Curriculum Vitae

ANDREW R. WILLIS, PH.D.

University of North Carolina at Charlotte • Department of Electrical and Computer Engineering
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EDUCATION

Brown University / Providence, RI USA

- Ph.D., *Scientia Machina* (Electrical Engineering), Thesis: *Stochastic 3D Geometric Models for Classification, Deformation, and Estimation.* May 2004.
- Master of Applied Math, Thesis Topic: *Markov Random Field Modeling for 3D Shape Sculpting*, May 2003.
- Master of Electrical Sciences, Thesis Topic: *Bayesian 3D Pot-Assembly from Fragments as Problems in Perceptual-Grouping and Geometric-Learning*, May 2001.

Worcester Polytechnic Institute / Worcester, MA USA

- Bachelor of Electrical Engineering *cum laude*, May 1995.
- Bachelor of Computer Science *cum laude*, May 1994.

PROFESSIONAL APPOINTMENTS

Assistant Professor / University of North Carolina - Charlotte / August 2005 - present

Research on medical imaging, computational reconstruction of artifacts, computational reconstruction of bone, computer vision, pattern recognition, and signal/image processing.

- Procured $1,039,320 (8/05-3/10) in research and educational grant funding through funding agencies including NASA, NSF, and NIH.
- Awarded the Maxheim Fellowship from the UNCC College of Engineering, an award given annually to one junior faculty member in the college in recognition for outstanding research performance.
- Member of The Center of Biomedical Engineering Systems (CBES) (2008-present)
- Directed data collection expeditions to archaeological sites in Oxcutzcab, Mexico (Huntichmul, Labna, Kuic sites - Mayan civilization) and in Herzilya-Petuach, Israel (Apollonia-Arsuf - Crusader era castle) in 2007
- Developed courses: Digital Signal Processing, Applied Computer Graphics, Applied Artificial Intelligence, Medical Ultrasonics, Computer Vision, Pattern Recognition, Recognition from 2D and 3D Images and Design of Intelligent Spacecraft.

Postdoctoral Research Associate and SHAPE Lab Manager / Brown University / June 2004 - August 2005

Research on statistical shape models and interactive sculpting of 3D shape in virtual environments.

- Manager and principal researcher for the SHAPE Lab which entails the supervision of graduate and undergraduate students, system and device procurement, administration, and maintenance.
- Assisted in the writing a successful NSF-KDI Grant #BCS-9980091 ($2M distributed over years 2002-2005).

Researcher / Brown University / 2002 - May 2004

Research on theoretical shape models and computational methods for 3D puzzle-solving.

- Conceived and implemented the first system which automatically assembles axially symmetric 3D objects from their fragments emphasizing the important application of assembling archaeological vessels from vessel fragments.

- Assisted in the writing a successful NSF-ITR grant: #IIS-0205477 ($1.3M distributed over years 1999-2001).
- Technical director of NSF-sponsored data collection expedition to the archaeological excavation of the Great Temple in Petra, Jordan during the Summer of 2002.

Research Consultant / Analog Devices / Norwood, MA / 1999-2002

Research on wavelet-based image compression and implementation of JPEG-2000 on integrated circuits.

- Software / hardware design of the ADVJP2000 image compression integrated circuit (released May 2002). The current revision (Aug. 2004) of this IC is referred to as Analog Devices ADV202 JPEG2000 Video codec.

Process Control Design & Field Service Engineer / Morgan Construction Co. / Worcester, MA 01615 / 1995-1998

- Designed / installed and upgraded control systems for high speed (>100 m/sec) steel rod manufacturing and managed on-site installation teams for contracts in excess of $2M.

PUBLICATIONS AND RESEARCH

Synopsis:

Publications: 35 peer reviewed journal and conference articles, 1 book chapter. This corpus has been cited externally 104 times.

Funding: $1,039,320 (13 funded proposals). Sole UNC Charlotte PI for $864,027 and 50% co-PI for remaining $175,293. Funding by agency: National Science Foundation (NSF - $359k), the National Institute of Health (NIH - $459k), the National Aeronautics and Space Administration (NASA - $201k), local industry ($14k) and UNC Charlotte ($6k).

