

Karl Ricanek, Jr. Ph.D.

UNCW
Computer Science
601 South College Road
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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: Sigma Xi (The Scientific Research Society), 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

Interim Director	Office of Innovation and Commercialization (OIC) The OIC reports to the Associate Provost for Research and is the organization that focuses on identifying translational research and ideas put forth by faculty, staff and students. This organization extends the traditional technology transfer office to capture both traditionally defined intellectual property and non-intellectual property, e.g. processes, software applications, etc.	2/14 – Present
Director	ISIS Institute Director of the UNCW Institute for Interdisciplinary Studies in Identity Sciences (ISIS) established as a UNC System Center/Institute in August 2010. This center reports to senior university leadership.	8/10 – Present
Co-Director	CASIS ODNI Center of Academic Excellence 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.	8/09 – Present
Director	Identity Science Program (College of Arts & Science) Founding Director of the College of Arts and Science (CAS) Identity Sciences Program (IdSci), was the first research program in the College of Arts and Science. It was composed of a team of exceptional researchers from Anthropology, Computer Science, and Mathematics & Statistics.	8/08 – 8/10
Founder	Interdisciplinary Research Lab/Face Aging Group	8/05 – Present

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Founding member and director of the IRL-Face Aging Group. This group is the authority on facial aging from a forensics, medical, and 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.

Facial Collaboration Meeting (FCM), is a product of the FBI Biometric Center of Excellence (BCOE) focused on understanding of using the face for forensic and automatic recognition. Details of the FBI BCOE can be found at: www.biometriccoe.gov.

2.1 Teaching Experience

Professor	UNIVERSITY OF NORTH CAROLINA, WILMINGTON Department of Computer Science	Wilmington, NC 7/03 to Present
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Courses Taught:

- CSC 100 Overview of Computer Science
- CSC 105 Introduction to Computing and Computer Applications
- CSC 121 Introduction to Object-Oriented Programming
- CSC 133 Discrete Structures
- CSC 221 Advanced Object-Oriented Programming
- CSC 241 Introduction to Computer Systems and Assembly Language
- CSC 242 Digital Logic, Computer Organization, and Assembly Language
- CSC 491 Directed Individual Study
- CSC 475/592 Machine Vision
- CSC 475/592 Introduction to Biometrics
- CSC 385 Ethics
- CSC 577 Pattern Recognition
- CSC 520 Digital Image Processing
- CSC 594 Graduate Independent Study
- CSC 595 Biometric Seminar

Visiting Assistant Prof	UNIVERSITY OF NORTH CAROLINA, WILMINGTON Department of Computer Science	Wilmington, NC 12/02 to 6/03
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Courses Taught:

- CSC 105 Introduction to Computing and Computer Applications
- CSC 241 Embedded Software Systems
- CSC 241 Introduction to Computer Systems and Assembly Language

Part-time Lecturer	UNIVERSITY OF NORTH CAROLINA, WILMINGTON Department of Computer Science	Wilmington, NC 8/99 to 12/02
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Courses Taught:

- CSC 105 Introduction to Computing and Computer Applications
- CSC 121 Introduction to Computer Science I (Into to OOP w/ Java)

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CSC 221 Introduction to Computer Science II (Advance OOP w/ Java)
CSC 241 Introduction to Computer Systems and Assembly Language

Instructor **NORTH CAROLINA A&T STATE UNIVERSITY** **Greensboro, NC**
Department of Electrical Engineering **8/95 to 5/99**

Courses Taught:

Undergraduate

ELEN 100 Numerical Methods in Engineering
ELEN 201 Introduction to Circuits Lab I
ELEN 301 Introduction to Circuits Lab II
ELEN 327 Digital Logic Lab

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 - review and evaluate breaking technologies for the 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.

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Business Manager - maintain current customer base and attract new customers within NUWC community, Department of Defense, and private enterprise. This includes identifying new customers and markets as well as implementing quality assurance principles and practices that guarantee 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**
Responsible for executing the disestablishment and disposition on NUWC Detachment Norfolk Code 20 functional tasks and resources.

