Curriculum Vitae

ANDREW R. WILLIS, PH.D.

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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

Associate Professor / ECE Dept. / University of North Carolina at Charlotte / July 2011 - present
Associate Chair / ECE Dept. / University of North Carolina at Charlotte / December 2018 - present
Undergraduate Director / ECE Dept. / University of North Carolina at Charlotte / January 2020 - present
Adjunct Research Professor / Mechanical and Aerospace Department. / University of Florida / August 2020 - present
Honors Faculty / Honors College / University of North Carolina at Charlotte / July 2020 - present
Affiliated Faculty: Optical Science and Engineering / Physics Dept. / University of North Carolina at Charlotte / August 2019 - present
Affiliated Faculty: Computer Science / C.S. Dept. / University of North Carolina at Charlotte / August 2012 - June 2015

Research on deep learning, robotics, medical imaging, formal models, real-time algorithms, computer vision, pattern recognition, and signal/image processing.

AFRL Summer Faculty Research Associate / Air Force Research Laboratory - Eglin Air Force Base - Florida / Summer 2017

- Synthetic Aperture Radar (SAR) simulation research: "Hardware-Accelerated SAR Simulation using Massively Parallel Ray-Tracing technologies."

Senior NRC Research Associate / National Academies of Science and the National Research Council - Eglin Air Force Base - Florida / July 2015 - July 2016

This 1-year research sabbatical sponsored by the National Research Council allowed me to perform research at the Air Force Research Laboratory for the Munitions directorate. Research focused on unsolved problems in unmanned vehicle navigation, quadrotors, Simultaneous Localization and Mapping (SLAM), and 3D SLAM using RGBD sensors.

- Applied shape grammar models for 3D point cloud simplification and autonomous 3D scene understanding.

Assistant Professor / University of North Carolina at Charlotte / July 2005 - July 2011

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

- 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 (August 2008).
- 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) (July 2007, July 2010).
- Developed courses: Digital Signal Processing (2006), Design of Intelligent Spacecraft (2007), Computer Vision (2007), Applied Computer Graphics (2008), Pattern Recognition (2008), Recognition from 2D and 3D Images (2008), Applied Artificial Intelligence (2009), Medical Signal Processing (2010) and Multidimensional Stochastic Signal Processing (2011).

Postdoctoral Research Associate and SHAPE Lab Manager / Brown University **/** June 2004 - July 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).

Graduate Research Associate / Brown University **/** June 2004 - August 2005

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 (2002-2005).
- 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 (Summer of 2002).

Electrical Engineering Consultant / Analog Devices **/** Norwood, MA **/** 1999-2002

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

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

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: 11 journal articles, 52 peer-review conference articles and 1 book chapter. This corpus has been cited externally at least 883 times. Google scholar statistic: Citations: 883 h-index 17 i10-index 24

Funding: $1,039,320 (13 funded proposals). Sole UNC Charlotte PI for $864,027 and 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.

Journal Articles

1. **Willis, A.**, Ganesh, P., Volle, K., Zhang, J. and Brink, K., Volumetric Procedural Models for Shape Representation, Elsevier Graphics and Visual Computing, June 2021. doi: 10.1016/j.gvc.2021.200018

2. Pengcheng, L., Hewitt, N., Shadid, W. and **Willis, A.**, A System for 3D Reconstruction Of Comminuted Tibial Plafond Bone Fractures, Elsevier Medical Imaging Journal, 89, April 2021. doi: 10.1016/j.compmedimag.2021.101884

3. Mitra, B., Chowdhury, B. and **Willis, A.**, Protection Coordination for Assembly HVDC Breakers for HVDC Multiterminal Grids Using Wavelet Transform, in IEEE Systems Journal, 14(1), pp. 1069-1079, March, 2020. doi: 10.1109/JSYST.2019.2922645

4. Anderson, M.L. and Brink, K. M., and **Willis, A.**, Real-Time Visual Odometry Covariance Estimation for Unmanned Air Vehicle Navigation, Journal of Guidance, Control and Dynamics, pp. 1-17, February, 2019. doi 10.2514/1.G004000

5. Shadid, W. and **Willis, A.**, *Bone fragment segmentation from 3D CT imagery*, Computerized Medical Imaging and Graphics, 66, pp. 14 -27, June, 2018. doi: 10.1016/j.compmedimag.2018.02.001