Dissertation

Willis, A., *Stochastic 3D Geometric Models for Classification, Deformation, and Estimation*, Ph.D. Thesis, Brown University, May 2004. (8 citations)

Refereed Journal Articles (5 total, 9 citations)

1. Thomas T.P., Anderson D.D., **Willis A.**, Liu P., Marsh J.L., Brown T.D.,*ASB Clinical Biomechanics Award Paper 2010 Virtual pre-operative reconstruction planning for comminuted articular fractures* . Clinical Biomechanics 2011, 26(2):109-115, February 2011. PMID:21215501. NIHMSID:259455
2. Thomas T.P., Anderson D.D., **Willis A.**, Liu P., Frank M.C., Marsh J.L., and Brown T.D. *A Computational/Experimental Platform for Investigating Three-Dimensional Puzzle Solving of Comminuted Articular Fractures*. Computer Methods in Biomechanics and Biomedical Engineering. March 14(3), pp. 263–270 2010. (1 citation)
3. **Willis, A.** and Speicher, J. and Cooper, D. B., *Rapid Prototyping 3D Objects from Scanned Measurement Data*, Journal of Image and Vision Computing, 25(7), pp. 1174-1184, 2007. (3 citations)
4. **Willis, A.** and Cooper, D. B., *From Ruins to Relics: Computational Reconstruction of Ancient Artifacts*, IEEE Signal Processing Magazine, Vol. 25, No. 4, pp. 65-83, July 2008. (5 citations)
5. **Willis, A.**, Scanning of Archaeological Artifacts and Structures, included in: *Apollonia-Arsuf between Past and Future*, Galor, K. and Roll, I. and Tal, O., Near Eastern Archaeology, Vol. 72 No. 1, pp. 4-27, December 2009.

Book Chapters

1. **Willis, A.**, *Computational Analysis of Archaeological Ceramic Vessels and their Fragments*, in Digital Imaging for Cultural Heritage Preservation, CRC-Press, chapter accepted for publication February 2010.

Refereed Conference Articles (31 total, 96 citations)

1. **Willis, A.** and Sui, Y. and Galor, K. and Sanders, D., *Estimating Gothic Facade Architecture from Imagery*, Conference on Computer Vision and Pattern Recognition (CVPR) Workshop, June 14, pp. 43–48, 2010.

2. Gay, E. and Galor, K. and Cooper, D. and **Willis, A.** and Kimia, B. and Taubin, G. and Sanders, D. *et. al.*, *REVEAL Intermediate Report*, Conference on Computer Vision and Pattern Recognition (CVPR) Workshop, June 14, pp. 1–6, 2010.

3. Galor, K. and Sanders, D. and **Willis, A.** and Kimia, B. and Tal, O. and Taubin, *Semi-Automated Data Capture and Image Processing: new routes to interactive 3D models*, in Proceedings III International Conference on Remote Sensing in Archaeology, Tamil Nadu, Tiruchirappalli, India, August 2009.

4. **Willis, A.** and Zhou, B., *Ridge Walking for 3D Surface Segmentation*, Fifth International Symposium on 3D Data Processing, Visualization and Transmission (3DPVT), May 17-20, Paris, France, 2010.

5. **Willis, A.** and Sui, Y., *Robot 2D Self-Localization Using Range Pattern Matching via the Discrete Fourier Transform*, IEEE Southeastcon, Charlotte, NC, March, pp. 408–411, 2010.

6. **Willis, A.** and Sui, Y., *An Algebraic Model for fast Corner Detection*, International Conference on Computer Vision (ICCV), pp. 2296–2302, September 29-October 2, Kyoto, Japan, 2009.

7. **Willis, A.** and Sui, Y. and Galor, K., *Parsing Architecture within Plan Drawings with Application to Medieval Castles and Fortresses*, International Symposium on Virtual Reality, Archaeology, and Cultural Heritage (VAST), September 22-25, St. Julians, Malta, 2009.

8. Zhou, B. and **Willis, A.** and Sui, Y. and Anderson, D. and Brown, T. and Thomas, T., *Virtual 3D Bone Fracture Reconstruction via Inter-Fragmentary Surface Alignment*, IEEE Workshop on 3D Digital Imaging and Modeling (3DIM), October 3-4, Kyoto, Japan, pp. 1809–1816, 2009.

9. **Willis, A.** and Zapata, M. and Conrad, J., *Linear Methods for Calibrating LIDAR-and-Camera Systems*, IEEE/ACM International Symposium on Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS), September 21-23, London, UK, pp. 1–3, 2009.

10. Thomas, T.P., and Anderson D.D., and **Willis, A.**, and Marsh, J.L., and Brown T.D. *A development platform for three-dimensional puzzle solving of comminuted articular fractures*. 55th Annual Meeting of the Orthopaedic Research Society (ORS), February 22–25, 2009, Las Vegas, Nevada. Paper #802.

