

# Henry Medeiros

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## EDUCATION

<b>Ph.D. Electrical and Computer Engineering</b>	2010
Purdue University, West Lafayette, Indiana	
<b>Master of Sciences in Electrical Engineering</b>	2005
Federal University of Technology of Paraná, Brazil	
<b>Bachelor Degree in Electrical Engineering</b>	2003
Federal University of Technology of Paraná, Brazil	

## PROFESSIONAL AFFILIATIONS

2014-present	<b>Assistant Professor</b> Department of Electrical and Computer Engineering, Marquette University
2012-2014	<b>Research Scientist</b> School of Electrical and Computer Engineering, Purdue University
2010-2014	<b>Chief Technology Officer</b> Spensa Technologies Inc., West Lafayette, Indiana
2011-2012	<b>Assistant Professor of Electrical Engineering</b> Federal University of Technology of Paraná, Brazil

## RESEARCH GRANTS AND CONTRACTS

2016	Marquette University Opus College of Engineering Legacy Initiative Seed Grant (PI), \$74,054, "Insect detection and tracking"
2016	Northeastern University ALERT Department of Homeland Security Center of Excellence, (co-PI), \$80,000, "Correlating luggage and specific passengers (CLASP)"
2016	Marquette University Regular Research Grant/Summer Faculty Fellowship (PI), \$8,740, "Estimation of Flower and Fruitlet Load in Apple Orchards with Computer Vision"
2016	Marquette University Opus College of Engineering Legacy Initiative Global Innovation Grant (co-PI), \$65,400, "Fostering a Durable International Partnership Between Marquette University (MU) and the University of Genoa, Italy (UNIGE)"
2016	National Institute of Standards and Technology (PI), \$260,459, "Dynamic Performance Measurement of Mobile Manipulators"
2016	Astronautics Corporation of America (PI), \$42,778, "On-ground Collision Alerting System"
2015	United States Department of Agriculture (PI), \$51,195, "Computer Vision and Machine Learning for Plant Sensing"
2014	Marquette University Regular Research Grant/Summer Faculty Fellowship (PI), \$8,200, "Distributed Multi-target Tracking using Wireless Camera Networks"

- 2014 College of Engineering Student Centered Learning Projects (PI), \$3,740, “Simulation-Based Signal Processing using Embedded Platforms”
- 2013 United States Department of Agriculture Small Business Innovation Research (SBIR) Phase I Grant (Senior Personnel), \$100,000, “Electronic Trap for Automated Monitoring of Insect Populations”, Spensa Technologies Inc.
- 2013 National Science Foundation Small Business Innovation Research (SBIR) Phase I and Phase II Grants (Senior Personnel), \$776,927, “A Multimodal Sensor Platform for Automated Detection and Classification of Pest Insects”, Spensa Technologies Inc.
- 2011 Brazilian Council for Scientific and Technological Development (CNPq) Grant (PI), \$8,422, “Efficient Data Collection on Wireless Sensor Networks”, Federal University of Technology of Paraná

**AWARDS AND FELLOWSHIPS**

- 2012 Brazilian Council for Scientific and Technological Development (CNPq) Research Productivity fellowship
- 2008 Second International Conference on Distributed Smart Cameras Service Award
- 2005 Fulbright commission fellowship for Ph.D. studies in the United States of America
- 2003 Agency of the Brazilian Ministry of Education (CAPES) fellowship for graduate studies
- 2003 Best student of the class of Electrical Engineering at the Federal University of Technology of Paraná
- 2000-2002 Brazilian Council for Scientific and Technological Development (CNPq) fellowships for undergraduate research

**TEACHING EXPERIENCE**

**MARQUETTE UNIVERSITY**

- Spring 2016 Introduction to Algorithms
- Fall 2016 Linear Systems Analysis
- Fall 2015
- Fall 2016 Bayesian Signal Processing
- Spring 2015
- Fall 2015 Digital Image Processing
- Fall 2014

**FEDERAL UNIVERSITY OF TECHNOLOGY OF PARANÁ, BRAZIL**

- 2012 Introduction to Control
- 2011
- 2012 Electronic Devices
- 2011
- 2011 Electric Circuit Analysis

