

Karl Ricanek, Jr. Ph.D.

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Computer Science
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1.0 EDUCATION

Ph.D. Electrical Engineering, North Carolina A&T State University (1995-1999)
Dissertation: “*Variable lateral pose face recognition using anthropometric analysis*”

M.S. Electrical Engineering, North Carolina A&T State University (1992-1993)
Thesis: “*The development of a graphical user interface for the Automated (Power) System Planning Tool in the X Windowing environment using OSF/Motif*”

B.S. Electrical Engineering, North Carolina A&T State University (1988-1992)
Focus: Genetic Algorithms

1.1 Academic Fellows/Honors

Fellows: Ronald E. McNair NASA Fellow, Naval Undersea Warfare Center Fellow, National Security Agency Fellow, and Bonneville Power Association Fellow

Honors: Upsilon Pi Epsilon (Computer Science Honor Society), Eta Kappa Nu (Electrical Engineering Honor Society), Tau Beta Pi (Engineering Honor Society), Summa Cum Laude (undergraduate), Golden Key Honor Society, National Dean’s List, and Who’s Who Among College Students.

2.0 PROFESSIONAL EXPERIENCE

Administrative Leadership/Directorships

Director of the Institute for Interdisciplinary Studies in Identity Sciences (I²SIS August 2010). This is the fourth center established by the UNCW. The center studies advanced technologies in automatic biometrics and forensic analysis for identification.

Founding Co-Director of the Center for Advanced Studies in Identity Science (CASIS), the 1st Director of National Intelligence Science & Technology Center of Academic Excellence in the United States. This interdisciplinary (Computer Science, Electrical & Computer Engineering, and Visual Computing) research center is composed of researchers from North Carolina A&T (Lead), Carnegie Mellon University, Clemson University, and the University of North Carolina at Wilmington.

Founding Director of the College of Arts and Science (CAS) Identity Sciences Program (IdSci), is the first research program in CAS. It is comprised of a team of interdisciplinary research faculty from Anthropology, Computer Science, and Mathematics & Statistics.

Founding member and director of the Face Aging Group. This group is the authority on facial aging from a biometrics point of view. The group conducts research in biometrics, soft-biometrics, and facial aging modeling.

International Scientific Working Groups

Facial Identification Scientific Working Group (FISWG), The mission of FISWG is to develop consensus standards, guidelines and best practices for the discipline of image-based comparisons of human features, primarily face, as well as to provide recommendations for research and development activities necessary to advance the state of the science in this field. Details can be found at: www.fiswg.org.

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Graduate

ELEN 650 Digital Signal Processing I
ELEN 651 Digital Signal Processing I Lab
ELEN 750 Digital Image Processing
ELEN 751 Digital Image Processing Lab

Substitute Teacher **GUILFORD TECHNICAL COMMUNITY COLLEGE** **Greensboro, NC**
Basic Skills Department **1999 to 2000**
Pre-GED Mathematics

2.2 Industry Experience

Supervisor **CORNING INCORPORATED** **Wilmington, NC**
Process **Measurement Dept., Division Engineering** **2001 to 2002**

Measurement Led a group of advance degreed optical, mechanical, and electrical engineers to develop solutions for in-process measurements for optical fiber manufacturing. Solutions consisted of micrometer measurement of optically pure glass and coating defects, glass tension while in the draw process, optical property measurements, etc. Led international group of senior Corning engineers to address technical issues associated with manufacturing process instrumentation for optical fiber and synchronization of said instrumentation.

Member of Technical Staff **CORNING INCORPORATED** **Wilmington, NC**
Project Engineering **1999 to 2001**

Core work revolved around developing algorithms to increase work productivity and efficiency through non-traditional methodologies. These methodologies include vision systems, i.e., camera based/gauge based/light curtain, fuzzy controls, neural networks, and evolutionary computing. Algorithm development and implementation is performed over all process controls within Corning corporate and partnerships. Also, identification of new technologies and processes that can reduce costs associated with the Corning production environment, e.g., Agent based analysis and design for heterogeneous process environments.