11. **Willis, A.** and Sui, Y. and Ringle, W. and Galor, K., *Design and Implementation of an Inexpensive LIDAR Scanning System with Applications in Archaeology and Anthropology*, SPIE-IS&T Electronic Imaging, January 18–22, San Jose, California, Proc of SPIE Vol. 7239, pp. 7239031-7238938, 2009.

12. Zhou, B. and **Willis, A.** and Sui, Y. and Anderson, D. and Thomas, T. P. and Brown, T., *Improving Inter-fragmentary Alignment for Virtual 3D Reconstruction of Highly Fragmented Bone Fractures*, SPIE Medical Imaging, February 9–15, Lake Buena Vista, Florida, Vol. 7259, pp. 7259341-7259349, 2009.

13. Liu, P. and **Willis, A.** and Sui, Y., *Stereoscopic 3D Reconstruction using Motorized Zoom Lenses within an Embedded System*, SPIE-IS&T Electronic Imaging: Image Processing and Machine Vision Applications II, January 18–22, San Jose, California, Vol. 7251, pp. 72510W-72510W-12, 2009.

14. **Willis, A.** and Shadid, W. and Eppes, M., *Mining Remote Image Repositories with Application to Mars Rover Stereoscopic Image Datasets*, SPIE-IS&T Electronic Imaging: Image Processing and Machine Vision Applications II, January 18–22, San Jose, California, Vol. 7251, pp. 72510M-72510M-10, 2009.

15. Sui, Y. and **Willis, A.**, *Using Markov Random Fields and Algebraic Geometry to Extract 3D Symmetry Properties*, Fourth International Symposium on 3D Data Processing, Visualization and Transmission (3DPVT), June 18-20, Atlanta, GA, 2008.

16. Kim, J.-T. and Oh, J-S. and **Willis, A.**, *Automatic Control of a Camera Signal for Monitoring Systems*, International Conference on Image Processing, Computer Vision, and Pattern Recognition (IPCV), July 14-17, Las Vegas, Nevada, 2008.

17. **Willis, A.** and Conrad, J., *Design of Intelligent Spacecraft: An Interdisciplinary Engineering Education Course*, ASEE Annual Conference & Exposition June 22-25, Pittsburgh, PA, 2008.

18. **Willis, A.** and Conrad, J., *Senior Design Project: A Robotic System using Stereoscopic Cameras for Navigation*, ASEE Annual Conference & Exposition June 22-25, Pittsburgh, PA, 2008.

19. **Willis, A.** and Anderson, D. and Thomas, T. and Brown, T. and Marsh, J.L., *3D Reconstruction of Highly Fragmented Bone Fractures*, Proceedings of SPIE Volume 6512, pp. 65121P1–65121P10, SPIE Conference on Medical Imaging, February 17–22, San Diego, California, 2007.

20. Anderson, D. and Thomas, T. and **Willis, A.** and Brown, T. and Marsh, J.L., *Identifying Fragment Morphology for 3-D Puzzle Solving/Surgical Planning*, 53rd Annual Meeting of the Orthopaedic Research Society (ORS), February 11-14, San Diego, California. Abstract 4161A26492, 2007.

21. Mack, C. and Mogallapu, V. and **Willis, A.** and Weldon, T., *Exploiting Typical Clinical Imaging Constraints for 3D Outer Bone Surface Segmentation*, IEEE Southeastcon, Richmond, VA, March, 2007.

22. **Willis, A.** and Cooper D. B., *Estimating a-Priori Unknown 3D Axially Symmetric Surfaces from Noisy Measurements of their Fragments*, Third International Symposium on 3D Data Processing, Visualization and Transmission (3DPVT), pp. 334-341, 2006.

23. Saykol, E. and Saygin, Y. and Ercil, A. and **Willis, A.** and Joukowsky, M. and Cooper, D. B., *A Web Service Platform for Web-Accessible Archaeological Databases*, ISCIS (International Symposium on Computer and Information Sciences), pp. 362-370, 2005.

