Paul M. Yanik, Ph.D.

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Department of Engineering and Technology
338 Belk Building
Western Carolina University
Cullowhee, NC 28723
Phone: (828) 227-2166
Fax: (828) 227-3805
Email: pyanik@wcu.edu

Home:
P.O. Box 70, 140 Amaryllis Trail
Cullowhee, NC 28723
Phone: (828) 293-5871

Research Interests

Development of complex intelligent and adaptive systems involving pattern recognition, machine learning, artificial intelligence, robotics, human-robot interaction, emergent robotic response with human teachers, robot path planning and shaping, image processing, and engineering education. Extensive background in digital electronics design including microprocessors, telecommunications data link layer protocols, electronics design automation, and digital design verification.

Education

2013 **Ph.D. Computer Engineering**, Clemson University, Clemson, SC

Dissertation title: Gesture-Based Robot Path Shaping
Advisor: Dr. Ian D. Walker

1995 **M.S. Computer Engineering**, North Carolina State University, Raleigh, NC

1989 **B.S. Electrical Engineering**, North Carolina State University, Raleigh, NC

Professional Experience

2005–present Western Carolina University, Cullowhee, NC
Assistant Professor - Electrical and Computer Engineering Technology

2004–2005 Qualcomm Corporation, Raleigh, NC
Staff Engineer - Mobile microprocessor verification

2002–2004 Mentor Graphics Corporation, Durham, NC
Technical Marketing Engineer - Digital simulation group

1998–2002 Vitesse Semiconductor Corporation, Morrisville, NC
Senior Member of Technical Staff - ASIC development and applications engineering

1993–1998 BroadBand Technologies, Inc., Research Triangle Park, NC
Senior Engineer - Telecommunications ASIC and FPGA development

1992–1993 Harris Corporation, Melbourne, FL
Senior Engineer - Airborne Systems Division

1990–1992 NCR Corporation, Liberty, SC
Design Engineer - PC platforms development group

Scholarship

Referreed Publications

[1] P.M. Yanik, A.L. Threatt, J. Merino, J. Manganelli, J.O. Brooks, K.E. Green, and I.D. Walker. A Novel Approach to Lifelong Learning for Robotic Response to Gesture. *Journal of Human Robot Interaction*, Jul. 2015 (submitted for publication).

[2] J. Manganelli, A. Threatt, J.O. Brooks, S. Healy, J. Merino, P. Yanik, I. Walker, and K Green. Confirming, Classifying, and Providing Needed Over-the-Bed Table Improvements via Methodological Triangulation. *Health Environments Research and Design*, 7(2):94–114, Fall 2014.

[3] J. Manganelli, A. Threatt, J.O. Brooks, S. Healy, J. Merino, P. Yanik, I. Walker, and K Green. Examination of How and Why Over-the-Bed Tables Are Used: Use Cases and Needs from Healthcare Providers. *Health Environments Research and Design*, 7(2):104–126, Jan. 2014.

[4] P.M. Yanik, J. Merino, A.L. Threatt, J. Manganelli, J.O. Brooks, K.E. Green, and I.D. Walker. A Gesture Learning Interface for Simulated Robot Path Shaping with a Human Teacher. *IEEE Transactions on Human-Machine Systems*, 44(1):41–54, 2014.

[5] P.M. Yanik. *Gesture-Based Robot Path Shaping*. PhD thesis, Clemson University, Clemson, SC, USA, 2013.

[6] J.O. Brooks, I.D. Walker, K.E. Green, J. Manganelli, J. Merino, L. Smolentzov, T. Threatt, P.M. Yanik, S. Ficht, R. Kriener, M. Mossey, A. Mutlu, D. Salvi, G. Schafer, P. Srikanth, and P. Xu. Robotic alternatives for bedside environments in healthcare. *International Journal of Systems Applications, Engineering and Development*, 6(3):308–316, 2012.

[7] P.M. Yanik, J. Merino, J. Manganelli, L. Smolentzov, I.D. Walker, J.O. Brooks, and K.E. Green. Sensor placement for activity recognition: comparing video data with motion sensor data. *International Journal of Circuits, Systems and Signal Processing*, 5:279–286, 2011.