6. Shadid, W. G., and **Willis, A.**, *A prototypical system to virtually reconstruct high energy fracture events, International Biomechanics*, 2(1), pp. 89–100, August 2015. doi: 10.1080/23335432.2015.1070687

7. Eppes, M.-C., **Willis, A.**, Molaro, J., Abernathy, S. and Zhou B., *Cracks in Martian boulders exhibit preferred orientations that point to solar-induced thermal stress*, Nature Communications, 6(6712), pp. 1–11, March 2015. doi: 10.1038/ncomms7712

8. 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), pp. 109–115, February 2011. doi: 10.1016/j.clinbiomech.2010.12.008

9. 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. 14(3), pp. 263–270, March 2010. doi: 10.1080/10255841003762042

10. **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. doi: 10.1086/NEA20697207

11. **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. doi: 10.1109/MSP.2008.923101

12. **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. doi: 10.1016/j.imavis.2006.06.011

Book Chapters

1. **Willis, A.**, *Computational Analysis of Archaeological Ceramic Vessels and their Fragments*, in Digital Imaging for Cultural Heritage Preservation: Analysis, Restoration, and Reconstruction of Ancient Artworks, CRC-Press, pp. 323–353, 2011. ISBN 9781138073791

Refereed Conference Articles

1. Willis, A., Brink, K. and Dipple, K., ROS georegistration: Aerial Multi-spectral Image Simulator for the Robot Operating System, International Conference on Unmanned Aircraft Systems (ICUAS), January 2022.

2. Ganesh, P., Volle, K., Willis, A., Extrinsic Calibration of Camera and Motion Capture Systems, SouthEastCon 2021, April 2021.

3. Yang, T., Zhu, S., Chen, C., Yan, S., Zhang, M. and **Willis, A.**, MutualNet: Adaptive ConvNet via Mutual Learning from Network Width and Resolution, European Conference on Computer Vision (ECCV), *accepted July 2020. arXiv preprint arXiv:1909.12978*

4. Zhang, J., **Willis, A.** and Godwin, J., "Compute-bound and low-bandwidth distributed 3D graph-SLAM", Proc. SPIE 11425, Unmanned Systems Technology XXII, 1142504 (19 May 2020); doi: 10.1117/12.2558168

5. Hossain, S., **Willis, A.** and Godwin, J., "Hardware-accelerated SAR simulation with NVIDIA-RTX technology", Proc. SPIE 11393, Algorithms for Synthetic Aperture Radar Imagery XXVII, 113930O (19 May 2020); doi:10.1117/12.2558091

6. Brink, K., Sherrill, R., Godwin, J. , Zhang, J. and **Willis**, **A.**,"Maplets: An Efficient Approach for Cooperative SLAM Map Building Under Communication and Computation Constraints," 2020 IEEE/ION Position, Location and Navigation Symposium (PLANS), Portland, OR, USA, 2020, pp. 367-374, doi: 10.1109/PLANS46316.2020.9109931.

7. Ganesh, P., Volle, K., Willis, A. and Brink, K., "Three Flavors of RGB-D Visual Odometry: Analysis of cost function compromises and covariance estimation accuracy," 2020 IEEE/ION Position, Location and Navigation Symposium (PLANS), Portland, OR, USA, 2020, pp. 1587-1595, doi: 10.1109/PLANS46316.2020.9110166.

8. **Willis, A.**, Tabkhi, H. Mendieta, M. and Neff, C., Measuring Compute-Reuse Opportunities for Video Processing Acceleration, IEEE SoutheastCon, pp. 1-8, April 2019. doi: 10.1109/SoutheastCon42311.2019.9020648

9. Chandrashekar, A., Papadakis, J., **Willis, A.**, and Gantert, J., *Structure-From-Motion and RGBD Depth Fusion*, IEEE SoutheastCon, pp. 1-8, April 2018. doi: 10.1109/SECON.2018.8478927

10. Papadakis, J., **Willis, A.**, and Gantert, J., *RGBD-Sphere SLAM*. IEEE SoutheastCon, pp. 1-8, April 2018. doi: 10.1109/SECON.2018.8479218

11. Depaola, R. Chimento, C. Anderson, M. L. Brink, K. and **Willis**, **A.** *UAV Navigation with Computer Vision – Flight Testing a Novel Visual Odometry Technique*, AIAA Guidance, Navigation, and Control Conference, AIAA SciTech Forum, (AIAA 2018-2102), 2018. doi: 10.2514/6.2018-2102

