Henry Medeiros

Marquette University
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414-288-6186

EDUCATION

2010 **Ph.D. Electrical and Computer Engineering**
Purdue University, West Lafayette, Indiana

2005 **Master of Sciences in Electrical Engineering**
Federal University of Technology of Paraná, Brazil

2003 **Bachelor Degree in Electrical Engineering**
Federal University of Technology of Paraná, Brazil

PROFESSIONAL AFFILIATIONS

2014-present **Assistant Professor**
Department of Electrical and Computer Engineering, Marquette University

2012-2014 **Research Scientist**
School of Electrical and Computer Engineering, Purdue University

2010-2014 **Chief Technology Officer**
Spensa Technologies Inc., West Lafayette, Indiana

2011-2012 **Assistant Professor of Electrical Engineering**
Federal University of Technology of Paraná, Brazil

RESEARCH GRANTS AND CONTRACTS

2018 State Horticultural Association of Pennsylvania Research Committee (PI), $20,200, "Bloom intensity estimation using your smartphone: Machine learning algorithms for species- independent visual recognition of flowers"

2018 National Institute of Food and Agriculture (co-PI, PI: Amy Tabb, USDA), $474,621 (MU budget $242,000), "Quantifying Invasive Insect Movement Within and Across Landscapes Using Laser Detection Technology and Unmanned Aerial Systems"

2017 Marquette University Opus College of Engineering Undergraduate Research Grant (PI), $4,990, "Tracking Passengers and their Luggage in Airport Checkpoints"

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), $100,000, "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”
2016	Marquette University Opus College of Engineering Summer Undergraduate Research Grant (PI), $4,990, “Feature Extraction and Pose Estimation for Complex Three-dimensional Objects”
2015	United States Department of Agriculture (PI), $58,195, “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 2018 Spring 2017 Spring 2016	Introduction to Algorithms
Fall 2017 Fall 2016 Fall 2015	Linear Systems Analysis

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

2018 Associate Editor: IEEE/RSJ International Conference on Intelligent Robots and Systems Editorial Board

2017 2016 Panelist: National Science Foundation

2017 2016 Member: ASTM Committee E57 on 3D Imaging Systems

2017 Technical Lead: ASTM Working Group WK54684 on New Test Method for Measuring System Latency Performance of Optical Tracking Systems that Measure Six Degrees of Freedom (6DOF) Pose

2017 Associate Editor: IEEE International Conference on Robotics and Automation Conference Editorial Board

2009 Publications Chair: 3rd IEEE/ACM International Conference on Distributed Smart Cameras

EXTERNAL REVIEWER

2018 IEEE International Conference on Robotics and Automation (ICRA)

2018 2017 IEEE Robotics and Automation Letters

2017 Sensors Journal

2017 IEEE Sensors Journal

2017 2016 IEEE Transactions on Circuits and Systems for Video Technology

2016 Robotics and Autonomous Systems Journal

2016 XXV Brazilian Congress on Biomedical Engineering (CBEB)

2016 2015 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
2017 2015 2014 2013 2009	IEEE Transactions on Signal Processing
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 2009	Computer Vision and Image Understanding
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

2017-2018	Committee member: Department of Electrical and Computer Engineering faculty search committee
2017	Marquette University Opus College of Engineering Design Day participant
2017	Marquette University Opus College of Engineering Open House participant
2017	Department of Electrical and Computer Engineering Computer Engineering Curriculum Subcommittee member
2016-2017	Marquette University Hispanic Serving Institution Curriculum subcommittee member
2016	Marquette University Leadership Academy faculty collaborator
2016	Project Judge: Second Marquette University Opus College of Engineering Hackathon
2015-2016	Society of Hispanic Professional Engineers (SHPE) Marquette Student Chapter faculty mentor
2015	ECE Department representative: Marquette University Graduate School open house
2014-2018	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

2020 (expected) Abubakar Siddique, 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.

2018 Karthick Sothivelr, Marquette University

2017 Mohammad Saber, Marquette University

2017 Tanmay Prakash, Purdue University

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.

2017 Ian Barge, Marquette University

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. Japanese Patent No. 5973910.

PARK, J.; HOLGUIN, G; MEDEIROS, H. "Automatic Monitoring of Insect Populations." U.S. Patent No. 9,585,376, Issued on February, 2017, Chinese Patent No. CN103281896, Issued on January, 2016, 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

MEDEIROS, H.; GUEVARA, A.E.; BERNAL, J.T.; O'ROURKE, J. "Robotic Tracking Navigation With Data Fusion," PCT Application No. PCT/US2018/17038.

PARK, J.; HOLGUIN, G; MEDEIROS, H. "Automatic Monitoring of Insect Populations." Mexican Patent Application No. MX/a/2013/004066, 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.