Manager (Facility) **NAVAL UNDERSEA WARFARE CENTER** **Newport, RI**
Advanced Interactive Media Technology Center **1995 to 1999**

Technology Manager - analyze and test current/breaking technologies for insertion into the core business areas of the AIMTC facility. AIMTC core business areas are Web-based technologies, Multimedia derived technical documentation, life cycle management (product data management and knowledge data management systems), computer based authoring/training, and technical drawings.

Business Manager - maintain current customer base and attract new customers within NUWC community, Department of Defense, and Commercially. This includes identifying new customers and markets as well as implementing quality assurance principles and practices to ensure customer satisfaction. This includes making the AIMTC facility ISO-9000/1 certified.

AIMTC IPT - responsible for coordinating and developing an Integrated Product Team (IPT) for AIMTC. The objective of the IPT is to combat the depleting Department of Defense dollars by combining forces: critical expertise, knowledge, and resources in order to produce the most cost effective solutions for the customer.

Member of BRAC Team **NAVAL UNDERSEA WARFARE CENTER** **Newport, RI**
Special Assignment (Base Realignment & Closure) **1994 to 1995**

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Responsible for executing the disestablishment and disposition on NUWC Detachment Norfolk Code 20 functional tasks and resources.

Software
Engineer

**NAVAL UNDERSEA WARFARE CENTER
Special Assignment (Base Realignment & Closure)**

**Newport, RI
1993 to 1994**

Lead software engineering for graphics and man-machine interface for Combat System Evaluation Laboratory, which is proving ground/test bed for enhancements to combat systems for submarines. Evaluated and made recommendation for object oriented tools for department.

2.3 Industry Recognition

NUWC Special Action Award 1998
NUWC Incentive Award 1998
NUWC Special Recognition Award 1997
NUWC Special Recognition Award 1995

2.4 Department of Defense Clearance

Secret (Year of last use: 1999)

3.0 RESEARCH

3.1 Directed Thesis

1. Brian Bullard, Department of Computer Science, "Automatic Face Detection and Image Tagging in a Social Networking Structure", anticipated December 2010.
2. Fernando Schiefelbein, Department of Mathematics and Statistics, "Robust Facial Age-Estimation using Advanced Statistical Techniques", April 2010.
3. Maurice Benson, Department of Computer Science, "Using 3D Video Game Feedback and Artificial Neural Networks to Elicit and Classify Valid Event Related Potentials for a Brain Computer Interface", April 2010.
4. Luu Khoa, Department of Computer Science, Concordia University, Montreal Canada, "Automatic-Photorealistic Facial-Aging of Children Derived from Familial Evidence", September 2009.
5. M. Moran Parker, "Academic Research Computing", anticipated October 2009.
6. William Shipman, Department of Computer Science, "Unifying Mobile Devices, the Internet, and Emergency Management Services via Short/Multimedia Messaging Services", December 2008.
7. Yi Chen, Department of Mathematics and Statistics, "QTL Detection from Stochastic Process by Bayesian Hierarchical Regression Model", December 2007.
8. Ryan Wilkins, Department of Computer Science, "Neurocognitive Inspired Hierarchical Face Recognition System, July 2007.
9. Kathleen Karlon, Department of Mathematics and Statistics, "Time Series Competition Among Three Sophisticated Paradigms", June 2006.
10. Tamirat Tesafaye, Department of Computer Science, Addis Ababa University, Addis Ababa, Ethiopia, "Impact of Face Image Currency on Recognition Rates of the Eigenface Algorithm," June 2005.

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11. Yeusheng Zhia, Department of Mathematics and Statistics, University of North Carolina Wilmington, Wilmington, NC, "Time Series Forecasting Competition Among Three Sophisticated Paradigms," May 2005.