12. **Willis, A.**, Papadakis, J. and Brink, K., *Linear Depth Reconstruction for RGBD Sensors*, SoutheastCon 2017, pp. 1-7, March, 2017. doi: 10.1109/SECON.2017.7925290

13. Tatavarti, A., Papadakis, J. and **Willis, A.**, *Towards Real-Time Segmentation of 3D Point Cloud Data into Local Planar Regions*, SoutheastCon 2017, pp. 1-6, March, 2017. doi:10.1109/SECON.2017.7925321

14. Papadakis, J. and **Willis, A.**, *Real-time surface fitting to RGBD sensor data*, SoutheastCon 2017, pp. 1-7, March, 2017. doi:10.1109/SECON.2017.7925286

15. **Willis, A.**, Sahawneh, L. and Brink, K., *Benchmarking Real-time RGBD Odometry for Light-Duty UAVs*, SPIE Defense + Commercial Sensing; Three-Dimensional Imaging, Visualization and Display, pp. 1-17, SI16C-SI116-26, April 18-20, 2016. doi: 10.1117/12.2225534

16. **Willis, A.**, and Brink, K., *iGRaND: An Invariant frame for RGBD Sensor Feature Detection and Descriptor Extraction with Applications*, SPIE Defense + Commercial Sensing; Three-Dimensional Imaging, Visualization and Display, pp. 1-15, SI16C-SI116-27, April 18-20, 2016. doi: 10.1117/12.2225540

17. **Willis, A.**, and Brink, K., *Real-Time Geometric Scene Estimation for RGBD Images using a 3D Box Shape Grammar*, SPIE Defense + Commercial Sensing; Three-Dimensional Imaging, Visualization and Display, pp. 1-11, SI16C-SI116-28, April 18-20, 2016. doi: 10.1117/12.2225545

18. **Willis, A.**, and Brink, K., *Real-Time RGBD Odometry for Fused-State Navigation Systems*, IEEE/ION Position Location and Navigation Symposium (PLANS), pp. 1-9, April 11-14, 2016. doi: 10.1109/PLANS.2016.7479744

19. Shue, S., **Willis, A.**, and Weldon, T., *HubVis: Software for Gravitational Lens Estimation and Visualization from Hubble Data*, Proceedings of IEEE SoutheastCon, pp. 1-5, March, 2014. doi: 10.1109/SECON.2014.6950682

20. Hunter, K.B., Conrad, J.M. and **Willis, A.**, Visible light communication using a digital camera and LED flashlight, Proceedings of IEEE SoutheastCon, pp. 1-5, March 2014. doi: 10.1109/SECON.2014.6950645

21. Mahfoud, E. and **Willis, A.**, *Volumetric Shape Grammars for Image Segmentation and Shape Estimation*, Proceedings of IEEE SoutheastCon, pp. 1-6, 2013. doi: 10.1109/SECON.2013.6567386

22. Shadid, W. and **Willis, A.**, Bone Fragment Segmentation From 3D CT Imagery Using the Probabilistic Watershed Transform, Proceedings of IEEE SoutheastCon, pp. 1-8, 2013. doi: 10.1109/SECON.2013.6567509

23. Longjiang, E. Shadid, W. and **Willis, A.**, Using a MAP-MRF model to improve 3D mesh segmentation algorithms, Proceedings of IEEE SoutheastCon, pp. 1-7, 2013. doi: 10.1109/SECON.2013.6567483

24. **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. doi: 10.1109/CVPRW.2010.5543519

25. 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. doi: 10.1109/CVPRW.2010.5543548

26. 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.

27. **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.

28. **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. doi: 10.1109/SECON.2010.5453840

29. **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. doi: 10.1109/ICCV.2009.5459443

30. **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. ISBN: 978-3-905674-18-7

31. 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. doi: 10.1109/ICCVW.2009.5457502

32. **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. doi: 10.1109/MASCOT.2009.5366801

33. 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.

34. **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. doi: 10.1117/12.804535

35. 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. doi: 10.1117/12.810967

36. 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. doi: 10.1117/12.805732

37. **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. doi: 10.1117/12.806134

38. 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.

39. 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.

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

41. **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.