24. **Willis, A**. and Aspelund, K. *et. al.*, *Computational Schemes for Biomimetic Sculpture*, 5th International Conference on Creativity and Cognition (C&C), ACM SIGCHI Conference, pp. 22-31, London, April 12–14, 2005. (1 citation)

25. **Willis, A.** and Speicher, J. and Cooper, D. B., *Surface Sculpting with Stochastic Deformable 3D Surfaces*, International Conference on Pattern Recognition (ICPR), Vol. II, pp. 249–252, 2004. (6 citations)

26. **Willis, A.** and Cooper, D. B., *Alignment of Multiple Non-Overlapping Axially Symmetric 3D Datasets*, International Conference on Pattern Recognition (ICPR), Vol. IV, pp. 96–9, 2004. (9 citations)

27. **Willis, A.** and Cooper, D. B., *Bayesian Assembly of 3D Axially Symmetric Shapes from Fragments*, Conference on Computer Vision and Pattern Recognition (CVPR), Vol. I, pp. 82–89, 2004. (13 citations)

28. Saykol, E., and Ercil, A., **Willis, A.**, Joukowsky, M. and Cooper, D. B., *Design and Implementation of a Multimedia Integrated Database of Archaeological Sites on a Web Service Platform*, International Symposium on Virtual Reality, Archaeology, and Cultural Heritage (VAST), pp. 23-28, 2004.

29. **Willis, A.** and Cooper, D. B. *et. al.*, *Accurately Estimating Sherd 3D Surface Geometry with Application to Pot Reconstruction*, Conference on Computer Vision and Pattern Recognition (CVPR) Workshop, 2003. (23 citations)

30. **Willis, A.** and Cooper, D. B. *et. al.*, *Bayesian Pot-Assembly from Fragments as Problems in Perceptual-Grouping and Geometric-Learning*, International Conference on Pattern Recognition (ICPR), Vol. III, pp. 297–302, 2002. (17 citations)

31. Cooper, D. B., and **Willis, A.** and Orriols, X., and Leymarie, F., and Mumford, D. *et. al.*, *Assembling Virtual Pots from 3D Measurements of their Fragments*, International Symposium on Virtual Reality Archaeology and Cultural Heritage (VAST), pp. 241–253, 2001. (16 citations)

Unrefereed Conference Articles

1. Aspelund, K. and Hatcher, D. and **Willis, A.** *et. al.*, *Exhibit : Computational Schemes for Biomimetic Sculpture*, 5th International Conference on Creativity and Cognition (C&C), ACM SIGCHI Conference, pp. 298–300, London, April 12–14, 2005.

2. **Willis, A.** and Orriols, X. *et. al.*, *Extracting Axially Symmetric 3D Geometry from Limited 3D Range Data*, Technical Report LEMS-192, Brown University, Providence, RI, 2001. (2 citations)

INVITED TALKS

1. *REVEAL: Leveraging 2D and 3D Image Data for Virtual Analysis and Reconstruction of Architecture*, Brown University Workshop on the Future of Excavation, May 7, 2011.

2. *Computer Vision and Biological Taxonomy,* presented at University of North Carolina at Greensboro, Seminar on New Directions in Visualization: Perspectives from Biology and Computer Science, April 4, 2008.

3. *Semi-Automatic 3D Reconstruction of Objects from their Fragments* presented at Iowa Institute of Biomedical Imaging (IIBI), University of Iowa, Department of Electrical and Computer Engineering and Department of Orthopaedic Surgery, November 6, 2007.

4. *Knowledge Modeling, Computational 3D Puzzle Solving, and Automatic Assembly of Archaeological Pottery* presented at :

   (a) Kyungpook National University, Korea UNCC exchange program, January 19, 2006.

   (b) Eta Kappa Nu Honor Society Seminar Series, Charlotte, North Carolina, October 4, 2005.

5. *Manipulation and Learning of 3D Stochastic Shape Models with Application to Archaeology*, presented at Massachusetts Institute of Technology Computer Science and Artificial Intelligence Laboratory (MIT - CSAIL), December 8, 2004.

6. *Stochastic Models for Estimation, Classification, and Deformation,* presented at Goldsmiths University of London, July 6, 2004.

7. *Assembling Virtual Pots from 3D Measurements of their Fragments (Geometric Learning),* presented at :

   (a) The Italy-United States Workshop : The Reconstruction of Archaeological Landscapes through Digital Technologies, at Boston University, Boston, Massachusetts, November 3, 2001.

   (b) The Computer Science and Engineering Divisions of Sabanci University, Istanbul, Turkey, November 25-26, 2001.

RESEARCH GRANTS (TOTAL $1,039,320)

Research (Total $1,017,820, sole PI $864,027, co-PI for $175,293)

1. Eppes, M. and Willis, A., *NASA-MDAP: An Investigation of Physical Weathering on Mars using New Web-Based, User-Friendly, 3-D MER Data-Mining Software*, NASA Mars Data Analysis Program (NASA-MDAP), 8/1/09 - 7/31/12, $161,648.