3.2 Research Grant/Contract Submissions

Extramural Funding Total (since 2003): \$5,747,850

1. Principle Investigator, 3D Synthesis of Facial Changes with Weight in Maya, with E. Patterson, Unisys Inc., Amount \$50,192, August 2009 (**funded**)
2. Principle Investigator, Optical Flaw Detector Characterization and Recommendation, Amount \$7,500, August 2009. (**funded**)
3. Principle Investigator, Exploitation of 3-D Craniofacial and Ocular Micro-Features for Robust 2-D Biometric Signals Against Aging and Pose Variation, with M. Savvides (CMU), Intelligence Advanced Research Project Activity (IARPA) IARPA-BAA-09-02, Amount \$2,878,521, April 2009. (**funded**)
4. Principle Investigator, Less Constrained Biometrics: Understanding the Science and Technology, with G. Dozier (NC A&T), K. Ricanek Jr. (PI), D. Woodard (Clemson), M. Savvides (CMU), Intelligence Advanced Research Project Activity (IARPA) IARPA-BAA-09-02, Amount \$2,614,342, April 2009. (under-review)
5. Principle Investigator, Facial Age Training & Research and Legacy Acquisition, with A. Midori Albert (UNCW), Federal Bureau of Investigation (FBI) Facial Collaboration, Amount \$350,000, March 2009. (**funded**)
6. Co-principle investigator, Intelligent Multi-Modal Fusion Using Quality Measures from: Soft-Biometrics, Automatic Robust Image Sanity Checks and Robust Age Estimation, with Marios Savvides (CMU) and Terry Boulton (Securics Inc.), ARL/ARO BAA W911NF-07-R-0001-02, Amount \$850,000, February 2009. (**under final negotiations**)
7. Principle investigator, Identification Across Age Using Distinguishable Facial Features, with Anil Jain (MSU), Unisys Corporation/National Security Agency, \$205,000, March 2008. (unfunded)
8. Principle investigator, Evoked Related Potentials for Brain Bio-signature Biometric, with Julian Keith (UNCW), Kayvan Najarian (VCU), & Krzysztof Cios (VCU), Unisys Corporation/National Security Agency, \$580,000 (2 yrs), March 2008. (unfunded)
9. Principle investigator, Video Analysis of Facial & Head Gestures for Validation of Identity, with Eric Patterson (UNCW), Kendall Giles (VCU), & Edward Boone (VCU), Unisys Corporation/National Security Agency, \$230,000, March 2008. (unfunded)
10. Principle investigator, Corneal Surface Topography: Advanced Identification System for Eye Region, with Damon Woodard (Clemson), Unisys Corporation/National Security Agency, \$194,000, March 2008. (unfunded)
11. Co-principle investigator, Digital Visualization and Analysis Tool, with R. Huber, L. Calhoun, D. Simmonds, National Oceanic Atmospheric Association, Amount \$289,000, February 2008. (unfunded)
12. Principle Investigator/Project Director, Center for Academic Studies in Identity Sciences, with G. Dozier (NC A&T), K. Ricanek Jr. (PI), D. Woodard (Clemson), M. Savvides (CMU), Director of National Intelligence Center for Academic Excellence, Amount \$8,933,000, December 2007. (**funded YR1**)

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13. Co-principle investigator, Genetic Architecture of Combined Drought and Ultraviolet Radiation Stress Responses in Maize, with E. Stapleton (PD-UNCW), B. Methe (TIGR), Susan Simmons (UNCW), J. Holland (USDA ARS NCSU), USDA CSREES NRI Plant Responses to the Environment 56.0, Amount \$350,000, November 2007. (unfunded)
14. Principle Investigator, 3D Representations of Craniofacial Aging, with A.M. Albert, E. Patterson, A. Sethuram Unisys Corporation, Amount \$187,000, August 2007. (**funded**)
15. Principle Investigator, Craniofacial Morphology: Development of Models of Human Adult Aging (Supplemental), with A.M. Albert, E. Patterson, A. Sethuram Dyncorp International, Amount \$100,000, December 2007. (**funded**)
16. Principle Investigator, Craniofacial Morphology: Development of Models of Human Adult Aging, with A.M. Albert, E. Patterson, A. Sethuram Dyncorp International, Amount \$124,637, November 2006. (**funded**)
17. Contributor, Genetic Architecture of Combined Drought and Ultraviolet Radiation Stress Responses in Maize, with E. Stapleton (PD-UNCW), L. McIntyre (University of Florida), Susan Simmons (UNCW), J. Holland (USDA ARS NCSU) USDA CSREES NRI Plant Responses to the Environment 56.0, Amount \$350,000, December 2006. (unfunded)
18. Co-principle investigator, North Carolina Upward Bound Math Science, with Bowling (ASU-PD) et al Department of Education Upward Bound Math Science, Amount \$250,000, October 2006. (unfunded)
19. Co-principle investigator, Virtual Studies of the Past, with T. Burgh, NEH Grants for Teaching and Learning Resources and Curriculum Development, Amount \$130,000, October 2005. (unfunded)
20. Co-principle investigator, Virtual Studies of the Past, with T. Burgh and S. Baptista, ITSD Innovations Grant, Amount \$2,500, January 2005. (**funded**)
21. K. Ricanek, CAS Travel Award, Amount \$1,500, Summer 2005. (Funded)
22. K. Ricanek, International Travel Award-International Program Committee, UNCW, Amount \$2,000, Summer 2005. (**funded**)
23. K. Ricanek, International Travel Award-International Program Committee, UNCW, Amount \$1,500, Summer 2004. (**funded**)
24. Co-principle investigator, A Set of Web Services to Improve Information Technology Fluency, with R. Vetter (UNCW CSC), T. Janicki (UNCW ISON), D. Kline (UNCW ISOM), J. Brown, and B. Heath, NSF CCLI 2004, NSF Proposal No. 0442325, Submitted June 2004. (unfunded)
25. K. Ricanek, Student Assistance Grant, CTE, UNCW, Amount \$720, Fall 2004. (**funded**).
26. Principle Investigator, Age Related Morphological Changes: Effects on Face Recognition Technologies, with E. Patterson & M. Albert, National Security Agency/Dyncorp International, Amount \$450,000, September 2003. (**funded**)