Software
Engineer **NAVAL UNDERSEA WARFARE CENTER** **Newport, RI**
 Special Assignment (Base Realignment & Closure) **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 (Issued: January 2012)

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3.0 RESEARCH

3.1 HONORS

1. Sigma Xi (The Scientific Research Society inducted 2012)
2. Upsilon Pi Epsilon (Computer Science Honor Society inducted 2008)
3. Tau Beta Pi (Engineering Honor Society inducted 1992)
4. Eta Kappa Nu (Electrical Engineering Honor Society inducted 1991)

3.2 Intellectual Property

3.2.1 Patents

1. 11-1260-US, Karl Ricanek et al, Demographic Analysis of Facial Landmarks, filed September 26, 2012, **issued April 22, 2014.**
2. 10-984-US, Karl Ricanek, Demographic Analysis of Facial Landmarks, filed September 7, 2011. (Pending)

3.2.2 Record of Invention

1. Karl Ricanek & Gayathri Mahalingam, Enhanced Latent Facial Recognition for Big Social Media Data Non-ideal Faces, filed May 2013.

3.2.3 Commercialization of Research Products/Data

Research products developed in Dr. Ricanek's labs have netted more than \$104,000. Proceeds are used for internal research and development efforts.

1. Academic version of the MORPH dataset is used in more than 25 countries around the world with 100's of research groups. Seven out of the top ten universities in the world use this product in their research. This dataset has generated nearly \$4,000.
2. Commercial version of the MORPH dataset is purchased by governments and companies and has generated over \$100,000 in receipts.

3.3 Directed Thesis/Capstone

1. Harleen Atwal, Department of Computer Science, "UAV Drones", May 2016. (Anticipated)
2. Shivani Bhardwaj, Department of Computer Science, "Evaluation of Face Recognition on Children", Summer 2015 (Anticipated)
3. Michael Sodomosky, Department of Computer Science, "Understanding the Limitation of Facial Recognition for use with Children", Summer 2014 (Anticipated)
4. Benjamin Barbour, Department of Computer Science, "Application of Deep Artificial Neural Networks for Biometrics and Soft-biometrics", Summer 2014. (Anticipated)
5. David Macurak, Department of Computer Science, "Development of Open Source System for Automatic Landmarking of Faces", Summer 2013.
6. Jeffrey Raynor, Department of Computer Science, "Evaluation of Learning Techniques for Automatic Demographic Classification of Faces", Summer 2013.

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7. Nnamdi Ihenacho, Department of Computer Science, “Developing an IT Strategy for New Hanover County Community Healthcare”, Summer 2012.
8. Rachel Cramer, Department of Mathematics & Statistics, “L1-Regularized Support Vector Machines for Soft Biometric Classification”, December 2011.
9. Dominique Jackson, Department of Computer Science, “Face Recognition Approach to Automating Film Analysis”, August 2011.
10. Brian Bullard, Department of Computer Science, “Automatic Face Detection and Image Tagging in a Social Networking Structure”, December 2010.
11. Fernando Schiefelbein, Department of Mathematics and Statistics, “Robust Facial Age-Estimation using Advanced Statistical Techniques”, April 2010.
12. 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.
13. Luu Khoa, Department of Computer Science, Concordia University, Montreal Canada, “Automatic-Photorealistic Facial-Aging of Children Derived from Familial Evidence”, September 2009.
14. M. Moran Parker, “Academic Research Computing”, October 2009.
15. William Shipman, Department of Computer Science, “Unifying Mobile Devices, the Internet, and Emergency Management Services via Short/Multimedia Messaging Services”, December 2008.
16. Yi Chen, Department of Mathematics and Statistics, “QTL Detection from Stochastic Process by Bayesian Hierarchical Regression Model”, December 2007.
17. Ryan Wilkins, Department of Computer Science, “Neurocognitive Inspired Hierarchical Face Recognition System”, July 2007.
18. Kathleen Karlon, Department of Mathematics and Statistics, “Time Series Competition Among Three Sophisticated Paradigms”, June 2006.
19. 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.
20. Yeusheng Zhia, Department of Mathematics and Statistics, University of North Carolina Wilmington, Wilmington, NC, “Time Series Forecasting Competition Among Three Sophisticated Paradigms,” May 2005.