2. Hildreth, J., and Willis, A., *NHRMC Inpatient Bed Tower Renovation (3D Imaging of Existing Hospital Infrastructure)*, Rodgers Builders Inc. (local industry), 7/28/09 - 1/31/10, $13,645.

3. Willis, A., *NIH-R21 AR054015: Quantifying Fracture Severity Using a 3-D Puzzle Solving Approach*, NIH Exploratory/Developmental Research Grant Award (NIH-R21), 7/1/08 – 4/31/10, $359,273 full award, $173,508 subcontract.

4. Willis, A., *NSF-IIS 0808718: Core Computer Vision Research: Promoting Paradigm Shifts in Archaeology*, NSF Intelligent Information Systems (IIS-III-CXT), 9/1/08 – 8/31/12, $2,638,964 full award, $305,000 subcontract.

5. Willis, A., NIH 1 *P50 AR055533-01 CORT: New Approaches to Assess and Forestall Osteoarthritis in Injured Joints*, NIH Clinical Research Center Grant (NIH-P50), 9/1/07 – 8/31/12, $7,435,286 full award, $178,290 subcontract.

6. Willis, A., *New Approaches to Assess and Forestall Osteoarthritis in Injured Joints*, University of Iowa, 9/1/07 – 8/31/12, $108,000.

7. Willis, A., *Rebuilding the Past : Virtual Reconstruction of Collapsed Ancient Structures*, UNCC Faculty Research Grant (UNCC-FRG), 1/1/07 - 5/31/08, $6,000.

8. Willis, A., *Power Efficient Implementation of a Hardware Accelerated Real-Time 3D Reconstruction System*, NASA: North Carolina Space Grant New Investigations Program (NC Spacegrant-NIP), 7/1/07 - 6/30/08, $25,000.

9. Willis, A., *IIS-ITR: 3D Free Form Models for the Representation, Manipulation, and Recovery of Shape, with Applications to Archaeology and Virtual Sculpting*, NSF Information Technology Research (IIS-ITR), subcontract from Brown University #IIS-0205477, 1/1/07 - 9/1/08, $2,055,616 full award, $46,729 subcontract.

Education (Total $21,500, sole PI $21,500)

1. Willis, A., *FY 2010 NSF REU: Digital Models of Medieval Architecture for Reconstruction of Ancient Castles*, NSF Research Experience for Undergraduates (NSF-REU), 8/15/09 – 7/31/10, $8,000.

2. Willis, A., *Senior Design Project: Real-Time Stereoscopic 3D Reconstruction on Low-Power FPGA Systems*, NASA/NC Space Grant: Exploration Systems Mission Directorate (NASA-ESMD) Design Award, 1/1/07 - 9/15/07, $1,500.

3. Willis, A., *Senior Design Project: FPGA Implementation of the ITU G.729a Speech Compression Codec*, NASA/NC Spacegrant: Exploration Systems Mission Directorate (NASA-ESMD) Design Award, 9/1/08 - 4/15/09, $2,000.

4. Willis, A., *A Course Proposal: Design of Intelligent Spacecraft*, NASA/NC Spacegrant: Higher Education Program (NC Spacegrant-HEP), 7/1/06 - 6/30/08, $10,000.

Student Advising of Research

Masters Thesis Students (3 graduated, 1 current)

- I currently advise one MS student in pursuit of a MS degree (student names and thesis titles are listed in the teaching section of my vita under advising).

- I have advised three students who have completed their MS degrees (student names and thesis titles are listed in the teaching section of my vita under advising).

Ph.D. Students (4 current)

- I currently advise four students towards the completion of their Ph.D. degrees (1 2nd year, 1 3rd year, 2 4th year) (student names and thesis titles are listed in the teaching section of my vita under advising).

Recent Research Collaborations

Brown University • *Division of Engineering* : David Cooper, Ben Kimia, Gabriel Taubin, *Department of Judaic Studies* : Katarina Galor, *Department of Archaeology and the Ancient World* : Martha Sharp Joukowsky. **Tel-Aviv University** • *Department of Archaeology* : Oren Tal, Israel Roll. **University of Iowa** • *Department of Orthopaedic Biomechanics* : Tom Brown, Donald Anderson, Thaddeus Thomas, *Carver School of Medicine* : J. Lawrence Marsh. **University of North Carolina at Charlotte** • *Department of Electrical and Computer Engineering* : Tom Weldon, James Conrad, Ivan Howitt, Arindam Mukherjee, Arun Ravindran, *Environmental Assistance Office* : Regina Guyer, *Department of Biology* : Edward Menhinick, *Department of Art* : Malena Bergmann, *Department of Architecture* : Chris Beorkrem, *Department of Civil Engineering* : Brian Anderson. **University of North Carolina Greensboro** • *Department of Biology* : Bruce Kirchoff. **Smithsonian Institution** • *Department of Entomology* : Robert Robbins, Allen Norrbom. **Yale Peabody Museum** • *Department of Entomology* : Leonard Munstermann.