3.3 Industry Collaboration/Consulting

“Flaw Detection Instrument Characterization”, collaboration with Corning Inc., Optical Fiber Division, Wilmington, NC.

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"Optical Signal Analysis and Classification for Optical Time Domain Reflectometry", collaboration with Corning Inc., Optical Fiber Division, Wilmington NC.

"Precision Machine Vision Based Metrology for Inspection of Optically Pure Glass Cylinders", is consulting for Corning, Inc. Optical Fiber Division, Wilmington NC.

3.4 Prior Professional Research

- Wavelet Analysis/De-noising of Polarization Optical Time Domain Reflectometry
- Ultra high precision diameter measurement of optical transparent glass cylinders (7.0" cylinders with .002" accuracy) with digital camera technology
- Small package precision bubble detection using COTS photo-electronics achieving 4x improvement of tube-diameter-to-bubble-size over conventional ultrasonic detectors
- Target recognition systems using optimized neural networks
- Face recognition systems using hybrid Hopfield neural networks
- Geological positioning and guidance system for Mars Rovers
- Multi-resolution image compression using wavelets

3.5 Publications

Books & Chapters

1. Ricanek, K.; Sethuram, A.; Patterson E.K.; Albert, A.M.; and Boone E.L. (2009) Craniofacial aging. In: Wiley Handbook of Science and Technology for Homeland Security. J.G. Voeller (Ed.), John Wiley & Sons, Inc. Hoboken, NJ.
<http://mrw.interscience.wiley.com/emrw/9780470087923/hns/article/hhs2671/curent/pdf>.
2. Woodard, D. L., Ricanek, K. (2009) *Iris Databases*. In: Biometrics Encyclopedia, Stan Z. Li (Ed.), New York, NY: Biometrics Encyclopedia, Springer.
3. Dozier, G., Savvides, M., Bryant, K., Ricanek, K., Woodard, D. L. (2009) *Developing Iris Templates via Bit Inconsistency and GRIT*. In Biometrics Encyclopedia, Stan Z. Li (Ed.), New York, NY: Biometrics Encyclopedia, Springer.
4. Albert A.M. and Ricanek, K. (2010) Implications of Adult Facial Aging Factors on Biometrics. In Biometrics", Vienna, Austria, ISBN 978-953-7619-X-X, Intech October 2010.

Full Referred Articles

1. Yishi Wang, Karl Ricanek, Cuixian Chen, Yaw Chang, "Gender Classification from Infants to Seniors", in the *Proceedings of the IEEE Conference on Biometrics: Theory, Applications, and Systems (BTAS)*, Washington, D.C., September, 2010.
2. Yishi Wang, Karl Ricanek, Cuixian Chen, Yaw Chang, "Manifold Learning for Gender Classification", in the *Proceedings of the 11th International Conference on Control, Automation, Robotics and Vision*, Singapore, December 7, 2010.
3. Khoa Luu, Tien Dai Bui, Ching Y. Suen, Karl Ricanek, "Combined Local and Holistic Facial Features for Age-Determination", in the *Proceedings of the 11th International Conference on Control, Automation, Robotics and Vision*, Singapore, December 7, 2010.
4. Marios Savvides, Karl Ricanek Jr, Damon L. Woodard, Gerry Dozier, "Unconstrained Biometric Identification: Emerging Technologies", *Computer Magazine*, vol. 43 no 3, pp 56 – 62, February 2010.