3.4 Research Grant/Contract Submissions

Extramural Funding Total: \$14,640,850

1. Principle Investigator, Face and Component Face Project, with A. Sethuram, West Virginia Univ/FBI Biometric Center of Excellence, Amount \$285,000, April 2013. **(funded)**
2. Co-Principle Investigator, TIGR: Team for Interdisciplinary Global Research, with H. Berg, J. Boersma, L. Pollard, and D. Masters, \$500,000, January 2013 **(funded)**
3. Co-Principle Investigator, CASIS Pilot Project, with A. Midori Albert UNCW, Gerry Dozier North Carolina A&T State University, Damon Woodard Clemson University, Anil Jain Michigan State University, Amount \$2,200,000, November 2012. **(funded)**

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4. Principle Investigator, Face and Component Face Project, with A. M. Albert, A. Sethuram, Y. Wang, and Y. Chang, West Virginia Univ/FBI, Amount \$499,000, October 2011. **(funded)**
5. Principle Investigator, Artemis Project Year 2, with A. Sethuram, Oak Ridge National Labs/National Institute of Justice, Amount \$70,000, September 2011. **(funded)**
6. Principle Investigator, CASIS 3rd, with A. Midori Albert, North Carolina A&T State Univ/Army Research Lab, Amount \$77,000, August 2011. **(funded)**
7. Principle Investigator, IJCB 2011 Doctoral Consortium, National Science Foundation, Amount \$15,000, June 2011. **(funded)**
8. Principle Investigator, Artemis Project, with A. Sethuram, Oak Ridge National Labs/National Institute of Justice, Amount \$49,000, September 2010. **(funded)**
9. Principle Investigator, 3D Synthesis of Facial Changes with Weight in Maya, with E. Patterson, Unisys Inc., Amount \$50,192, August 2009 **(funded)**
10. Principle Investigator, Optical Flaw Detector Characterization and Recommendation, Amount \$7,500, August 2009. **(funded)**
11. 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)**
12. 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)**
13. 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. **(funded)**
14. 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)**
15. Principle Investigator, 3D Representations of Craniofacial Aging, with A.M. Albert, E. Patterson, A. Sethuram Unisys Corporation, Amount \$187,000, August 2007. **(funded)**
16. 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)**
17. 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)**
18. Co-principle investigator, Virtual Studies of the Past, with T. Burgh and S. Baptista, ITSD Innovations Grant, Amount \$2,500, January 2005. **(funded)**
19. K. Ricanek, CAS Travel Award, Amount \$1,500, Summer 2005. **(Funded)**
20. K. Ricanek, International Travel Award-International Program Committee, UNCW, Amount \$2,000, Summer 2005. **(funded)**

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21. K. Ricanek, International Travel Award-International Program Committee, UNCW, Amount \$1,500, Summer 2004. **(funded)**
22. K. Ricanek, Student Assistance Grant, CTE, UNCW, Amount \$720, Fall 2004. **(funded)**.
23. 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)**

3.5 Industry Collaboration/Consulting

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

"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.

3.6 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

3.7 Publications

Books & Chapters

1. Ricanek, K. Mahalingam, G., Albert, A.M. Vorder Bruegge, R. (2013) *Human Face Aging: A Perspective Analysis from Anthropology and Biometrics* in Age Factors in Biometric Processing, Institution of Engineering and Technology, Editor Michael Fairhurst, Fall 2013.
2. Albert A.M., Sethuram, A., Ricanek, K. (2011) *Implications of Adult Facial Aging Factors on Biometrics*. in Biometrics – Unique and Diverse Applications in Nature, Science, and Technology, Vienna, Austria, 978-953-307-187-9, Intech April 2011.
3. 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>.
4. Woodard, D. L., Ricanek, K. (2009) *Iris Databases*. In: Biometrics Encyclopedia, Stan Z. Li (Ed.), New York, NY: Biometrics Encyclopedia, Springer.

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5. 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.