Professional Affiliations

Professional Societies

- Institute of Electrical and Electronics Engineers (IEEE) (1995 - 2005), Senior Member (2006-present)

- Association for Computing Machinery (ACM) (2004 - present)
- American Association for the Advancement of Science (AAAS) (2005 - 2008)
- American Society for Engineering Education (ASEE) (2005 - 2009)
- The International Society for Optical Engineering (SPIE) (2006 - 2007,2010)

Honor Societies

- Sigma Xi, The Scientific Research Society (2003 - present)
- Eta Kappa Nu, An Electrical and Computer Engineering Honor Society (2006 - present)
- Phi Delta Beta, An Honor Society for International Scholars (2008 - present)

Honors

- John H. Maxheim Faculty Fellowship, received from the UNCC College of Engineering August 2008 in recognition of outstanding research performance as a junior faculty member.

External Media Research Exposure

- "Piecing the Past", by Lisa DeKeukelaere, Scientific American, Sept. 2004, p. 30. This is a one page Scientific American article written by their staff, motivated by an IEEE conference publication, and is devoted to discussing research on 3D pot shape estimation from dense data laser scans of fragments found at archaeological sites.
- Oct 2004. A 1.5 minute TV Channel 10 segment, on the 6:00 PM news, devoted to our work on archaeological pot estimation and reconstruction of other structures. This was motivated by the Scientific American article, and in preparation they spent two hours shooting material to present this work.

Unsolicited Public Research Exposure

- 11"x12" article "University Archaeologists Really Starting to Dig Technology" in Investor's Business Daily", June 14, 2005, page A4, discussed results on digital archaeology research resulting from collaborations between UNCC and Brown University. (They say that this news letter is the 2nd largest-circulation business news letter in the US.)

TEACHING

Synopsis:

Teaching: *18 semester-long courses covering 11 different topics.*

Curriculum: *Developed 4 new courses (1 undergraduate, 3 graduate) approved as part of the UNC Charlotte course catalog and 6 seminar courses on advanced topics. Mentored 8 undergraduate senior design projects and 3 independent study projects.*

Advising: *7 Ph.D. students (7 current), 4 MS students (3 graduated, 1 current).*

Courses Taught - University of North Carolina at Charlotte

Undergraduate Courses

- (**core curriculum course**) ECGR4124/5124 Digital Signal Processing
  - Fall 2005
  - Fall 2006
  - Fall 2007
  - Fall 2008

  - Fall 2009
  - Fall 2010

- (**developed and adopted course**) ECGR4103/5103 Applied Computer Graphics
  - Spring 2005
  - Spring 2008

Graduate Courses

- (**developed and adopted course**) ECGR6119/8119 Applied Artificial Intelligence
  - Fall 2009
  - Fall 2010
- (**developed and adopted course**)ECGR6127/8127 Medical Signal Processing
  - Spring 2010
- (**developed and adopted course**) ECGR6090/8090 Multidimensional Stochastic Signal Processing
  - Spring 2011
- ECGR6090/8090 Computer Vision and Pattern Recognition Seminar Course
  - Fall 2006
- ECGR3090/6090/8090 Design of Intelligent Spacecraft (NASA-Sponsored Curriculum - see Educational Grants)
  - Spring 2007
- ECGR4090/6090/8090 Computer Vision Seminar Course
  - Fall 2007
  - Fall 2008
- ECGR4090/6090/8090 Pattern Recognition Seminar Course
  - Spring 2008
- ECGR4090/6090/8090 Pattern Recognition II Seminar Course
  - Spring 2009
- ECGR 6090/8090 Recognition from 2D and 3D Images Seminar Course
  - Fall 2008

Student Advising

Advised Ph.D. Degrees (7 current)

- Sui, Y., *Tentative title: Markov Field Analysis for 3D Object Recognition, to be completed May 2011.*
- Liu, P., *Tentative title: Pattern-Matching Methods for Automatic Reconstruction of Complex Bone Fractures, to be completed May 2012.*
- Zhou, B., *Tentative title: A Cybernetic System for Complex Bone Fracture Reassembly, to be completed May 2012.*