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5. Guodong Gou, Gouwang Mu, Karl Ricanek, "Cross-Age Face Recognition on A Very Large Database: The Performance Versus Age Intervals and Improvement Using Soft Biometric Traits", in the *Proceedings of IAPR 20th International Conference on Pattern Recognition (ICPR 2010)*, Istanbul Turkey, August. 2010.
6. K. Luu, T. D. Bui, C. Y. Suen, K. Ricanek, "Spectral Regression based Age Determination", *IEEE Computer Society Workshop on Biometrics, in association with the 23th IEEE Conf. on Computer Vision and Pattern Recognition (CVPR 2010)*, San Francisco, June. 2010.
7. Amrutha Sethuram, Karl Ricanek, Eric Patterson, "A Hierarchical Approach to Facial Aging", in the *Proceedings of IEEE Computer Society Workshop on AMFG, in association with the 23th IEEE Conf. on Computer Vision and Pattern Recognition (CVPR 2010)*, San Francisco, June. 2010.
8. Cuixian Chen, Yaw Chang, Karl Ricanek, Yishi Wang, "Face Age Estimation Using Model Selection", in the *Proceedings of IEEE Computer Society Workshop on AMFG, in association with the 23th IEEE Conf. on Computer Vision and Pattern Recognition (CVPR 2010)*, San Francisco, June. 2010.
9. Susan J. Simmons, Ann E. Stapleton, Fang Fang, Qijun Fang, and Karl Ricanek, "Bayesian Hierarchical Models to Identify Quantitative Trait Loci Using Replicated Lines", in the *Journal of the Indian Society of Agricultural Statistics*, 2010
10. Susan J. Simmons, Fang Fang, Qijun Fang, Karl Ricanek, "Markov Chain Monte Carlo Model Composition Search Strategy for Quantitative Trait Loci in a Bayesian Hierarchical Model", in the *Proceedings of International Conference on Biological Science and Engineering*, Rio de Janeiro, Brazil, March 2010.
11. Karl Ricanek, "Hierarchical Face Age-Estimation Algorithm Using Informed Facial Features", in the *Proceedings of 19th Annual International ANNIE*, St. Louis, MO, November 2009.
12. Allen Rawls and Karl Ricanek, "MORPH: Development and Optimization of a Longitudinal Age Progression Face Database", in the *Proceedings of the International Conference on Biometric Identity and Management*, Madrid Spain, September, 2009.
13. Khoa Luu, Ching Y. Suen, Tien D. Bui, Karl Ricanek, "Automatic Child-Face Age-Progression Based on Heritability Factors of Familial Faces", in the *Proceedings of the IEEE International Conference on Biometrics, Identity and Security (Bids)*, Tampa, FL, September, 2009.
14. Khoa Luu, Karl Ricanek, Tien D. Bui, Ching Y. Suen, "Age Estimation using Active Appearance Models and Support Vector Machine Regression", in the *Proceedings of the IEEE Conference on Biometrics: Theory, Applications, and Systems (BTAS)*, Washington, D.C., September, 2009.
15. Eric Patterson, Amurtha Sethuram, Karl Ricanek, Fred Bingham, "Improvements in Active Appearance Models Synthetic Age Progression for Adult Aging", in the *Proceedings of the IEEE Conference on Biometrics: Theory, Applications, and Systems (BTAS)*, Washington, D.C., September, 2009.

