

Institution: U.S. Naval Academy
Program: Systems Engineering

Date: 6 March 2012

1. Name: Randy P. Broussard

2. Education:

BS	Electrical Engineering	Tulane University	1986
MS	Computer Engineering	Florida Institute of Technology	1991
PhD	Electrical Engineering	Air Force Institute of Technology	1997

3. Academic experience: 12.5 years - USNA Professor

Current rank: Associate Professor 2011

4. Non-academic experience:

22 years - Military Officer

1997-2000 Qualia Computing Incorporated - Breast cancer detection / Stock market prediction

2000-2002 CadX Incorporated - Breast cancer detection

Research resulted in three FDA approved commercial Digital Breast Cancer Detection systems

Patents: US Patent Number 6,650,766, Method for combining automated detections from medical images with observed detections of a human interpreter (Issued November 18, 2003)

US Patent Number 6,556,699, Method for combining automated detections from medical images with observed detections of a human interpreter (Issued April 29, 2003)

US Patent Number 6,389,157, Joint optimization of parameters for the detection of clustered microcalcifications in digital mammograms (Issued May 14, 2002)

US Patent Number 6,205,236, Method and system for automated detection of clustered microcalcifications from digital mammograms (Issued March 20, 2001)

US Patent Number 6,167,146, Method and system for segmentation and detection of microcalcifications from digital mammograms (Issued December 26, 2000)

US Patent Number 6,137,898, Gabor filtering for improved microcalcification detection in digital mammograms (Issued October 24, 2000)

US Patent Number 6,115,488, Method and system for combining automated detections from digital mammograms with observed detections of a human interpreter (Issued September 5, 2000)

US Patent Number 6,091,841, Method and system for segmenting desired regions in digital mammograms (Issued July 18, 2000)

US Patent Number 5,999,639, Method and system for automated detection of clustered microcalcifications from digital mammograms (Issued December 7, 1999)

Numerous foreign patents in Digital Breast Cancer Detection

5. States in which registered: none

6. Scientific and professional societies of which a member:

IEEE - Institute of Electrical and Electronics Engineers (member and reviewer)

INNS - International Neural Network Society (member)

SPIE - The International Society for Optical Engineering (member and reviewer)

ASEE - American Society for Engineering Education (member, reviewer and national session office holder (Secretary/Treasurer))

WMSCI - Multi-Conference on Systemics, Cybernetics and Informatics: (Invited program committee member and reviewer)

Reviewer for IEEE Transactions on Aerospace and Electronic Systems journal
Reviewer for ASEE Computers in Education journal
Standing “Yearly” reviewer for Multi-Conference on Systemics, Cybernetics and Informatics conference

7. Honors and awards:

- 2010 Nominated for the AY2010 “Apgar Award for Excellence in Teaching”.
- 2009 Won “Best Paper” award at the 2008 World Multi-Conference on Systemics, Cybernetics and Informatics. My paper was rated in the top 10% of the entire conference (1200+ articles) and selected for publication in the Journal of Systemics, Cybernetics and Informatics
- 2008 Won “Best Paper” award at 2008 IEEE International Conference on Biometrics: Theory, Applications and Systems
- 2008 Won “Best Paper of session” award at 2008 World Multi-Conference on Systemics, Cybernetics and Informatics
- 2007 I was interviewed for the cover story of the October 2007 issue of “What’s up Annapolis” and “What’s up Eastern Shore”. This cover story was titled “07 Guide to TOP DOCS”. The article focused on doctors who are making notable advances in medical research. This interview was totally unsolicited on my part (I have never purchased an issue or submitted to either magazine). The author had heard of my Breast Cancer research from the medical community. She searched for me and requested an interview.
- 2000 Research and Development of the Year award for the Air Force (top individual R&D award in the entire Air Force)
- 2000 Scientific/Technical Individual Achievement of the Year award for the Air Force Research Laboratory (top individual R&D award in 8000+ person AFRL)
- 1999 Military Research and Development of the Year award for the Sensors Directorate of the Air Force Research Laboratory (top R&D award in 700 person laboratory)
- 1999 Technology Transition of the Year award for the Sensors Directorate of the Air Force Research Laboratory

8. Institutional and professional service in the last five years :

Yard

2004-2006 Air Force Senior Representative at the USNA

Division

2001-present Division Computer Technology Group. Formulate future growth plan for division and department computers and network.

2006-present Associate director of the USNA Center for Biometric Signal Processing. Research is funded by the National Security Agency and the Central Intelligence Agency. One of our current goals is to develop a government owned iris identification algorithm to allow the government to mass produce very high accuracy human identification systems without the large cost of current patented algorithms.