Full Referred Articles

Journals

1. Mahalingam, G. and Ricanek, K. "LBP-based Periocular Recognition on Challenging Face Datasets", EURASIP Journal on Image and Video Processing, Springer.
2. Wankou Yang, Changyin Sun, Jun Gao, Karl Ricanek, "Gender Classification Using 3-D Statistical Models", Pattern Recognition, (submitted, minor revision).
3. Gayathri Mahalingam and Karl Ricanek, "LBP-based Periocular on Three Challenging Face Datasets", (submitted, minor revision).
4. Wankou Yang, Changyin Sun, Karl Ricanek, "Sequential Row-Column 2DPCA for Face Recognition", Journal of Neural Computing and Application, 21 (7), p.1729-1735, Oct 2012.
5. Yaw Chang, Yishi Wang, Cuixian Chen, and Karl Ricanek, "Improved Image-based Automatic Classification by Feature Selection," Journal of Artificial Intelligence and Soft Computing Research (JAISCR), Vol 1, Num 3, 2011, pp 241- 253.YY
6. W. Yang, C. Chen, K. Ricanek, C. Sun, "Ensemble of Global and Local Features for Face Age Estimation", Advances in Neural Networks, Lecture Notes in Computer Science, vol 6676, no 1, pp 251 – 259, 2011.
7. A. Midori Albert and Karl Ricanek Jr., "The use of 3dMD surface imaging technology in forensic face identity research at I²SIS", Journal of Forensic Technology Review, vol. 1 no 1, pp 4 – 9, January 2011.
8. Karl Ricanek Jr., "Dissecting Human Identity", IEEE Computer, vol. 44 no 1, pp 96 – 107, January 2011.
9. Wankou Yang, Changyin Sun, Lei Zhang, Karl Ricanek, "Laplacian Bidirectional PCA for Face Recognition, in the Journal of Neurocomputing Letters, Elsevier, vol 74, issues 1-3, pp 487-493, December 2010.
10. Karl Ricanek Jr, Marios Savvides, Damon L. Woodard, Gerry Dozier, "Unconstrained Biometric Identification: Emerging Technologies", IEEE Computer, vol. 43 no 3, pp 56 – 62, February 2010.
11. 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
12. 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.

Conferences

1. Brown, C, Ricanek, K, Simmonds, D, BIOBase: An Adaptable Biometric Tool and Database," International Conference on Bioinformatics and Computational Biology 2014 (BioComp 2014), Las Vegas, Nevada, July 21 2014.

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2. Mahalingam, G. and Ricanek, K., “Investigating the Effects of Gender and Age-group based Differences in Identical Twins”, National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIG), Jodhpur, India, December 18 2013.
3. Macurak, D., Sethuram, A., Ricanek, K. and Barbour, B. “DASM: An Open Source Active Model for Automatic Registration of Objects” IEEE National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIG), Jodhpur, India, December 18 2013.
4. Chen, C., Chang, Y. O., Wang, Y., & Ricanek, K.. “Eyebrow Shape Analysis by Using a Modified Functional Curve Procrustes Distance”, IEEE Conference on Biometrics: Theory, Applications, and Systems (BTAS), Washington, DC, October 2013.
5. Mahalingam, G. and Ricanek, K. “Is the Eye Region More Reliable Than the Face? - A Preliminary Study of Face-based Recognition on Transgender Dataset”, IEEE Conference on Biometrics: Theory, Applications, and Systems (BTAS), Washington, DC, October 2013.
6. Amrutha Sethuram, Karl Ricanek, Jason Saragih, and Chris Boehnen, “Facial Landmarking: Comparing Automatic Landmarking Methods with Applications in Soft Biometric”, European Conference for Computer Vision (ECCV 2012) Workshop What is a Face, Florence, Italy, Oct 7-13, 2012.
7. Amrutha Sethuram, Jason Saragih, Karl Ricanek, Benjamin Barbour, “Extremely Dense Face Registration: Comparing Automatic Landmarking Algorithms for General and Ethno-Gender Models”, in the Proceedings of IEEE Biometric: Theory, Systems and Applications (BTAS 2012), Washington, DC, September 23-26, 2012.
8. Karl Ricanek, Amrutha Sethuram, and Wankou Yang, “Face Registration: Evaluating Generative Models for Automatic Dense Landmarking of the Face”, Second International Workshop on Intelligence Science and Intelligent Engineering Data (IScIDE 2012), Nanjing, China, Oct 15-17, 2012.
9. Wankou Yang, Cuixian Chen, Karl Ricanek and Changyin Sun, “Gender Classification via Global-Local Features Fusion”, 6th Chinese Conference on Biometric Recognition (CCBR 2011), Beijing, China, December 3-4, 2011
10. Cuixian Chen, Wankou Yang, Yishi Wang, Karl Ricanek and Shiguang Shan, “Learning Gabor Wavelets with Features Fusion and Feature Selection for Facial Age Estimation”, 6th Chinese Conference on Biometric Recognition (CCBR 2011), Beijing, China, December 3-4, 2011
11. A. Alford, C. Hansen, G. Dozier, K. Bryant, J. Kelly, T. Abegaz, K. Ricanek, D.L. Woodard, “GEC-Based Multi-Biometric Fusion”, in the Proceedings of the IEEE Congress on Evolutionary Computation, New Orleans, LA, June 5 – 8, 2011.
12. A. Alford, K. Popplewell, G. Dozier, K. Bryant, J. Kelly, J. Adams, T. Abegaz, J. Shelton, K. Ricanek, D.L. Woodard, “A Comparison of GEC-Based Feature Selection and Weighting for Multimodal Biometric Recognition”, in the Proceedings of the IEEE Congress on Evolutionary Computation, New Orleans, LA, June 5 – 8, 2011.
13. T. Abegaz, G. Dozier, K. Bryant, J. Adams, J. Shelton, K. Ricanek, D. L. Woodard, “SSGA and EDA Based Feature Selection and Weighting for Face Recognition”, in the Proceedings of the IEEE Congress on Evolutionary Computation, New Orleans, LA, June 5 – 8, 2011.

