

## **SATHISHKUMAR SAMIAPPAN, PhD**

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Geosystems Research Institute  
Mississippi State University  
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### **EDUCATION**

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**Ph.D. - Electrical and Computer Engineering**, Mississippi State University, 2014

**Masters - Computer Science and Engineering**, Amrita University, India, 2006

**Bachelors - Electronics and Communications Engineering**, Bharathiar University, India, 2003

### **PROFESSIONAL EXPERIENCE**

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**Mississippi State University**, Geosystems Research Institute (GRI), Starkville, MS

Postdoctoral associate – August 2014 to present  
*(Unmanned aerial systems, remote sensing, pattern recognition, flight planning and operations)*  
Graduate research assistant – August 2009 to May 2012  
*(Remote sensing, hyperspectral image analysis, applications in agriculture and food safety)*

**Mississippi State University**, Department of Electrical & Computer Engineering, Starkville, MS

Graduate teaching assistant – June 2012 – May 2013  
Graduate teaching assistant – August 2013 – August 2014

**National Data Buoy Center**, Stennis Space Center, MS

Data quality analyst intern – May 2013 to August 2013  
*(Studying ocean currents, temperature, and wind, data quality, and analysis)*

**Amrita University**, Department of Electronics and Communications Engineering, Ettimadai, India

Lecturer – June 2006 to July 2009

**International Institute of Information Technology**, Center for Visual Information Technology,  
Hyderabad, India

Research intern – May 2007 – July 2007  
*(Image understanding, and video summarization)*

**Amrita University**, Department of Computer Science and Engineering, Ettimadai, India

Graduate Assistant – September 2004 to May 2006  
*(Content-based image retrieval, image understanding)*

## **PUBLICATIONS**

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### **Refereed Journal Articles (in print)**

- 1) **S. Samiappan**, G. Turnage, L. Hathcock, *et.al* “Mapping of Invasive *Phragmites* (common reed) in Gulf of Mexico Coastal Wetlands using Multispectral Imagery and Unmanned Aerial Systems” *International Journal of Remote Sensing* November 2016 (Accepted)
- 2) **S. Samiappan**, G. Turnage, L. Hathcock, *et.al* “Using Unmanned Aerial Vehicles for High-Resolution Remote Sensing to Map Invasive *Phragmites australis* in Coastal Wetlands” *International Journal of Remote Sensing*, October 2016
- 3) **S. Samiappan**, S. Prasad, and L.M. Bruce, “Non-Uniform Random Feature Selection and Kernel Density Scoring with SVM-based Ensemble Classification for Hyperspectral Image Analysis” *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, April 2013
- 4) B. Sridhar, I. A. Sheriff, K.A.N. Kutty, and **S. Samiappan** “Comparison of Cascaded LMS-RLS, LMS and RLS Adaptive Filters in Non-Stationary Environments”, *Springer Novel Algorithms and Techniques in Telecommunications and Networking*, May 2010

### **Refereed Journal Articles (under preparation)**

- 5) **S. Samiappan**, *et.al* “Estimating the Distribution and Abundance of Water Birds on Catfish Aquaculture Facilities Using Imagery Collected from an Unmanned Aerial System” *International Journal of Wildlife Management*
- 6) **S. Samiappan**, *et.al* “Identification and Estimation of Damage caused by Feral Hogs in Corn Fields using Change Detection and an Unmanned Aerial System” *International Journal of Wildlife Management*