42. **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. doi: 10.1117/12.708683

43. 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.

44. 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. doi: 10.1109/SECON.2007.342956

45. **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. doi: 10.1109/3DPVT.2006.56

46. 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.

47. **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. doi: 10.1145/1056224.1056230

48. **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. doi: 10.1109/ICPR.2004.1334147

49. **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. doi: 10.1109/ICPR.2004.1333714

50. **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. doi: 10.1109/CVPR.2004.1315017

51. 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.

52. **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. doi: 10.1109/CVPRW.2003.10014

53. **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. doi: 10.1109/ICPR.2002.1047853

54. 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. doi: 10.1145/584993.585032

Un-refereed 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.

INVITED TALKS

1. *Hardware Acceleration for Synthetic Aperture Radar Simulation*, Air Force Research Laboratory/University of Florida, Research and Engineering Education Facility (UF-REEF), Eglin AFB, Shalimar, FL, July 23, 2019.

2. *Real-Time Target Tracking and Recognition from Dense Range Images,* Air Force Research Laboratory/University of Florida, Research and Engineering Education Facility (UF-REEF), Eglin AFB, Shalimar, FL, July 20, 2017.

3. *Shape Grammars for Real-Time Target Tracking and Recognition from Dense Range Images,* Air Force Research Laboratory, Eglin AFB, Shalimar, FL, August 14, 2017.

4. *RGBD Image Processing Results from My NRC Fellowship Experience*, Air Force Research Laboratory/University of Florida Research and Engineering Education Facility (UF-REEF), Eglin AFB, Shalimar, FL, June 16, 2016.

5. *Semantic 3D Scene Modeling and Understanding with Shape Grammars*, Air Force Research Laboratory/University of Florida Research and Engineering Education Facility (UF-REEF), Eglin AFB, Shalimar, FL, July 23, 2015.

6. *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.

7. *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.

8. *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 Orthopedic Surgery, November 6, 2007.

9. *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.

10. *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.

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

12. *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 $1,137,399, sole PI $983,606, co-PI for $175,293)

1. Willis, A., GPS-Free Synthetic Aperture Radar Focusing Algorithms (continuation), AFRL, 8/1/2021 - 7/31/2022, $66,000.

2. Willis, A., GPS-Free Synthetic Aperture Radar Focusing Algorithms, AFRL, 8/1/2020 - 7/31/2021, $50,000.

3. 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.

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

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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.

11. 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: 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.

3. 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.

4. 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.

RECENT RESEARCH COLLABORATIONS

Davidson College • *Anthropology Department:* William Ringle. **Air Force Research Laboratory** • *RWWI:* Kevin Brink, Jamie Godwin. **University of Florida** • *Department of Mechanical and Aerospace Engineering:* Matthew Hale. **University of North Carolina at Charlotte** • *Department of Electrical and Computer Engineering*: James Conrad, Hamed Tabkhi *Geology and Earth Sciences:* Martha Eppes.

PROFESSIONAL AFFILIATIONS

Professional Societies

1. Institute of Electrical and Electronics Engineers (IEEE) (1995 - 2005), Senior Member (2006-present)
2. Association for Computing Machinery (ACM) (2004 - 2012), Senior Member (2013 - present)
3. American Association for the Advancement of Science (AAAS) (2005 - 2008)
4. American Society for Engineering Education (ASEE) (2005 - 2009)
5. The International Society for Optical Engineering (SPIE) (2006 - 2007, 2010)

Honor Societies

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

Honors

1. **John H. Maxheim Faculty Fellowship** (2008); Awarded by: UNCC College of Engineering; Recognizes outstanding research performance as a junior faculty member. Awarded to 1 member of the college ($\sim$1 in 100 engineering faculty members receive this award each year).
2. **William States Lee Award for Graduate Teaching Excellence** (2018); Awarded by: UNCC College of Engineering; Recognizes outstanding teaching performance for graduate coursework. Awarded to 1 member of the college ($\sim$1 in 100 engineering faculty members receive this award each year).

External Media Research Exposure

1. "Quest for the Lost Maya", National Geographic Television Special. This one hour episode produced by National Geographic aired for the first time on October 2, 2013. It describes current archaeological research the Mayan civilization in the Yucatan Peninsula. The archaeological 3D scanning field work is featured at a time index of 32 minutes from the video start time.
2. "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.
3. 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 newsletter is the 2nd largest-circulation business newsletter in the US.)