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14. J. Shelton, G. Dozier, K. Bryant, L. Smalls, J. Adams, K. Popplewell, T. Abegaz, D. L. Woodard, K. Ricanek, "A Comparison of Genetic and Evolutionary Feature Extraction Methods for Facial Recognition", in the Proceedings of the International Conference on Genetic and Evolutionary Methods (GEM 2011), Las Vegas, NV July 18 – 21, 2011.
15. A. Alford, K. Popplewell, G. Dozier, K. Bryant, J. Kelly, J. Adams, T. Abegz, J. Shelton, D. L. Woodard, K. Ricanek, "Hybrid GEC-Based Techniques for Multi-Biometric Recognition" in the Proceedings of the International Conference on Genetic and Evolutionary Methods (GEM 2011), Las Vegas, NV, July 18 – 21, 2011.
16. T. Abegaz, G. Dozier, K. Bryant, J. Adams, V. McLean, J. Shelton, A. Alford, K. Ricanek, D.L. Woodard, "Applying GEC in Feature Selection and Weighting for LBP, oLBP, and Eigenface", in the Proceedings of the International Conference on Genetic and Evolutionary Methods (GEM 2011), Las Vegas, NV, July 18 – 21, 2011.
17. Chi Nhan Duong, Kha Gia Quach, Khoa Luu, Hoai Bac Le, Karl Ricanek, "Fine Tuning Age-estimation with Global and Local Facial Features", in the Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), Prague, Czech Republic, May 24, 2011.
18. Wankou Yang, Cuixian Chen, Karl Ricanek, Changyin Sun, "Ensemble of Global and Local Features for Face Age Estimation", in the Proceedings of the 8th International Symposium on Neural Networks (ISSN), Guilin, China, pp 251 – 259, May 2011.
19. Wankou Yang, Amrutha Sethuram, Eric Patterson, Karl Ricanek, Changyin Sun, "Gender Classification using the Profile", in the Proceedings of the 8th International Symposium on Neural Networks (ISSN), Guilin, China, May 2011.
20. Yaw Chang, Yishi Wang, Karl Ricanek, Cuixian Chen, "Feature Selection For Improved Automatic Gender Classification", in the Proceedings of the IEEE Workshop Computational Intelligence in Biometrics and Identity Management, Paris, France, April 2011.
21. T. Tabegaz, J. Shelton, G. Dozier, K. Bryant, D. Woodard, Karl Ricanek, "Hybrid GAs for Eigen-Based Facial Recognition", in the Proceedings of the IEEE Workshop Computational Intelligence in Biometrics and Identity Management, Paris, France, April 2011.
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23. E. L. Boone, S.J. Simmons, K Ricanek, "A Bayesian Method for the Detection of Epistasis in Quantitative Trait Loci using Markov Chain Monte Carlo Model Composition with Restricted Model Spaces", in the Proceedings of the 3rd International Conference on Agents and Artificial Intelligence (ICAART 2011), Rome, Italy, January 28, 2011.
24. 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., pp 1 – 6, September, 2010.

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25. 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, (ICCARV 10) Singapore, December 7, 2010.
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39. 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.
40. 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.
41. 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.
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43. 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.
44. 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.
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47. 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.