- Shadid, W., *Tentative title: Data Mining methods for indexing into very large remote image repositories, to be completed 2013.*
- Kwon, J., *Tentative title: Data mining into remote Image Repositories, to be completed May 2014.*
- E, L., *Tentative title: Computational Analysis of 3D Comminuted Fractures, to be completed 2014.*
- Mahfoud, E., *Tentative title: Shape Grammars as prior models for 3D Inference from Sparse Imagery, to be completed 2017.*

Advised M.Sc. Degrees (4 total, 1 current, 3 graduated)

- Mogallapu, V., *Semi-Automatic 3D Reconstruction of Highly Fragmented Bone Fractures*, Masters Thesis (EE), University of North Carolina at Charlotte, August 2007.
- Mack, C., *A Simple, Cost Effective, Active Range Sensing System*, Masters Thesis (EE), University of North Carolina at Charlotte, June 2007.
- Sushant Mehta, *Design and Implementation of Inexpensive 3D Scanner with Real-time Integrated Surface Textures*, Masters Thesis (EE), May 2011.
- Rewa Tikekar, *Tenative title: Analysis of Bone Fragment Surfaces to Improve Computational Prediction of Fracture Severity*, Masters Thesis (EE), to be completed December 2011.

Advised Undergraduate Student Projects (7)

- Chan, Sye-Min, *Semi-Automatic Assembly of Broken Fragments*, Undergraduate Honors Thesis, Brown University, May 2005.
- Brewer, D. and Sheldon, C., *Sponsor UNCC, High Speed Frequency Detection in FPGAs*, Undergraduate Senior Design Project, University of North Carolina at Charlotte, December 2005.
- Conrad, N., *Sponsor: UNCC, Linux Device Driver for the Acuity AR-4000,* Undergraduate Senior Design Project, University of North Carolina at Charlotte, December 2006.
- Vasconez, P. and Daniels, M. and Adams, Q. and Fennel, A., *Sponsor: General Dynamics, FPGA/DSP Performance Comparison Project*, Undergraduate Senior Design Project, University of North Carolina at Charlotte, May 2007.
- Meiswinkel, T. and Abdulrazzak, A. and Haines, J. and Stevens, A., *Sponsor: NASA/NC Spacegrant, Robotic Rover Vision System Design*, Undergraduate Senior Design Project, University of North Carolina at Charlotte, December 2007.
- Young, J. and Wickersham, A. and Dover, M., *Sponsor: UNCC, 3D Laser Scanning for Video Game Model Creation*, May 2008. **won second place overall in the annual senior design exposition.*
- Hennika, S. and Krotki, N. and Cavuoto, A. and Amengano, Y., *Sponsor: NASA/NC Spacegrant, FPGA Design of the ITU G.729a Speech Compression Codec*, May 2009. Amengano, Y. went on to work as an intern at the NASA Johnson Space Center under the direction of Gregory Hall.
- Sonek, A., and Woods, B. and Song, S. and Gragnani, L., *Sponsor: UNCC, Self-Contained 3D Scanner*, May 2011.

Graduate Student Independent Study Projects (3)

- Davuluri, S., *Intensity smoothing and Equalization of Mars Rover Images using MRF models,* Individual Study Project, University of North Carolina at Charlotte, May 2006.
- Mogallapu, V., *Bone Segmentation in 3D CT Images,* Individual Study Project, University of North Carolina at Charlotte, December 2006.

- Mysore, G., *Design and Implementation of a low-cost 3D range scanning device*, Individual Study Project, University of North Carolina at Charlotte, May 2006.

Teaching Workships / Seminars

- Workshop on Learning Styles and Active Learning, *How To Get Students Actively Involved in their Learning, even if you have 150 of them in the class*, presented by Dr. Richard M. Felder, North Carolina State University, June 6, 2006.

UNIVERSITY AND COMMUNITY SERVICE

Synopsis:

Committees: member on 12 committees (8 department, 1 college, 3 university) totaling 35 effective years of service.

Scholarly Service: program committee for 11 conferences, reviewed 12 articles for 7 different journals, reviewed proposals for 2 granting agencies (NSF, NASA).