TEACHING

Synopsis:

Teaching: *Taught 49 semester-long courses covering 19 different topics (32 undergraduate, 17 graduate).*

Curriculum: *Developed or re-designed 15 courses (7 undergraduate, 8 graduate) 4 of which have been approved as part of the UNC Charlotte course catalog and 7 seminar courses on advanced topics. Mentored 12 undergraduate senior design projects and 3 independent study projects.*

Advising: *6 Ph.D. students (4 graduated, 2 current), 7 MS Thesis students (7 graduated).*

Courses Taught - University of North Carolina at Charlotte

Undergraduate Courses

1. (**core curriculum course**) ENGR3295 Multidisciplinary Professional Development
   - Spring 2020
2. (**core curriculum course**) ECGR2103 Computer Utilization in C++
   - Spring 2013 (developed completely new course material)
3. (**core curriculum course**) ECGR2254 Analytical Foundations of Electrical and Computer Engineering
   - Spring 2020 (developed completely new course material, team-taught this course)
4. (**core curriculum course**) ECGR3111 Signals and Systems
   - Fall 2017 (major re-design for this course)
   - Fall 2014
   - Spring 2014
   - Spring 2012 (developed completely new course material, team-taught this course)
   - Spring 2020 (developed new course material)
5. (**core curriculum course**) ECGR4124/5124 Digital Signal Processing
   - Fall 2019
   - Fall 2018 (new project materials)
   - Fall 2017
   - Fall 2016
   - Fall 2014
   - Fall 2013
   - Fall 2012
   - Fall 2011
   - Fall 2010
   - Fall 2009
   - Fall 2008
   - Fall 2007
   - Fall 2006
   - Fall 2005 (developed completely new course material)
6. (**developed and adopted course**) ECGR4103/5103 Applied Computer Graphics

- Fall 2018
- Fall 2016
- Spring 2015
- Fall 2013
- Fall 2011
- Spring 2008
- Spring 2005

7. (**developed and adopted course**) ECGR4222/5222 Multidimensional Stochastic Signal Processing
   - Spring 2011
8. **(developed course)** ECGR3090/6090/8090 Design of Intelligent Spacecraft (NASA-Sponsored Curriculum - see Educational Grants)
   - Spring 2007

Graduate Courses

1. (**developed and adopted course**) ECGR6118/8118 Applied Image Processing
   - Spring 2018
2. (**developed and adopted course**) ECGR6119/8119 Applied Artificial Intelligence
   - Spring 2017
   - Fall 2012
   - Fall 2010
   - Fall 2009
3. ECGR 6090/8090: Mobile Robot Sensing, Mapping and Exploration
   - Spring 2019
   - Spring 2017
4. ECGR 6118/8118: Applied Image Processing
   - Spring 2018 (completely new class material, Projects on Optical Flow, Kalman Filters, Image Magnification, Deep Learning)
5. ECGR6121/8121 Advanced Theory of Communications I
   - Spring 2019
   - Spring 2015
6. (**developed and adopted course**) ECGR6127/8127 Medical Signal Processing
   - Spring 2018 (new projects for ultrasound, MRI simulation)
   - Spring 2010 (completely new class material)
7. ECGR6090/8090 Computer Vision and Pattern Recognition Seminar Course
   - Fall 2006
8. ECGR4090/6090/8090 Computer Vision Seminar Course

- Fall 2008
- Fall 2007

9. ECGR4090/6090/8090 Pattern Recognition Seminar Course
   - Spring 2008
10. ECGR4090/6090/8090 Pattern Recognition II Seminar Course
    - Spring 2009
11. ECGR 6090/8090 Recognition from 2D and 3D Images Seminar Course
    - Fall 2008

STUDENT ADVISING

Advised Ph.D. Degrees (6 total, 4 graduated)

1. Sajjad, H., *GPU Acceleration of Synthetic Aperture Radar Simulation*, *to be completed May 2022.*
2. Zhang, J., *Deep Learning and Real-Time Vision for Robotic Mapping*, Navigation and Control, *to be completed May 2022.*
3. Shadid, W., *Computational Inverse Mechanics of a Highly Comminuted Tibia Fracture,* May 2015.
4. Zhou, B., *Geometric Analysis Tools for Mesh Segmentation,* May 2013.
5. Liu, P., *A System for Computational Analysis and Reconstruction of 3-D Comminuted Bone Fractures*,December 2012.
6. Sui, Y., *Architecture Estimation from Sparse Images Using Grammatical Shape Priors for Cultural Heritage*, December 2011.