INVITED TALKS

Workshop on Computer Vision for Active and Assisted Living Keynote Talk
Incorporating Domain Knowledge in the Design of Vision-based Assisted Living Systems, Lake Tahoe, CA, March 2018

Marquette University Engineering Student Council Speaker Series
Measuring the Mobility of Geriatric Patients using Computer Vision, Milwaukee, WI, February 2018

National Institute of Standards and Technology Intelligent Systems Division Seminar
Dynamic Performance Measurement of Mobile Manipulators, Washington, DC, July 2017

University of Genoa
Vision-based Target Tracking using Recursive Bayesian Estimation and Deep Learning, Genoa, Italy, June 2017

Marquette University Senior Design Class
Bayesian Signal Estimation, Milwaukee, WI, February 2017

Marquette University GasDay Lab
GasDay Symposium Talk, Milwaukee, WI, February 2017

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, Miguel Hernandez Virto, 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.

Kevin Rice, Amy Tabb, Henry Medeiros, Miguel Hernandez Virto, Tracy C. Leskey. Tracking Insects in the Field Using lasers and Drones. *2017 Cumberland-Shenandoah Fruit Workers Conference*, November, 2017.

PUBLICATIONS

JOURNAL PAPERS

[12] TABB, A.; MEDEIROS H.; "Automatic segmentation of trees in dynamic outdoor environments," *Computers in Industry*, vol. 99, 2018.

[11] DIAS, P.A.; TABB, A.; MEDEIROS H.; "Apple flower detection using deep convolutional networks," *Computers in Industry*, vol. 99, 2018.

[10] KIM, D.; COMANDUR, B.; MEDEIROS, H.; ELFIKY, N.; KAK, A.; "Multi-View Face Recognition from Single RGBD Models of the Faces," *Computer Vision and Image Understanding*, vol. 160, 2017.

[9] TAPIERO, J.E.; MEDEIROS, H.; BISHOP, B. "Predicting Multiple Target Tracking Performance for Applications on Video Sequences," *Machine Vision and Applications*, vol. 28, no. 5, 2017.

[8] HOAK, A; MEDEIROS, H.; POVINELLI, R.J. "Image-Based Multi-Target Tracking through Multi-Bernoulli Filtering with Interactive Likelihoods," *Sensors*, vol. 17, no. 501, 2017.

[7] 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*, vol. 34, no. 7, 2017.

[6] 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.

[5] 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.

[4] 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.

[3] 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.

[2] 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.

[1] 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.

PEER-REVIEWED CONFERENCE PAPERS

[19] AMOAKO-FRIMPONG, S.Y.; MESSINA, M.; MEDEIROS, H.; MARVEL, J.; BOSTELMAN, R.; "Stochastic Search Methods for Mobile Manipulators," *International Conference in Flexible Automation and Intelligent Manufacturing*, 2018.

[18] TABB, A.; MEDEIROS, H. "Fast and robust curve skeletonization for real-world elongated objects," *IEEE Winter Conference on Applications of Computer Vision*, In Press, 2018.

[17] DIAS, P. A.; MEDEIROS, H.; ODONE, F; "Fine segmentation for Activity of Daily Living analysis in a wide-angle multi-camera set-up," *5th Activity Monitoring by Multiple Distributed Sensing Workshop (AMMDS) in conjunction with British Machine Vision Conference*, In Press, 2017.

[16] REZNICHENKO, Y.; MEDEIROS, H. "Improving target tracking robustness with Bayesian data fusion," *British Machine Vision Conference*, In Press, 2017.

[15] TABB, A.; MEDEIROS, H. "A robotic vision system to measure tree traits," *IEEE/RSJ International Conference on Intelligent Robots and Systems*, In Press, 2017.

[14] MOZHDEHI, R.J.; MEDEIROS, H. "Deep convolutional particle filter for visual tracking," *International Conference on Image Processing*, 2017.

[13] WALSH, R.; MEDEIROS, H. "Detecting Tracking Failures from Correlation Response Maps," *International Symposium on Visual Computing*, 2016.

[12] 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.

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

[10] 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.

[9] 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.

[8] 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.

[7] RAO, S.; MEDEIROS, H.; KAK, A. “An Incremental Update Framework for Efficient Retrieval from Software Libraries for Bug Localization,” *20th Working Conference on Reverse Engineering*, 2013.

[6] 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.

[5] 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.

[4] 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.

[3] 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.

[2] MEDEIROS, H.; PARK, J.; KAK, A., “A Parallel Color-based Particle Filter for Object Tracking,” *Computer Vision and Pattern Recognition Workshops*, 2008.

[1] 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.

BOOK CHAPTERS

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