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16. Karl Ricanek, Yishi Wang, Ciuxen Chen and Susan J. Simmons, "Generalized Multi-Ethnic Age Estimation", in the *Proceedings of the IEEE Conference on Biometrics: Theory, Applications, and Systems (BTAS)*, Washington, D.C., September, 2009.
17. A. Sethuram, E. Patterson, K. Ricanek, and A. Rawls, "Improvements and Performance Evaluation Concerning Synthetic Age Progression and Face Recognition Affected by Adult Aging", in the *Proceedings of the Third IAPR International Conference on Biometrics (ICB)*, Sardinia Italy, June 2009.
18. Karl Ricanek Jr, Eric Patterson, and Amrutha Sethuram, "Diachronic Review of Facial Aging: Mechanisms and Algorithms", in the Proceedings of the First IEEE International Workshop on Robust Biometrics: Understanding the Science and Technology (ROBUST), Waikiki, Hawaii, October 2008.
19. Khoa Luu, K. Ricanek Jr, T.D. Bui, and C.Y. Suen, "The Burlington Familial Face Database: A Longitudinal Study of Family-based Growth and Development on Face Recognition", in the Proceedings of the First IEEE International Workshop on Robust Biometrics: Understanding the Science and Technology (ROBUST), Waikiki, Hawaii, October 2008
20. Eric Patterson, Mathew Ratliff, and Karl Ricanek Jr, "Facial Micro-expressions Identification", in the Proceedings of the First IEEE International Workshop on Robust Biometrics: Understanding the Science and Technology (ROBUST), Waikiki, Hawaii, October 2008.
21. Phillip J. Whisenhunt, Karl Ricanek Jr, "A Look at Biometrics Focused in Iris Recognition", in the *Proceedings of the Eighth IASTED International Conference on Visualization, Imaging, and Image Processing*, ACTA Press, Palma de Mallorca, Spain, September 2008.
22. Susan Simmonds, Devrim Unay, Karl Ricanek Jr, Bernard Gosselin, "Random Forests Versus Support Vector Machines: Stem and Calyx Classification for Jonagold Apples", in the *Proceedings of the Eighth IASTED International Conference on Visualization, Imaging, and Image Processing*, ACTA Press, Palma de Mallorca, Spain, September 2008.
23. A. Midori Albert and Karl Ricanek, Jr., "The MORPH Database: Investigating the Effects of Adult Craniofacial Aging on Automated Face-Recognition Technology", *Journal of Forensic Science Communications*, Research and Technology, Volume 10, No. 2, April 2008,
http://www.fbi.gov/hq/lab/fsc/backissu/april2008/research/2008_04_research02.htm
24. C. Pearson, S. Simmons, K. Ricanek, and E. Boone, "Comparative Analysis of a Hierarchical Bayesian Method for Quantitative Trait Loci Analysis for the Arabidopsis Thaliana", *Pattern Recognition in Bioinformatics, Second IAPR International Workshop*, Singapore, October 2007.
25. E. Patterson, A. Sethuram, M. Albert, K. Ricanek, and M. King, "Aspects of Age Variation in Facial Morphology Affecting Biometrics," *Proceedings of the IEEE Conference on Biometrics: Theory, Applications, and Systems*, Washington, D.C., September, 2007.