Advised M.Sc. Thesis Degrees (7 total, 7 graduated)

1. Bagepalli, A., *Visual Sonar: Estimating depth using sound waves and Neuromorphic Cameras,* Masters Thesis (EE), May 2020.
2. Papadakis, J., *Improving Dense Real-Time 3D SLAM using Sparse Geometric Constraints*, Masters Thesis (EE), May 2018.
3. Chandrashekar, A., *Structure-From-Motion and RGBD Depth Fusion*, Masters Thesis (CS), May 2018.
4. Tikekar, R., *Using Virtual Fracture Reduction Software to Explore Features for Fracture Severity Prediction*, Masters Thesis (EE), completed May 2015.
5. Mehta, S., *Design and Implementation of Inexpensive 3D Scanner with Real-time Integrated Surface Textures*, Masters Thesis (EE), May 2011.
6. Mogallapu, V., *Semi-Automatic 3D Reconstruction of Highly Fragmented Bone Fractures*, Masters Thesis (EE), University of North Carolina at Charlotte, August 2007.
7. Mack, C., *A Simple, Cost Effective, Active Range Sensing System*, Masters Thesis (EE), University of North Carolina at Charlotte, June 2007.

Advised Undergraduate Student Projects (12 total, 12 completed)

1. Hovis, J. and Phillips, M. and Barker, K., Sponsor: NASA - Near Space Balloon II: Altitude Control via Pressure Regulation for Near-Space Weather Balloons, December 2014.
2. Honeycutt, W. and Fung, K. and Nicholson, K. and Orocz, M., Sponsor: UNCC Electric Guitar with Tube-Shaped Piezoelectric Pickups, May 2014.

3. Boehm, C. and Bennett, L. and Raynor, C. and Alexander, R., Sponsor: UNCC Near-Space Weather Balloon, December 2013. **Senior Design Expo finalist. Featured on UNCC Public Website*

4. Dumitru, A. and Beatty, C., and Mansour, A. and Davidsson, R., *Sponsor: UNCC iPod/iPad 3D Scanner*, December 2012. **won second place overall in the annual senior design exposition.*

5. Sonek, A., and Woods, B. and Song, S. and Gragnani, L., *Sponsor: UNCC, Self-Contained 3D Scanner*, May 2011.

6. 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.

7. 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.*

8. 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.

9. 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.

10. Conrad, N., *Sponsor: UNCC, Linux Device Driver for the Acuity AR-4000,* Undergraduate Senior Design Project, University of North Carolina at Charlotte, December 2006.

11. 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.

12. Chan, Sye-Min, *Semi-Automatic Assembly of Broken Fragments*, Undergraduate Honors Thesis, Brown University, May 2005.

Graduate Student Independent Study Projects (4 total)

1. Mitra, Bhaskar, *Real-Time Controller Hardware in the Loop for Grid Monitoring Operations Using Wavelet Transform,* Winner of EPIC Innovator Competition, Participant NSF Innovation Corps. and UNC Charlotte Venturprise, May 2019.

2. Davuluri, S., *Intensity smoothing and Equalization of Mars Rover Images using MRF models,* Individual Study Project, University of North Carolina at Charlotte, May 2006.

3. Mogallapu, V., *Bone Segmentation in 3D CT Images,* Individual Study Project, University of North Carolina at Charlotte, December 2006.

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

Professional Development: Teaching Workshops

1. Fundamentals of ABET Assessment Workshop, 2019 ABET Symposium, Dallas, Texas April 10, 2019.

2. 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:

University Committees: Member on 74 committees (53 department, 12 college, 9 university) averaging ~5 committee service roles per year. Administrative service as ECE department Associate Chair, Director of Undergraduate Programs, and Honors College faculty service.

Scholarly Service: Program committee for 25 conferences, editorial service for 1 journal, article review services for 14 different journals, reviewed proposals for 4 different national and international granting agencies.