### **Refereed Conference Proceedings**

- 7) **S.Samiappan**, L.Dabbiru and R.Moorhead “Fusion Of Hyperspectral And Lidar Data Using Random Feature Selection And Morphological Attribute Profiles” *8<sup>th</sup> IEEE Workshop on Hyperspectral Image and Signal Processing*, Los Angeles, CA, August 2016
- 8) **S. Samiappan** and R. J. Moorhead, “Semi-Supervised Co-Training and Active Learning Framework for Hyperspectral Image Classification” *IEEE International Geoscience and Remote Sensing Symposium*, Milan, Italy June 2015
- 9) L. Dabbiru, **S. Samiappan**, R.Nobrega, *et.al* “Fusion of Synthetic Aperture Radar and Hyperspectral Imagery to Detect Impacts of Oil Spill in Gulf of Mexico” *IEEE International Geoscience and Remote Sensing Symposium*, Milan, Italy June 2015
- 10) J. E. Ball, D. T. Anderson, and **S. Samiappan**, “Hyperspectral Band Selection Based on the Aggregation of Proximity Measures for Automated Target Detection”, *SPIE Conference - DSS*, Baltimore, ML April 2014
- 11) **S Samiappan**, L.M. Bruce, and H. Yao, “Support Vector Machines Classification of Fluorescence Hyperspectral Image for Detection of Aflatoxin in Corn Kernels” *IEEE Workshop on Hyperspectral Image & Signal Processing: Evolution in Remote Sensing* July 25, 2013
- 12) **S Samiappan**, L.M. Bruce, and S Prasad, “Automated Hyperspectral Imagery Analysis via Support Vector Machines based Multi-Classifer System with Non-Uniform Random Feature Selection”, *Proceedings of the IEEE Geoscience and Remote Sensing Symposium*, Vancouver, Canada. July 5, 2011
- 13) **S Samiappan**, L.M. Bruce, and S. Prasad, “Branch and Bound based Feature Elimination for Support Vector Machine based Classification of Hyperspectral Images”, *Proceedings of the IEEE Geoscience and Remote Sensing Symposium*, Vancouver, Canada. July 5, 2011

- 14) **S. Samiappan**, S. Prasad, and L.M. Bruce, “NASA's Upcoming HypsIRI Mission - Precision Vegetation Mapping with Limited Ground Truth” *Proceedings of the IEEE Geoscience and Remote Sensing Symposium*. Honolulu, Hawaii, USA June 2010
- 15) B. Arumugam, **S. Samiappan**, and P. Manoharan, “Improved Adaptive Skip Algorithm for Video Shot Boundary Detection”, *Proceedings of the IEEE International Conference on Signal Processing, Communications and Networking*, Chennai, February 5, 2007

#### **Other Refereed Conference Presentations and Posters**

- 16) K. Grissom, **S. Samiappan**, R. Beets, D. Petraitis, and Z. Zhou “Improvements to the TAO web-based Data Management System”, *NOAA's 38th Climate Diagnostics and Prediction Workshop* August 21, 2013
- 17) G. Turnage, **S. Samiappan**, L. Hathcock, R. Moorhead “Mapping of Phragmites australis using 5-band imagery collected from an Unmanned Aerial System” presented at *2016 The Wildlife Society annual conference*, Raleigh, NC, October 2016.
- 18) **S. Samiappan**, A.Crain, and L. Hathcock, *et.al* “Identification and Estimation of Damage caused by Feral Hogs in Corn Fields using Change Detection and an Unmanned Aerial System” presented at *The Wildlife Society annual conference*, Raleigh, NC, October 2016.
- 19) P. Burr, **S. Samiappan**, and L. Hathcock, *et.al* “Estimating the Distribution and Abundance of Water Birds on Catfish Aquaculture Facilities Using Imagery Collected from an Unmanned Aerial System” presented at *The Wildlife Society annual conference*, Raleigh, NC, October 2016.
- 20) G. Turnage, **S. Samiappan**, and L. Hathcock, *et.al* “Mapping of Phragmites australis using 5-band Imagery Collected from an Unmanned Aerial System” Presented at Midsouth Aquatic Plant Management Society conference, Baton Rouge LA September 2016.
- 21) **S. Samiappan**, G. Turnage, and R. Moorhead “Identifying and Mapping Chinese Tallow Tree Using Unmanned Aerial Systems and Multispectral Imagery” Presented at Midsouth Aquatic Plant Management Society conference, Baton Rouge LA September 2016.
- 22) **S.Samiappan**, B.W Henry and R. Moorhead “Plant stand count and corn crop density assessment using texture analysis on visible imagery collected using unmanned aerial vehicles” presented at the 13<sup>th</sup> International conference on Precision Agriculture, St.Louis, MO July 2016,
- 23) **S.Samiappan** and R.Moorhead “Mapping of Phragmites Australis in Gulf Of Mexico Wetlands Using Small UAS” Presented at the Gulf of Mexico Oil Spill and Ecosystem Science conference, Tampa, FL February 2016
- 24) M. Hock, W.B. Henry, and **S.Samiappan**, *et.al* “Evaluating Texture Modelling Techniques to Determine Stand Establishment and Plant Populations in Corn”. Presented at South branch American society of Agronomy, Houston TX. 2016
- 25) G.Turnage, P.Stinson and **S.Samiappan** “Mapping of Common Reed (Phragmites Australis) Using Unmanned Aerial Vehicles, Gray Level Co-Occurrence Matrix Texture Extraction, and eCogntion” Presented at Midsouth Aquatic Plant Management Society conference, Mobile AL September 2015.