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48. 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.
49. 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>.
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51. 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.
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53. 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.
54. 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.
55. 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)
56. 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.
57. M.C. King, G.L. Leiby, 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.
58. K. Heywood, G.L. Leiby, K. Ricanek, "Hopfield Like Networks for Pattern Recognition with Applications to Face Recognition", International Joint Conference on Neural Networks, July 10-16 1999.
59. K. Ricanek, G.L. Leiby, 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.

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60. Karl Ricanek, Jung Kim, Gary L. Lebbly, "Biologically Inspired Object Recognition in a Multi-context Scene," IASTED ACS, May 26, 1998.
61. Karl Ricanek, Michael Cooke, and Gary L. Lebbly, "A Theory: Cellular Powered Electric Vehicle", International Conference on Advances in Vehicle Control and Safety, Amiens, France, July 1, 1998.
62. K. Ricanek, A. Homaifar, G. Lebbly, "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.
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)

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- American Association on Artificial Intelligence (AAAI)
- International Neural Network Society (INNS)
- National Society of Black Engineers (NSBE)
- International Association for Science and Technology Development (IASTED) Technical Committee Neural Networks and Image Processing

4.2 Peer Reviewer (Current)

- IEEE Transactions on Information Forensics & Security (IEEE TIFS)
- IEEE Certified Biometrics Professional Certification and Training (IEEE CBP)
- Elsevier, Image and Vision Computing (IVC)
- 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

- **Editor**, IEEE Computer Identity Science (January 2011 - Present)
- IEEE International Conference on Face and Gesture Recognition: Program Committee (FG 2013)
- International Conference on Biometrics: Program Committee (ICB 2013)
- IEEE 6th International Conference on Biometrics: Theory, Applications, and Systems (BTAS 2013) Executive Committee: Chair of Local Activities
- IEEE 5th International Conference on Biometrics: Theory, Applications, and Systems (BTAS 2012) Executive Committee: Co-Chair Competitions & Demos
- SPIE Biometrics Conference (SPIE BC 2011)
- International Joint Conference on Biometrics (IJCB 2011)
- Co-Chair Dissertation Consortium in conjunction with IJCB 2011.
- IEEE Biometrics: Theory, Applications, and Systems (IEEE BTAS 2010)

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- 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 & Public Presentations

1. "DASM: An Open Source Active Shape Model for Automatic Registration of Objects", National Conference on Vision, Pattern Recognition, Image Processing and Graphics, Jodhpur, India, December 20th, 2013.
2. "Investigating the Effects of Gender and Age Group based Differences in Identical Twins", National Conference on Vision, Pattern Recognition, Image Processing and Graphics, Jodhpur, India, December 20th, 2013.
3. "Faces", Indraprastha Institute of Information Technology Delhi, December 13, 2013.
4. "Research @UNCW", Invited Speaker by Chancellor Miller to Congressman Mike McIntyre, November 26th 2013.
5. "Biometrics: A new way of Life", Infragard Southeastern Region, October 16th, 2013.
6. "Computer Science @UNCW", Invited Speaker for General Electric (GE) Collaboration, October 4th, 2013.
7. "Eyebrow Shape Analysis Using a Modified Function Curve Procrustes Distance", IEEE BTAS 2013, October 1, 2013.
8. "Is the Eye More Reliable than the Face? A Preliminary Study of Face-based Recognition on Transgender Dataset", IEEE BTAS 2013, October 1, 2013.
9. "New Challenges of Aging Face Recognition: Twins, Children, and Transgender", IEEE BCC 2013, September 19th, 2013.
10. "What is ISIS Institute", Invited Speaker for Director of Center for Innovation & Entrepreneurship, September 16th, 2013.
11. "Building Research @UNCW", UNCW New Faculty Orientation, August 6th 2013.
12. "Face Recognition: The Challenges of Real World Biometrics", Research Triangle Park Security Working Group, May 28th, 2013.
13. "Face Processing", Invite a Scientist Program, April 2013.
14. "Human & Computer Face Processing", Invited Speaker Instructional Technology, Dr. R. Pastore, February 28th, 2013.
15. "MORPH LLC, Craniofacial Morphological Longitudinal Face Database", UNCW Research Foundation, February 24th, 2013.