## **PROFESSIONAL SERVICE**

### **TECHNICAL PROGRAM COMMITTEE MEMBER**

- 2016 Associate Editor: IEEE International Conference on Robotics and Automation Conference Editorial Board
- 2009 Publications Chair: 3<sup>rd</sup> IEEE/ACM International Conference on Distributed Smart Cameras

### **EXTERNAL REVIEWER**

- 2016 IEEE Transaction on Circuits and Systems for Video Technology
- 2016 Robotics and Autonomous Systems Journal
- 2016 XXV Brazilian Congress on Biomedical Engineering (CBEB)
- 2015, 2016 Society of Hispanic Professional Engineers Research and Innovation in STEM (RISE) Symposia poster and presentations judge
- 2015 IEEE Transactions on Signal and Information Processing over Networks
- 2015 IEEE Transactions on Biomedical Engineering
- 2014 Book Computer Vision Metrics: Survey, Taxonomy, and Analysis by Scott Krig
- 2014 Brazilian Council for Scientific and Technological Development (CNPq)
- 2014 Information Fusion
- 2014 International Journal of Distributed Sensor Networks
- 2014 IEEE Transactions on Networking
- 2015 2014 IEEE Transactions on Signal Processing
- 2013 2009
- 2014 2013 EURASIP Journal on Wireless Communications and Networking
- 2012 IEEE Transactions on Image Processing
- 2012 ACM Transactions on Sensor Networks
- 2012 Telemedicine and e-Health
- 2012 Texas Instruments University Stellaris ARM Cortex-M Microcontroller (MCU) Teaching Tools
- 2011 Neurocomputing
- 2015 2010 Computer Vision and Image Understanding
- 2009
- 2008 Book Multi-Camera Networks: Concepts and Applications, Eds. H. Aghajan and A. Cavallaro
- 2004 Texas Instruments “DSP Implementation using the TMS320C6711, C6713 & C6416” teaching materials

### **UNIVERSITY SERVICE**

- 2016 Marquette University Leadership Academy faculty collaborator
- 2015-2016 Society of Hispanic Professional Engineers (SHPE) Marquette Student Chapter faculty mentor
- 2015 ECE Department representative: Marquette University Graduate School open house

- 2014-2015      Committee member: Marquette University College of Engineering manufacturing director search committee
- 2014-2016      Committee member: Marquette University Department of Electrical and Computer Engineering undergraduate committee
- 2012             Committee member: Federal University of Technology of Paraná faculty search committee for an Assistant Professor of Electrical Engineering in the area of digital systems
- 2011-2012      Committee member: Federal University of Technology of Paraná inter-campus committee for undergraduate research fellowships
- 2011-2012      Committee chair: Federal University of Technology of Paraná graduate program in electrical engineering committee for English language proficiency evaluation

**STUDENTS ADVISED**

**Ph.D.**

- 2020 (expected) Philipe Ambrozio Dias, Marquette University
- 2019 (expected) Reza Mozhdehi, Marquette University

**M.S.**

- 2018 (expected) Samuel Amoako-Frimpong, Marquette University
- 2018 (expected) Yevgeniy Reznichenko, Marquette University
- 2016             Anthony Hoak, Marquette University
- 2016             Andres Echeverri Guevara, Marquette University
- 2015             Daniel Schlifske, Marquette University

**STUDENTS MENTORED (AS A COMMITTEE MEMBER)**

**Ph.D.**

- 2016             Juan Tapiero Bernal, Marquette University
- 2016             Jennifer Bonniwell, Marquette University
- 2015             Donghun D. Kim, Purdue University
- 2013             Shivani G. Rao, Purdue University
- 2013             Kihyun Hong, Purdue University
- 2013             Joshua J. Zapf, Purdue University
- 2011             Marcos V. Rambo, Federal University of Technology of Paraná, Brazil

**M.S.**

- 2015             Elise Russell, Marquette University
- 2012             Marcos C. Maciel, Federal University of Technology of Paraná, Brazil

## **PROFESSIONAL AFFILIATIONS**

Institute of Electrical and Electronics Engineers (IEEE) Member  
American Society for Engineering Education (ASEE) Member  
American Society for Testing and Materials (ASTM) International Member  
Society of Hispanic Professional Engineers (SHPE)

## **PATENTS**

### **ISSUED PATENTS**

MEDEIROS, H; PARK, J; KAK, A; IWAKI, H. "Clustering Protocol for Directional Sensor Networks," U.S. Patent No. 9086499. Issued on June 21, 2015.