2010-present Faculty Senate Sub-committee for Information Technology.

Department

2004-2006 Department financial officer for the expense budget. Authorized and tracked purchases for the department.

2001-present Member of Department ABET Accreditation committee. Assisted in developing and implementing the process that achieved department ABET accreditation under the new ABET rules.

2002-2006 Summer Seminar Workshop Coordinator for Systems Engineering Department

2007-present Member of Department Curriculum Committee. Review and modify department curriculum based on current needs and future goals.

2007-present Summer Internship Coordinator for entire department. This is a demanding job in the WSE department. In AC2009 I screened 30+ midshipmen for 11 internship positions. I then arranged for housing, travel, funding, and arrival/departure dates for each internship.

2011 Faculty hiring committee member.

9. Principal publications of last five years:

----- JOURNAL ARTICLES-----

R.P. Broussard, and R.W. Ives, "Improving Identification Accuracy on Low Resolution and Poor Quality Iris Images using an Artificial Neural Network Based Matching Metric ", *Journal of Electronic Imaging*, Feb 2011.

R.P. Broussard, and R.W. Ives, "Accelerating Image Based Scientific Applications using Commodity Video Graphics Adapters ", *Journal of Systemics, Cybernetics and Informatics*, Vol 7, 1st quarter 2010 (Won Best Paper of session Award. Was rated in the top 10% of the entire conference and selected to be published in this journal.)

R.N. Rakvic, B.J. Ullis, **R.P. Broussard**, R.W. Ives, and N. Steiner, "Parallelizing Iris Recognition", *IEEE Transactions on Forensics and Information Security*, December 2009.

J.R. Matey, **R.P. Broussard**, and L.R. Kennell, "Iris Image Segmentation and Sub-Optimal Images", *Image and Vision Computing Journal: Special issue on Segmentation of Visible Wavelength Iris Images Acquired On-The-Move and At-A-Distance*, doi:10.1016/j.imavis.2009.05.006, Vol. 28, pp 215-222, 2010.

R.P. Broussard, R.N. Rakvic, and R.W. Ives, "Accelerating Iris Template Matching using Commodity Video Graphics Adapters," *The 2008 IEEE International Conference on Biometrics: Theory, Applications and Systems*, Crystal City, VA, Sep. 2008. (Won Best Paper Award.)

R.W. Ives, **R.P. Broussard**, L.R. Kennell and D.L. Soldan, "Effects of Image Compression on Iris Recognition System Performance," *Journal of Electronic Imaging*, Vol. 17, No. 1, Jan-Mar 2008.

----- CONFERENCE ARTICLES-----

R.N. Rakvic, H.T. Ngo, and **R.P. Broussard**, Assistant Professor, and R.W. Ives, Associate Professor "Cell or FPGA for an Image Processing Algorithm" *accepted to Proceedings of the International Conference on Advances in Computing, Control, and Telecommunication Technologies*, ACT 2009, Trivandrum, India, Dec. 2009.

R.P. Broussard and R.W. Ives, "Using Artificial Neural Networks to Statistically Fuse Current Iris Segmentation Techniques to Improve Limbic Boundary Localization," *SPIE Symposium on Defense Security + Sensing*, Orlando, FL, Apr. 2009.

H.T. Ngo, R.N. Rakvic, **R.P. Broussard** and R.W. Ives, "An FPGA-Based Design of a Modular Approach for Integral Images in a Real-Time Face Detection/Recognition System," *SPIE Symposium on Defense Security + Sensing*, Orlando, FL, Apr. 2009.

R.P. Broussard and R.W. Ives, "Using Artificial Neural Networks and Feature Saliency to Identify Iris Measurements that Contain the Most Discriminatory Information for Iris Segmentation", *2009 IEEE Workshop on Computational Intelligence in Biometrics: Theory, Algorithms, and Applications*, Apr. 2009

R.N. Rakvic, **R.P. Broussard**, R.W. Ives, D.M. Etter, L.R. Kennell, and J. Matey, Visiting Research Professor, "Iris Matching with Configurable Hardware," *Proceedings of the SPIE (Real-Time Image and Video Processing)*, San Jose, CA., Volume 7244, pp. 724402-724402-10 (Jan. 2009).

R.N. Rakvic, **R.P. Broussard**, R.W. Ives, D.M. Etter, L.R. Kennell, and J. Matey, "Iris matching for rapid identification with configurable hardware," Invited Paper to the *SPIE Newsroom*, <http://spie.org/x31559.xml?ArticleID=x31559> DOI: 10.1117/2.1200811.1349 6 November 2008.