Electrical and Computer Engineering Department (56 committees)

1. Departmental Review Committee (Promotion and Tenure DRC)
   - 2010, 2012 (chair), 2014, 2015, 2018, 2019
2. Computer Engineering Technical Thrust (TT) / Focus Area Improvement Team (FAIT)
   - 2005, 2006, 2007, 2008, 2009, 2010
3. 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), 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021
4. Undergraduate Curriculum Committee
   - 2006, 2007, 2008, 2009, 2010, 2013, 2014, 2015, 2019, 2020, 2021
5. Publicity Committee
   - 2006, 2007, 2008, 2009
6. Outreach Committee
   - 2006, 2014, 2015
7. Hiring Committee
   - 2013 - EPIC Hiring Committee; Associate Professor Tenured Position in Power and Control Systems
   - 2015 - Chair Search Committee (hired 1 position)
   - 2016, 2017 - Computer Engineering Tenure-Track Search Committee (hired 1 position)
   - 2018 - Chair Tenure-Track Search Committee (Computer Vision, Electromagnetism) (hired 2 positions)
   - 2019 - Chair Tenure-Track Search Committee (Communications, Information Theory) (hired 1 position)
   - 2020 - Chair Undergraduate Advisor Search Committee
   - 2021 - Chair Tenure-Track Search Committee (Computer Vision, Imaging, Artificial Intelligence) (hired 1 position)
8. Ad Hoc Committees
   - 2018 - Committee on course creation: ECGR 2254 Mathematics for Electrical and Computer Engineers
   - 2018 - Committee to assist in talent search for Distinguished Professor opening
   - 2019 - Committee to create the M.S. CpE program "Request to Establish" document to create a new M.S. CpE program in the ECE department.
   - 2019-2020 - "First Two Years" Committee to perform a comprehensive review of Freshman and Sophomore Electrical Engineering and Computer Engineering Major Degree programs.
9. Strategic Planning Committee
   - 2021

William States Lee College of Engineering (11 committees)

1. Computing Facilities Advisory Committee (CFAC)
    - 2005, 2006
2. Reassignment of Duties Committee
    - 2012, 2013
3. Academic Policy and Curriculum Committee (CEAPCC)
    - 2014, 2015, 2021
4. Review Committee: Undergraduate Teaching Award for the College of Engineering
    - 2017, 2019
5. Strategic Planning and Assessment Resource Team (SPART)
    - 2019, 2020
6. Undergraduate Advisory Committee (UAC)
    - 2020, 2021, 2022
7. Academic Procedures and Policies Assessment Committee
    - 2021
8. Strategic Planning Committee for College Advising
    - 2021

University of North Carolina at Charlotte (8 committees)

1. Faculty Competitive Grants Committee (2007, 2008)
2. Review Committee: Distinguished Ph.D. Dissertation Awards (2006).
3. Review Committee: Distinguished Masters Thesis Awards (2006)
4. Academic Integrity Board (2017, 2018, 2019)
5. Ad-Hoc Committee for IT Governance Policy (2017-alternate)
6. Honors Faculty (2020-present)
7. Honors Council (2021-present)

SCHOLARLY SERVICE

Academic Journal Editor Service

1. Topic Board Editor: Journal: Sensors, Publisher: MDPI.
    (a) Special Issue in Sensors: 3D Reconstruction with RGB-D Sensors (submissions June 2020 - June 2021)

Conference Program Committee Membership

1. ICCV 2007, The Eleventh IEEE International Conference on Computer Vision, Rio de Janeiro, Brazil, October 14-21, 2007.
2. ICCV 2009, The Twelfth IEEE International Conference on Computer Vision, Kyoto, Japan, September 29 - October 2, 2009.