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26. E. Patterson, A. Sethuram, M. Albert, and K. Ricanek, "Comparison of Synthetic Face Aging to Age Progression by Forensic Sketch Artist," *Proceedings of the Seventh IASTED International Conference on Visualization, Imaging, and Image Processing*, ACTA Press, pages 247-252, Palma de Mallorca, Spain, August, 2007.
27. K. Ricanek, R.B. Wilkins, A. Sethuram, and E. Patterson, "A Novel Cognitive-Psychology Based Face Recognition System for Improved Identification Rates for the Problem of Age-Progression" *Proceedings of the Seventh IASTED International Conference on Visualization, Imaging, and Image Processing*, ACTA Press, pages 289-294, Palma de Mallorca, Spain, August, 2007.
28. E. Boone, K. Ricanek, and S. Simmons, "Quantitative Trait Loci Analysis Using a Bayesian Framework", *Proceedings of the International Joint Conference on Neural Networks*, pp 1217-1220, Orlando FL, August 12-17, 2007.
29. Midori Albert, Jr., Karl Ricanek and Eric Patterson, A review of the literature on the aging adult skull and face: Implications for forensic science research and applications, *Journal of Forensic Science International*, 16 April 2007, <http://www.sciencedirect.com/science/article/B6T6W-4NH6N87-4/2/32387a10f5d792b909910ac112f32a6c>).
30. E. Patterson, K. Ricanek, M. Albert, and E. Boone, "Automatic Representation of Adult Aging in Facial Images" *Proc. 6th IASTED International Conference on Visualization, Imaging, and Image Processing*, Palma de Mallorca, Spain, August 2006, pp 171-176.
31. K. Ricanek, E. Boone, and E. Patterson, "Craniofacial Aging on the Eigenface Biometric", *Proc. 6th International Association of Science and Technology for Development International Conference on Visualization, Imaging, and Image Processing*, Palma de Mallorca, Spain, August 2006, pp 249-253.
32. Yusheng Zhai, Kathleen Karlson, Karl Ricanek, and Edward Boone, "An Assessment of Dynamic Linear Modeling and Artificial Neural Networks Against the M3 Forecasting Competition", *Hawaiian International Conference on Statistics*, Honolulu, Hawaii, January 2006. (electronic dissemination only; no page numbers issued)
33. Karl Ricanek, Jr. and Tamirat Tesafaye, "MORPH: A Longitudinal Image Database of Normal Adult Age-Progression", *IEEE 7th International Conference on Automatic Face and Gesture Recognition*, Southampton, UK, April 2006, pp 341-345.
34. K. Ricanek and E. Boone, "The Effect of Normal Adult Aging on Standard PCA Face Recognition Accuracy Rates," *International Joint Conference on Neural Networks*, Montreal, Canada, July 2005, pp 2018-2023.
35. K. Ricanek, and E. Boone, "Landmark Based Statistical Measures for Face Recognition," *Hawaiian International Conference on Statistics*, Honolulu, Hawaii, January 2005. (electronic dissemination only; no page numbers issued)
36. M. C. King, G. L. Leiby, K. Ricanek Jr., "Context Realization Utilizing Hierarchical Mutually Exclusive Neural Experts", *SCI 2001/ISAS 2001, VOLUME XVI, International Conference on Information Systems Analysis and Synthesis, World Multi-conference on Systemics, Cybernetics And Informatics: Concepts And Applications*, Vol. 16, July 22-25, 2001.

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37. M.C. King, G.L. Lebby, and K. Ricanek, "A Dialog Control Strategy Using a Hierarchical Controller of Mutually Exclusive Neural Experts," *IASTED International Conference on Artificial Intelligence and Soft Computing*, Cancun, Mexico, 21-24 May 2001.
38. K. Heywood, G.L. Lebby, K. Ricanek, "Hopfield Like Networks for Pattern Recognition with Applications to Face Recognition", *International Joint Conference on Neural Networks*, July 10-16 1999.
39. K. Ricanek, G.L. Lebby, F.J. Ricanek, J.H. Kim, "Hybrid Hopfield Network for Pattern Recognition and Face Recognition", *IASTED International Conference on Artificial Intelligence and Soft Computing*, Honolulu, Hawaii, August 1999.
40. Karl Ricanek, Jung Kim, Gary L. Lebby, "Biologically Inspired Object Recognition in a Multi-context Scene," *IASTED ACS*, May 26, 1998.
41. Karl Ricanek, Michael Cooke, and Gary L. Lebby, "A Theory: Cellular Powered Electric Vehicle", *International Conference on Advances in Vehicle Control and Safety*, Amiens, France, July 1, 1998.
42. K. Ricanek, A. Homaifar, G. Lebby, "Genetic Algorithm Composes Music", *In Proceedings of the Twenty-Fifth Southeastern Symposium on System Theory*, Tuscaloosa, AL. March 7-9, 1993, pp. 223-227.