R.W. Ives, **R.P. Broussard**, L.R. Kennell, R.N. Rakvic, and D.M. Etter, "Iris Recognition using the Ridge Energy Direction (RED) Algorithm", *42nd Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, California, Oct. 2008

L.R. Kennell, **R.P. Broussard**, R.W. Ives, and J.R. Matey, "Preprocessing of off-axis iris images for recognition", *The 2008 SPIE Europe Security & Defense Conference*, Cardiff, Wales, UK, Sep. 2008

R.P. Broussard, R.N. Rakvic, and R.W. Ives, "Accelerating Iris Template Matching using Commodity Video Graphics Adapters," *The 2008 IEEE International Conference on Biometrics: Theory, Applications and Systems*, Crystal City, VA, Sep. 2008. (Won Best Paper Award)

R.P. Broussard, L.R. Kennell, and R.W. Ives, "Accelerating Image Based Scientific Applications using Commodity Video Graphics Adapters ", *2008 World Multi-Conference on Systemics, Cybernetics and Informatics*, Orlando, Florida, June 2008. (Won Best Paper Award)

R.P. Broussard, L.R. Kennell, R.W. Ives, "Identifying Discriminatory Information Content within the Iris", *SPIE Defense and Security Conference*, Orlando, FL, March 2008.

R.P. Broussard, L.R. Kennell, R.W. Ives, R.N. Rakvic, "An Artificial Neural Network Based Matching Metric for Iris Identification", *IS&T and SPIE Electronic Imaging Symposium*, San Jose, California, January 2008.

R.P. Broussard, L.R. Kennell, D.L. Soldan, and R.W. Ives, "Using Artificial Neural Networks and Feature Saliency Techniques for Improved Iris Segmentation," *Proceedings of the 2007 International Joint Conference on Neural Networks*, Orlando, FL, Aug. 2007.

J. A. Piepmeier, J. Waters, **R.P. Broussard**, "A Stereo Vision-based Wave Surface Measurement Project", *Proceedings for the 2006 ASEE Annual Conference*, June 21, 2006, Electronic publication, Session 2578

----- **Trident Scholar Conference articles**-----

C. Moore, M. Harper, M. Nelson, **R. Broussard**, "Autonomous Robotic Detection of Radioisotopes by High Purity Germanium Detectors", *50th Annual INMM Conference*, Tuscon, Arizona, July, 2009 (Refereed Poster Presentation)

B.J. Ulis, **R.P. Broussard**, R.N. Rakvic, R.W. Ives, N. Steiner, H.T. Ngo, "Hardware Based Segmentation in Iris Recognition and Authentication Systems," *SPIE Symposium on Defense Security + Sensing*, Orlando, FL, Apr. 2009.

B.J. Ulis, R.N. Rakvic, and **R.P. Broussard**, "Iris Recognition Algorithm Implementation Using Parallel Logic in Field Programmable Gate Arrays" *Proceedings of the National Conference on Undergraduate Research*, La Crosse, WI, Apr. 2009.

R.N. Rakvic, B.J. Ulis, **R.P. Broussard**, and R.W. Ives, "Iris Template Generation with Parallel Logic", *42nd Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, California, Oct. 2008

J. Papon, **R.P. Broussard**, and R.W. Ives, "Autonomous Detection and Imaging of Abandoned Luggage in Real World Environments," *the 2007 National Conference on Undergraduate Research*, San Rafael, CA, Apr. 2007.

J. Papon, **R.P. Broussard**, and R.W. Ives "Dual Camera System for Acquisition of High Resolution Images of Moving Targets," *IS&T/SPIE Electronic Imaging 2007*, San Jose, CA, Feb. 2007.

----- **BOOK CHAPTERS**-----

R.N. Rakvic, **R.P. Broussard**, L.R. Kennell, R.W. Ives, and R. Bell, "Iris Acquisition Devices," published as a peer-reviewed chapter in the *Biometrics Encyclopedia*, Springer publishing, July 2009, ISBN 978-0-387-73002-8 (Print) 978-0-387-73003-5 (Online).

L.R. Kennell, R.N. Rakvic, **R.P. Broussard**, and R.W. Ives, "Segmentation of Off-Axis Iris Images," published as a peer-reviewed chapter in the *Biometrics Encyclopedia*, Springer publishing, July 2009, ISBN 978-0-387-73002-8 (Print) 978-0-387-73003-5 (Online).

10. Professional development activities in the last five years:

2009 Attended the International Summer School for Biometrics

2009 Attended a short course on Presenting Data