#### **Project Reports**

- 26) **S.Samiappan** “Mapping of invasive phragmites in the pearl river coastal wetlands and the results of its eradication efforts” June 2016 Geosystems Research Institute May 2015
- 27) **S.Samiappan** “Evaluation of unmanned aerial vehicles (UAV's) for estimating distribution and abundance of waterbirds on catfish aquaculture facilities. NWRC December 2015
- 28) **S.Samiappan** “Evaluation of Unmanned Aerial Vehicles (UAV's) for estimating distribution and damage of feral swine” USDA-APHIS October 2015
- 29) **S.Samiappan** “Estimation of plant stands on corn hybrids from UAS imagery using color segmentation and template matching algorithms” PrecisionHawk May 2015

## **Dissertation and Thesis**

### Doctoral Dissertation

- 30) Spectral band selection for ensemble classification of hyperspectral images with applications to agriculture and food safety

### Master's Thesis

- 31) Extraction of saliency regions using human visual attention model

## **EXTRAMURAL RESEARCH SUPPORT**

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### **Funding sources for Graduate Research Assistantships**

- 1) Lori M Bruce - PI, NGA (NURI Program), "Redundant Wavelet Transforms and Information Fusion for Robust Hyperspectral ATR" \$298,580 – Grant duration: 2010 – 2012  
Involvement: Development and implementation of hyperspectral data fusion using RWT.
- 2) Lori M Bruce – PI, NASA, "Applying NASA HypsIRI observations to precision vegetation mapping for ecological forecasting applications" \$106,415 – Grant duration: 2010 – 2011  
Involvement: Field data collection, Development, and implementation of HypsIRI data classification of aquatic species.
- 3) Lori M Bruce – PI, DHS, "Rapid Detection of Agriterrorism via Remote Sensing" – Phase II \$560,779 – Grant duration: 2008 – 2011  
Involvement: Field data collection, Development and implementation of hyperspectral feature selection and classification of levels of herbicide stress on row-crop corn.
- 4) Nagabhusan P – PI, ISRO, "Content based multimedia retrieval system" – Grant duration: 2004-2007

### **Funding Sources for Postdoctoral Research**

- 5) Robert J Moorhead – PI, NOAA, "Sensing Hazards with Operational Unmanned Technology for the River Forecasting Centers (SHOUT4Rivers)" Grant duration: 2014 - 2016  
Involvement: Flight planning and logistics, image preprocessing, development of texture based algorithm for mapping invasive *Phragmites australis*, and land water classification.
- 6) Robert J Moorhead, USDA APHIS, "Evaluation of changes in distribution and abundance of fish-eating birds on catfish aquaculture and possible effects of industry changes" Grant duration: 2014 - 2015  
Involvement: Flight planning and logistics, image preprocessing, development of color based segmentation and template matching algorithm for estimating and distinguishing fish-eating birds.
- 7) Robert J Moorhead, USDA APHIS, "Evaluation of unmanned aerial vehicles for estimating distribution and damage of feral swine" Grant duration: 2014 - 2016  
Involvement: Flight planning and logistics, image preprocessing, development of density based classification algorithm for estimating and mapping damages caused by feral hogs on row crop corn.

## **RESEARCH INTERESTS**

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- Remote Sensing
- Pattern Classification
- Image Processing
- Machine Learning
- Computer Vision
- Unmanned Aerial Systems

## **PROFESSIONAL ACTIVITIES**

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### **Publication Review**

- IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing
- IEEE Journal of Selected topics in Signal Processing
- Taylor and Francis Geodesy and Cartography
- Taylor and Francis International Journal of Remote Sensing and Remote Sensing Letters
- IET Image Processing
- IETE Journal of Research

### **Society Activities**

- Chairman, ACM Student Chapter – 2006

### **Society Memberships**

- Member, IEEE
- Member, IEEE Computer Society
- Member, IEEE Eta Kappa Nu Honor Society
- Member, International Society of Precision Agriculture
- Member, Wildlife Society
- Life Member, IETE

## **STUDENT ADVISING**

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### **Undergraduate Advising**