Technical Reports & White Papers

1. A. Midori Albert and Karl Ricanek Jr, "Adult Diachronic Facial Aging Considerations Pertinent to Computer Automated Face Recognition Research," September 2008.
2. E.K. Patterson, K. Ricanek, and A.M. Albert, "Models and Techniques for Facial Aging of Digital Images of Adults," Dyncorp International Technical Report, March 2006.
3. A.M. Albert, K. Ricanek, and E.K. Patterson, "The Aging Adult Skull and Face: A Critical Update to the Review of the Literature on Factors and Processes of Change Focusing on Interaction Between Bodyweight, Facial Fat, and Aging," Dyncorp International Technical Report, April 2006.
4. K. Ricanek, E.K. Patterson, and A.M. Albert, "Age-Related Morphological Changes: Effects on Facial Recognition Technologies," UNCW Technical Report, CALL #WRG FSC-\$, 2004.
5. A.M. Albert, K. Ricanek, and E.K. Patterson, "The Aging Adult Skull and Face: A Review of the Literature and Report on Factors and Processes of Change," UNCW Internal Technical Report, UNCW Technical Report, CALL #WRG FSC-A, 2004.
6. M. Albert, K. Ricanek, and E. Patterson, "The Aging Adult Skull and Face: A Review of the Literature and Report on Factors and Processes of Change", Technical Report, Dyncorp, July 2004.
7. K. Ricanek, E. Patterson, and M. Albert, "Age Related Morphological Changes: Effects on Facial Recognition Technologies", White Paper for Dept. of Defense, July 2003.
8. K. Ricanek and J. Meacham, "Coating Vision System", Invention Disclosure, Oct 2002.

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9. K. Ricanek, "Comparative Analysis of Draw Tension Instrumentation", White Paper, Corning, Inc. 2000.

4.0 SERVICE

4.1 Affiliations

- Institute of Electrical & Electronic Engineering (IEEE) Senior Member
- Association for Computing Machinery (ACM)
- IEEE Educational Activities Board Biometrics
- International Association for Pattern Recognition (IAPR)
- American Association on Artificial Intelligence (AAAI)
- International Neural Network Society (INNS)
- International Association for Science and Technology Development (IASTED) Technical Committee Neural Networks and Image Processing
- National Society of Black Engineers (NSBE)

4.2 Peer Reviewer

- IEEE Transactions on Information Forensics & Security
- IEEE Certified Biometrics Professional Certification and Training (IEEE CBP)
- Elsevier, Image and Vision Computing to
- Book Reviewer for The Institution of Engineering and Technology on Age Factors in Biometric Processing
- IEEE Signal Processing Letters
- IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)
- IEEE Transactions on Neural Networks
- IEEE International Joint Conference on Neural Networks (IJCNN)
- IEEE International Conference on Automatic Face and Gesture Recognition (FG)
- IEEE International Conference on Biometrics: Theory, Applications, and Systems (BTAS)
- Journal of Network and Computer Applications (JNCA)
- International Association for Science and Technology Development Proceedings of Artificial Intelligence and Soft Computing (IASTED ASC)
- International Association for Science and Technology Development, International Proceedings of Visualization, Imaging, and Image Processing (IASTED VIIP)

4.3 Editor/Organizer/Program Committee

- SPIE Biometrics Conference (SPIE BC 2011)
- International Joint Conference on Biometrics (IJCB 2011)

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- IEEE Biometrics: Theory, Applications, and Systems (IEEE BTAS 2010)
- Chair, Workshop, IEEE Int'l Conference on Automatic Face and Gesture Recognition (FG 2011)
- Chair, Session Aging, IEEE 4th International Conference on Biometrics: Theory, Applications, and Systems (BTAS 2010)
- Chair, Special Session on Aging and Age-Progression, IEEE 8th Int'l Conference on Automatic Face and Gesture Recognition (FG 2008) (www.fg2008.nl)
- IEEE Education Advisory Board, Subject Matter Expert in Biometrics (IEEE EAB Biometrics)

4.4 Invited Talks

- Auburn University, Computer Science Dept, 2010
- Notre Dame University, Computer Science and Engineering Dept, 2010
- Vietnam National University, Computer Science Faculties, 2010
- University of Maryland College Park, Computer Science Dept, 2009
- North Carolina A&T State University, Computer Science Dept, 2009
- North Carolina A&T State University, Electrical and Computer Engineering Dept, 2008

4.5 Service Volunteer to Students

- STEM Professor Meet and Greet, UNCW Women in Science and Engineering
- Engineer's Week
- USEIT Summer Institute, UNCW Computer Science Dept.
- Explore Your Background, UNCW Admissions Office
- Gear Up, UNCW Office of Diversity
- Junior Achievement, Gregory Elementary School, Wilmington, NC
- Science Fair, Gregory Elementary School, Wilmington, NC
- ROCAME Jamboree (2008)