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16. "ISIS Institute & Identity Sciences", Vice President for Research of UNC System, November 1, 2012
17. "Face Registration: Evaluating Generative Models for Automatic Dense Landmarking of the Face", IScIDE, Nanjing, China, October 2012
18. "Facial Aging Update and Facial Modeling", IEEE Biometrics Consortium Conference (IEEE BCC), September 2012
19. "The ISIS Institute: Biometrics and Facial Analytics", United States Special Operation Command (USASOC), August 2012.
20. "Human and Computer Face Processing", UNCW Board of Visitors (BOV), May 2012.
21. "The Institute for Interdisciplinary Studies in Identity Sciences", Information Technology Services Spring Colloquium, March 2012.
22. "The beautiful and complex face", Oak Ridge National Labs Colloquium Series, Oak Ridge Tennessee, October 2011
23. "Face Processing: the complexities of the face", Michigan State University, April 29 2011
24. Bones to Bits, Booz Allen Hamilton (CIA), 2010
25. "Age Estimation from Digital Photos", Facial Identification Scientific Working Group (FISWG), October 2010
26. "Solving the Unconstrained Face Recognition Problem", Honeywell, Automation & Control Solutions Division, September 2010
27. "What is ISIS Institute", North Carolina State University, Electrical & Computer Eng, August 2010
28. "Biometrics and the Face", Institute for Homeland Security Solutions, June 2010 (www.ihssnc.org)
29. "Diachronic Biometrics", Auburn University, Computer Science Dept, June 2010
30. "CASIS @UNCW", Central Intelligence Agency, ODNI CAE, Greensboro, NC, February 2011.
31. "Enhancements to Facial Analysis and 3D Biometrics", ", Biometric Exploitation Scientific Technology (BEST Program) Intelligence Advanced Research Project Activity (IAPR), Dulles, VA, January 2011.
32. "Gentle Introduction to Face Recognition", Summer Ventures, UNCW, June 2010
33. "Age Progression of the Face", FBI Face Collaboration Meeting, June 2010
34. "Future of Face Recognition", Praxis Engineering, April 2010 (www.praxiseng.com)
35. "Unconstrained Biometrics", United States Army Special Forces Command, March 3 2010
36. "Diachronic Biometrics: Morphology of the Face", Notre Dame University, Computer Science and Engineering Dept, March 2010
37. "Methods for Face Analysis", Vietnam National University, Computer Science Faculties, February 2010

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38. "Understanding Biometrics and Face Recognition", UNC System, Office of the President, Jan 2010
39. "Robust 3D Biometrics", Biometric Exploitation Scientific Technology (BEST Program) Intelligence Advanced Research Project Activity (IAPR), Dulles, VA, December 2009.
40. "Age Estimation Using Active Appearance Models with Support Vector Regression", IEEE Biometrics: Theory and Applications Systems (BTAS), Crystal City, VA, September 2009.
41. "MORPH: Development and Optimization of a Longitudinal Age Progression Face Database", International Biometric ID Management and Multimodal Communication (BioID), Crystal City, VA, September 2009
42. "The Changing Face: Developing a Diachronic Biometric for the Visible Face Modality", University of Maryland College Park, Computer Science Dept, February 2009
43. "What is Diachronic Biometrics?", North Carolina A&T State University, Computer Science Dept, 2009
44. "Review of Facial Aging", IEEE 1st International Workshop on Robust Biometrics, Honolulu, HI, November 2008.
45. "Random Forests versus Support Vector Machines: Stem and Calyx Classification for Jonagold Apples", Visualization, Image, and Image Processing Conference, Spain, September 2008.
46. "Adult Face Recognition", North Carolina A&T State University, Electrical and Computer Engineering Dept, 2008
47. "Quantitative Trait Loci Analysis Using a Bayesian Framework", International Joint Conference on Neural Networks (IJCNN), Orlando FL, August 2007.
48. "Novel Cognitive-Psychology Based Face Recognition System for Improved Identification Rates for the Problem of Age-progression", IASTED, Palma de Mallorca Spain, August 2006
49. "Automatic Representation of Adult Aging in Facial Images", IASTED, Palma de Mallorca Spain, August 2006

4.5 Service Volunteer to Students

- Invite A Scientist Program (2013)
- Advisor to ACM Student Chapter (2004 – Present)
- 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

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- Science Fair, Gregory Elementary School, Wilmington, NC
- ROCAME Jamboree (2008)