MEDEIROS, H; PARK, J; KAK, A; IWAKI, H. "Calibration of Large Cameras Networks," U.S. Patent No. 8,760,521, Issued on June 24, 2014.

PARK, J.; HOLGUIN, G; MEDEIROS, H. "Automatic Monitoring of Insect Populations." South African Patent No. 2013/3528, Issued on January 29, 2014, Colombian Patent No. 78025, Issued on December 18, 2014, Australian Patent No. 2011317278, Issued on February 12, 2015, New Zealand Patent No. 608703, Issued on March 23, 2015 and No. 623192, Issued on November 3, 2015.

### **PATENT APPLICATIONS**

PARK, J.; HOLGUIN, G; MEDEIROS, H. "Automatic Monitoring of Insect Populations." U.S. Patent Application No. 13/879,685, Mexican Patent Application No. MX/a/2013/004066, Chinese Patent Application No. 201180063662.8, Indian Patent Application No. 4224/DELNP/2013, European Patent Application No. 11834936.4, Canadian Patent Application No. 2,814,940, Chilean Patent Application No. 2013-1050, Brazilian Patent Application No. BR11 2013 009401 0.

MEDEIROS, H; PARK, J; KAK, A; IWAKI, H. "Calibration of Large Cameras Networks," Japanese Patent Application No. 2012-526995, Patent Cooperation Treaty Application PCT/US2010/034937, Filed May, 2010, Published December 2011, Pub. No. 2011/0310255A1.

## **INVITED TALKS**

Society of Hispanic Professional Engineers  
Engineering Science Symposium Talk, Seattle, WA, November 2016

Federal University of Technology of Paraná  
Graduate Program in Electrical and Computer Engineering Seminar, Curitiba, Brazil, June 2016

Federal University of Santa Catarina  
Department of Electrical Engineering Seminar, Florianópolis, Brazil, June 2016

United States Department of Agriculture Brown Marmorated Stink Bug IPM Working Group Meeting  
Engineering Computer Vision Tools for Entomology Research, Winchester, VA, December 2015

National Institute of Standards and Technology Intelligent Systems Division Seminar  
Target Tracking using Mobile Platforms, Washington, DC, December 2015

Northeastern University Advanced Development for Security Applications Workshop (ADSA14)  
Tracking and Pose Estimation, Boston, MA, October 2015

## CONFERENCE PRESENTATIONS

Kevin Rice, Amy Tabb, Henry Medeiros, Rob Morrison, John Tooker, Tracy C. Leskey. Tracking insects in the field using lasers and drones. *Mark-release-recapture revisited: Historical, state-of-the-art, and future developments for tracking insect movement in the field, a symposium at the meeting of Eastern branch of the Entomological Society of America*, March, 2017.

## PUBLICATIONS

### JOURNAL PAPERS

MEDEIROS, H.; KIM, D.; SUN, J.; SESHADRI, H.; AKBAR, S.; ELFIKY, N.; PARK, J; “Modeling Dormant Fruit Trees for Agricultural Automation,” *Journal of Field Robotics*, In Press, 2016.

HONG, K.; MEDEIROS, H.; SHIN, P.; PARK, J. “Resource-Aware Distributed Particle Filtering for Cluster-Based Object Tracking in Wireless Camera Networks,” *International Journal of Sensor Networks*, vol. 21, no. 3, 2016.

MEDEIROS, H.; MACIEL, M.C.; SOUZA, R.D.; PELLENZ, M.E. “Lightweight Data Compression in Wireless Sensor Networks using Huffman Coding,” *International Journal of Distributed Sensor Networks*, vol. 2014, Article ID 672921, 11 pages, 2014.

DE SCHATZ, C.V.; MEDEIROS, H.; SCHNEIDER, F.; ABATTI, P.J. “Wireless Medical Sensor Networks: Design Requirements and Enabling Technologies,” *Telemedicine and e-Health*, vol. 18, no. 5, 2012.

