Title:* Face Recognition using Eigenfaces and Fisherfaces *(Final year project in* USJ*)*

This tool was developed using image processing techniques in MATLAB® 7.6 and C#.net.

* *Title:* Study of Management Practices in a Real World Organization: Hatton National Bank, Sri Lanka

Fellowships and Awards

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| 2017 January | SIAM Student Travel Award for SIAM Conference on Optimization |
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| 2016 November | School of Natural Sciences Dean’s Distinguished Scholars Fellowship 2017, UC Merced |
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| 2016 October | U.S. NSF Student Travel Fellowship for IEEE GlobalSIP 2016 |
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| 2016 Summer | Summer Research Fellowship, Applied Mathematics, UC Merced |
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| 2016 Spring | Applied Mathematics Research Travel Fellowship, UC Merced |
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| 2016 | Artist of the Year (Photography) – 2nd Place, Bobcat Art Show, UC Merced |
| 2015 Spring | Applied Mathematics Research Travel Fellowship, UC Merced |

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| 2015 – 2016 | Graduate Student Opportunity Program Fellowship, UC Merced |
| 2005 – 2009 | Five Scholarships in recognition of superior academic performance during B. Sc. (Hons) Degree in IT |
| 2001 | Electronics Subject Prize in Grade 11 |
| 1995 | Grade - 5 Scholarship with a Cash Prize |

Certification

* Neural Networks for Machine Learning by University of Toronto on Coursera. Certificate earned on 2017.
* PC Hardware, Department of Computer Science & Engineering, University of Moratuwa, Sri Lanka, 2004.

Professional Societies

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| 2015 - 2017 | Society for Industrial and Applied Mathematics (SIAM), Student member |
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| 2015 - 2017 | Institute of Electrical and Electronics Engineers (IEEE), Student member |
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| 2016 - 2017 | Institute of Electrical and Electronics Engineers (IEEE), SPS member |

Skills

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| Programming Languages: | Python, R, Matlab, C++, C#.net, Java |
| Database Technologies: | MS SQL Server 2000/2005, Oracle 10g, Microsoft Access |

Extra Curricula Activities

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| 2009 | Student Exhibition Committee Member, 50th Anniversary Exhibition of University of Sri Jayewardenepura. |
| 2004 | Committee Member of the Ananda College Mathematics Society and Chemistry Club. |
| 2002 – 2003 | Assistant Secretary of the Ananda College Electronics Society. |