- Senior Design Team - Sylvania Golla, *et.al.* “Extracting Cricket Game Summaries via Frame Clustering” 2008 (Amrita University)
- Senior Design Team - Manoj Kumar, *et.al.* “Non-Chronological Dynamic Video Abstraction using Rack Through Method” 2009 (Amrita University)
- Senior Design Team – Arunchander Kalyanasamy, *et.al.* “Video object based Content-Based Video Retrieval system” 2007 (Amrita University)
- Senior Design Team – Kaushik Prakash and Gaurav Pratap “Resolution Enhancement of Color Video Sequences” 2007

### **Undergraduate Summer Research**

- Preston Stinson, Honors Student in EE, Mississippi State University – 2015
- Luan Carlos da Silva Casagrande, Universidade Federal de Santa Catarina, Brazil – 2015
- Donna Jaison, Mississippi State University – 2016

## **COURSES TAUGHT**

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Taught approximately 18 sections of 9 different courses at the undergraduate levels resulting in more than 1000 students. Maintained a high level of dedication to teaching, resulting in instructor evaluation scores averaging 4.0/5.0.

### **Fall 2015**

- ECE3413 Introduction to Electric Circuits, 128 students, undergraduate (Mississippi State University)

### **Fall 2014**

- ECE3443 Signals and Systems, 42 students, undergraduate (Mississippi State University)  
\*Taught selective lectures (8 lectures)

**Summer 2012, Fall 2012, Spring 2013, Fall 2013, and Spring 2014**

- ECE3714 Digital Devices and Logic Design - Laboratory, 270 students combined, undergraduate (Mississippi State University)

**Fall 2009**

- ECE3313 Electromagnetics I - Laboratory, 36 students, undergraduate (Mississippi State University)

**Spring 2009**

- EC3072 Digital Communication, 55 students, undergraduate (Amrita University)

**Fall 2008**

- EC5049 Adaptive Signal Processing, 55 students, undergraduate (Amrita University)
- EC3091 Analog Communications, 55 students, undergraduate (Amrita University)

**Spring 2008**

- EC3020 Digital Signal Processing, 55 students, undergraduate (Amrita University)
- EC5084 Digital Image Processing, 40 students, undergraduate (Amrita University)

**Fall 2007**

- EC5049 Adaptive Signal Processing, 55 students, undergraduate (Amrita University)
- EC3091 Analog Communications, 55 students, undergraduate (Amrita University)

**Spring 2007**

- EC3020 Digital Signal Processing, 52 students, undergraduate (Amrita University)
- EC3072 Digital Communication, 55 students, undergraduate (Amrita University)

**Fall 2006**

- EC3010 Signals and Systems, 48 students, undergraduate (Amrita University)

**UNIVERSITY AND COMMUNITY SERVICE**

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- Evaluator – Graduate Student Research Symposium (GSRS) , Mississippi State University – Spring 2016  
The GSRS is an interdisciplinary forum comprised of a series of oral and poster presentations by graduate students from across the MSU campus. The GSRS showcases the outstanding quality and diversity of graduate-level research at MSU. GSRS serves as an opportunity for graduate students to gain experience giving presentations and to receive meaningful feedback from an evaluative panel of established MSU faculty members and researchers in a conference-style venue.
- Evaluator – Honors Undergraduate Student Symposium, Mississippi State University – Summer 2015, 2016  
The symposium, hosted by the Shackouls Honors College at MSU is an opportunity to showcase faculty-guided student research and creative activity from diverse departments, colleges and research centers across campus. I have had my undergraduate research students presenting at the symposium and I am also actively involved as an evaluator.
- Faculty Mentor, Day One – Montgomery Leadership Program – Fall 2015 and Fall 2016  
Day One is a service-learning community for entering freshmen in which students take a two-credit course on leadership and apply what they learn towards 20 hours of community service in the fall semester. This is offered out of the Office of Student Leadership and Community Engagement.  
  
A Mentor is a faculty who guides a single team of 5-7 students towards the completion of its community service project over the semester. Mentors help coordinate the efforts of the team with the needs of the community and help the team members develop their leadership skills.
- American Cancer Foundation – Volunteer – 2014

- Team Mentor, Dawg Daze, Mississippi State University – 2015 and 2016  
Dawg Daze is an exciting collection of service, other activities and events held to welcome new freshmen & transfer students to Mississippi State.