YODER, J.; MEDEIROS, H.; PARK, J.; KAK, A. “Cluster-Based Distributed Face Tracking in Camera Networks,” *IEEE Transactions on Image Processing*, vol. 19, no. 10, 2010.

MEDEIROS, H.; HOLGUIN, G.; SHIN, P.J.; PARK, J. “Parallel Histogram-based Particle Filter for Object Tracking on SIMD-based Smart Cameras,” *Computer Vision and Image Understanding*, vol. 114, no. 11 2010.

MEDEIROS, H.; PARK, J.; KAK, A. “Distributed Object Tracking Using a Cluster-Based Kalman Filter in Wireless Camera Networks,” *IEEE Journal of Selected Topics in Signal Processing*, vol. 2, no. 4, 2008.

### BOOK CHAPTERS

MEDEIROS, H.; PARK, J. “Cluster-Based Object Tracking by Wireless Camera Networks,” Book Chapter In: *Multi-Camera Networks: Concepts and Applications*, Elsevier, 2009.

### PEER-REVIEWED CONFERENCE PAPERS

WALSH, R.; MEDEIROS, H. “Detecting Tracking Failures from Correlation Response Maps,” *International Symposium on Visual Computing*, 2016.

GUEVARA, A. E.; BERNAL, J. T.; HOAK, A.; MEDEIROS, H. “Vision-based Self-contained Target Following Robot using Bayesian Data Fusion,” *International Symposium on Visual Computing*, 2016.

PILLA, V.; BORBA, G.B.; MEDEIROS, H; “Facial Expression Classification Using Convolutional Neural Network and Support Vector Machine,” *Brazilian Computer Vision Workshop (WCV)*, 2016.

CHATTOPADHYAY, S.; AKBAR, S.; ELFIKY, N.; MEDEIROS, H.; KAK, A.; “Measuring and Modeling Apple Trees using Time-of-Flight Data for Automation of Dormant Pruning Applications,” *IEEE Winter Conference on Applications of Computer Vision*, 2016.

- SCHLIFSKE, D.; MEDEIROS, H. "A Fast GPU-Based Approach to Branchless Distance-Driven Projection and Back-Projection in Cone Beam CT," In *SPIE Medical Imaging Conference*, 2016.
- RAO, S.; MEDEIROS, H.; KAK, A. "Comparing Incremental Latent Semantic Analysis Algorithms for Efficient Retrieval from Software Libraries for Bug Localization," In *Second International Workshop on Software Mining*, 2013.
- RAO, S.; MEDEIROS, H.; KAK, A. "An Incremental Update Framework for Efficient Retrieval from Software Libraries for Bug Localization," In *20th Working Conference on Reverse Engineering*, 2013.
- SHIN, P.J.; MEDEIROS, H.; PARK, J.; KAK, A.C. "Predictive Duty Cycle Adaptation for Wireless Camera Networks," In *Fifth ACM/IEEE International Conference on Distributed Smart Cameras*, 2011.
- DE SCHATZ, C.V.; MEDEIROS, H.; SCHNEIDER, F.K.; ABATTI, P.J. "Wireless Protocols for Ad-Hoc Medical Sensor Networks," In *IASTED Symposium on Imaging and Signal Processing in Healthcare and Technology*, 2011.
- MEDEIROS, H.; GAO, X.; PARK, J.; KLEIHORST, R.; KAK, A. "A Parallel Implementation of the Color-Based Particle Filter for Object Tracking," In *ACM Sensys Workshop on Applications, Systems, and Algorithms for Image Sensing*, 2008.
- MEDEIROS, H.; IWAKI, H.; PARK, J. "Online Distributed Calibration of a Large Network of Wireless Cameras Using Dynamic Clustering," In *Second ACM/IEEE International Conference on Distributed Smart Cameras*, 2008.
- MEDEIROS, H.; PARK, J.; KAK, A., "A Parallel Color-based Particle Filter For Object Tracking," *Computer Vision and Pattern Recognition Workshops*, 2008.
- MEDEIROS, H.; PARK, J.; KAK, A. "A Light-weight Event-driven Protocol for Sensor Clustering in Wireless Camera Networks," In *ACM/IEEE International Conference on Distributed Smart Cameras*, 2007.