Electrical and Computer Engineering Department (8 committees, 29 effective years)

- Departmental Review Committee (Promotion and Tenure DRC)
  - 2010
- Computer Engineering Technical Thrust (TT) / Focus Area Improvement Team (FAIT)
  - 2005, 2006, 2007, 2008, 2009, 2010
- Communications and Signal Processing Technical Thrust (TT) / Focus Area Improvement Team (FAIT)
  - 2005, 2006 (chair), 2007 (chair), 2008 (chair), 2009 (chair), 2010 (chair), 2011 (chair)
- Undergraduate Curriculum Committee
  - 2006, 2007, 2008, 2009, 2010
- Publicity Committee
  - 2006, 2007, 2008, 2009
- Advisor, Student Branch, Eta Kappa Nu, An Electrical and Computer Engineering Honor Society (HKN)
  - 2007, 2008, 2009, 2010, 2011
- IEEE Southeast Section Nomination Committee Chair
  - 2008, 2009, 2010

William States Lee College of Engineering (1 committee, 2 effective years)

- Computing Facilities Advisory Committee (CFAC)
  - 2005, 2006

University of North Carolina at Charlotte (3 committees, 4 effective years)

- Faculty Competitive Grants Committee
  - 2007, 2008

- Review Committee: Distinguished Ph.D. Dissertation Awards, 2006.
- Review Committee: Distinguished Masters Thesis Awards, 2006.

SCHOLARLY SERVICE

Conference Program Committee Membership (11)

- ICCV 2007, The Eleventh IEEE International Conference on Computer Vision, Rio de Janeiro, Brazil, October 14-21, 2007.
- ICCV 2009, The Twelfth IEEE International Conference on Computer Vision, Kyoto, Japan, September 29 - October 2, 2009.
- 3DIM 2007, The 6th International Conference on 3-D Imaging and Modeling, Montréal, Canada, August 21-23, 2007.
- 3DIM 2009, The 7th International Conference on 3-D Imaging and Modeling, Kyoto, Japan, September 29 - October 2, 2009.
- MASCOTS 2009, IEEE/ACM International Symposium on Modelling, Analysis and Simulation of Computer and Telecommunication Systems, London, England, September 21-23, 2009.
- ASEE 2008, 115th Annual American Society for Engineering Education Conference & Exposition, Pittsburgh, PA, USA, June 22-25, 2007.
- CVPR 2008, IEEE Computer Society Conference on Computer Vision and Pattern Recognition, Anchorage, Alaska, USA, June 24-26, 2008.
- ACVA 2003, CVPR Workshop: Applications of Computer Vision in Archaeology, Madison, Wisconsin, USA, June 17, 2003.
- ACVA 2010, CVPR Workshop: Applications of Computer Vision in Archaeology, San Francisco, California, USA, June 14, 2010. (Session Chair)
- IEEE SoutheastCon 2007, Technical Conference for the IEEE SouthEast Region, Richmond, VA, USA, March 22-25, 2007.
- IEEE SoutheastCon 2010, Technical Conference for the IEEE SouthEast Region, Charlotte, NC, USA, March 18-21, 2010.
- CVPR 2008, IEEE Computer Society Conference on Computer Vision and Pattern Recognition, San Francisco, CA, USA, June 14-18, 2010.
- 3DPVT 2010, International Conference on 3-D Processing Visualization and Transmission, Paris, France, May 17-20, 2010. (Session Chair, 3D View Registration and Matching)
- 3DIMPVT 2010, International Conference on 3-D Imaging, Modeling, Processing Visualization and Transmission, Hangzhou, China, May 16-19, 2011.
- SIGGRAPH The 38th International Conference and Exhibition on Computer Graphics and Interactive Techniques, Vancouver, Canada, August 7-11, 2011.

Journal Article Reviewer

- IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI) (2001, 2004, 2008, 2009).
- Elsevier Science Journal of Image and Vision Computing (IMAVIS) (2005, 2008).
- Elsevier Science Journal of Computer Vision and Image Understanding (CVIU) (2008, 2009, 2010).
- ACM Journal on Computing and Cultural Heritage (JOCCH) (2010, 2011).

- Springer Journal of Mathematical Imaging and Vision (JMIV) (2010).
- Elsevier Science Journal Pattern Recognition (PR) (2009)
- IEEE Transactions on Image Processing (2005).
- EURASIP Journal on Advances in Signal Processing (ASP) (2009)
- Journal of Circuits, Systems and Computers (2007).

Grant Proposal Reviewer

- NSF Intelligent Information Systems (IIS) Computer and Information Science and Engineering (CISE) Computing Resource Infrastructure (CRI) (2007).
- NASA: North Carolina Spacegrant Consortium proposals to the New Investigations Program (NIP) (2008), proposals to the Higher Education Program (HEP) (2009).
- BSF: United States - Israel Binational Science Foundation (2011).
- FWF: Austrian Science Fund (2005).