3. 3DIM 2007, The 6th International Conference on 3-D Imaging and Modeling, Montréal, Canada, August 21-23, 2007.
4. 3DIM 2009, The 7th International Conference on 3-D Imaging and Modeling, Kyoto, Japan, September 29 - October 2, 2009.
5. 3DIMPVT 2011, The 1st Joint International Conference on 3-D Imaging and Modeling, Hangzhou, China, May 2011.
6. 3DIMPVT 2012, The International Conference on 3-D Imaging and Modeling, Zurich, Switzerland, July 2012.
7. 3DV 2013, The 3rd Joint International Conference on 3-D Digital Imaging and Modeling, Zurich, Switzerland, July 2013.
8. MASCOTS 2009, IEEE/ACM International Symposium on Modelling, Analysis and Simulation of Computer and Telecommunication Systems, London, England, September 21-23, 2009.
9. ASEE 2007, 115th Annual American Society for Engineering Education Conference & Exposition, Pittsburgh, PA, USA, June 22-25, 2007.
10. CVPR 2008, IEEE Computer Society Conference on Computer Vision and Pattern Recognition, Anchorage, Alaska, USA, June 24-26, 2008.
11. ACVA 2003, CVPR Workshop: Applications of Computer Vision in Archaeology, Madison, Wisconsin, USA, June 17, 2003.
12. ACVA 2010, CVPR Workshop: Applications of Computer Vision in Archaeology, San Francisco, California, USA, June 14, 2010. (Session Chair)
13. IEEE SoutheastCon 2007, Technical Conference for the IEEE SouthEast Region, Richmond, VA, USA, March 22-25, 2007.
14. IEEE SoutheastCon 2010, Technical Conference for the IEEE SouthEast Region, Charlotte, NC, USA, March 18-21, 2010.
15. CVPR 2010, IEEE Computer Society Conference on Computer Vision and Pattern Recognition, San Francisco, CA, USA, June 14-18, 2010.
16. 3DPVT 2010, International Conference on 3-D Processing Visualization and Transmission, Paris, France, May 17-20, 2010. (Session Chair, 3D View Registration and Matching)
17. 3DIMPVT 2011, International Conference on 3-D Imaging, Modeling, Processing Visualization and Transmission, Hangzhou, China, May 16-19, 2011.
18. SIGGRAPH The 38th International Conference and Exhibition on Computer Graphics and Interactive Techniques, Vancouver, Canada, August 7-11, 2011.
19. 3DV 2012, International Conference on 3-D Vision, Zurich, Switzerland, October 13-15, 2012.
20. 3DV 2013, International Conference on 3-D Vision, Seattle, Washington, June 29-30, 2013.
21. 3DV 2014, International Conference on 3-D Vision, Tokyo, Japan, December 11-12, 2014.
22. VISIGRAPP 2015, 10th International Joint Conference on Computer Vision, Imaging, and Computer Graphics Theory and Applications, Berlin, Germany, March 11-14, 2015.
23. VISIGRAPP 2016, 11th International Joint Conference on Computer Vision, Imaging, and Computer Graphics Theory and Applications, Rome, Italy, February 27-29, 2016.
24. VISIGRAPP 2017, 12th International Joint Conference on Computer Vision, Imaging, and Computer Graphics Theory and Applications, Porto, Portugal, February 27-29, 2017.

25. VISIGRAPP 2018, 13th International Joint Conference on Computer Vision, Imaging, and Computer Graphics Theory and Applications, Medeira, Portugal, January 27-29, 2018.

Journal Editorial Service

1. MDPI Sensors Journal (Topic Editor)

Journal Article Reviewer

1. IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)
2. Springer International Journal of Computer Vision (IJCV)
3. Elsevier Science Journal on Computers & Graphics (C&G)
4. Elsevier Science Journal of Image and Vision Computing (IMAVIS)
5. Elsevier Science Journal of Computer Vision and Image Understanding (CVIU)
6. ACM Journal on Computing and Cultural Heritage (JOCCH)
7. Springer Journal of Mathematical Imaging and Vision (JMIV)
8. Elsevier Science Journal Pattern Recognition (PR)
9. IEEE Transactions on Image Processing
10. EURASIP Journal on Advances in Signal Processing (ASP)
11. Journal of Circuits, Systems and Computers
12. Journal of Healthcare Engineering
13. MDPI Sensors Journal
14. MDPI Robotics Journal

Grant Proposal Reviewer

1. NSF Intelligent Information Systems (IIS).
2. NASA: North Carolina Spacegrant Consortium.
3. BSF: United States - Israel Binational Science Foundation.
4. FWF: Austrian Science Fund.

PROFESSIONAL SERVICE

IEEE - Institute of Electrical and Electronics Engineers

1. Advisor to the UNC Charlotte (Kappa Phi) Chapter of Eta Kappa Nu, An Electrical and Computer Engineering Honor Society (HKN)
    - 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015
2. IEEE Southeast Section Nomination Committee Chair
    - 2008, 2009, 2010
3. IEEE Charlotte Section Executive Committee
    - Secretary (2014, 2015), Treasurer (2016, 2017, 2018)