[8] J.O. Brooks, L. Smolentzov, A. DeArment, W. Logan, K. Green, I. Walker, J. Honchar, C. Guirl, R. Beeco, C. Blakeney, A. Boggs, C. Carroll, K. Duckworth, L. Goller, S. Ham, S. Healy, C. Heaps, C. Hayden, J. Manganelli, L. Mayweather, H. Mixon, K. Price, A. Reis, and P. Yanik. Towards a 'smart' nightstand prototype: An examination of nightstand table contents and preferences. *Health Environments Research and Design*, 4(2):91–108, 2011.

Peer-Reviewed Publications

[9] P.M. Yanik, A.L. Threatt, J. Merino, J. Manganelli, J.O. Brooks, K.E. Green, and I.D. Walker. A Method for Neighborhood Gesture Learning Based on Resistance Distance. In *Proc. of the Seventh Intl. Conf. on Applied Human Factors and Ergonomics (AHFE 2016)*, Orlando, FL, Jul. 2016. (accepted for publication).

[10] C.W. Ferguson, P.M. Yanik, Y. Yan, and S. Kaul. NSF S-STEM Scholarship Program Initiative via Recruitment, Innovation, and Transformation: SPIRIT Program Year-One Results. In *Proc. of the 123nd ASEE Annual Conference and Exposition*, New Orleans, LA, Jun. 2016 (accepted for publication).

[11] P.M. Yanik, Y. Yan, S. Kaul, and C.W. Ferguson. Sources of Anxiety among Engineering Students: Assessment and Remediation. In *Proc. of the 123nd ASEE Annual Conference and Exposition*, New Orleans, LA, Jun. 2016 (accepted for publication).

[12] Y. Yan, S. Kaul, C.W. Ferguson, and P.M. Yanik. Perceptions and Applications of Honors Contracts in Developing an Undergraduate Engineering Research Experience. In *Proc. of the 123nd ASEE Annual Conference and Exposition*, New Orleans, LA, Jun. 2016 (accepted for publication).

[13] S. Kaul, C.W. Ferguson, P. Yanik, and Y. Yan. Importance of Undergraduate Research: Efficacy and Student Perceptions. In *Proc. of the 123nd ASEE Annual Conference and Exposition*, New Orleans, LA, Jun. 2016 (accepted for publication).

[14] Y. Yan, P.M. Yanik, S. Kaul, C.W. Ferguson, W. Stone, R. Adams, H. Jack, and J. Ray. The Challenges and Lessons Learning in Establishing a Travel Course. In *Proc. of the 123nd ASEE Annual Conference and Exposition*, New Orleans, LA, Jun. 2016 (accepted for publication).

[15] C.C. Drawdy and P.M. Yanik. Gaze estimation technique for directing assistive robotics. In *Proc. of the Sixth Intl. Conf. on Applied Human Factors and Ergonomics (AHFE 2015)*, volume 3, pages 837–844, Las Vegas, NV, Jul. 2015.

[16] C.W. Ferguson, P.M. Yanik, A. Chang, and S. Kaul. Scholarship Program Initiative via Recruitment, Innovation, and Transformation. In *Proc. of the 122nd ASEE Annual Conference and Exposition*, Seattle, WA, Jun. 2015.

[17] S. Kaul, A. Chang, P.M. Yanik, and C.W. Ferguson. Development of a Mentorship Program in Engineering and Technology. In *Proc. of the 122nd ASEE Annual Conference and Exposition*, Seattle, WA, Jun. 2015.

[18] A. Iglesias-Diaz, M.L. Tanaka, P.M. Yanik, and A.K. Ball. Investigating the Effect of Ball Impact Location. In *Summer Biomechanics, Bioengineering and BIotransport Conference*, Snowbird Resort, UT, Jun. 2015.

[19] A.D. Kapadia, I.D. Walker, K.E. Green, J.C. Manganelli, H. Houayek, A.M. James, V. Kanuri, T. Mokhtar, I. Siles, and P. Yanik. Rethinking the Machines in Which We Live - A Multidisciplinary Course in Architectural Robotics". *IEEE Robotics and Automation Magazine*, 21(3):143–150, Sep. 2014.

[20] P.M. Yanik, A.L. Threatt, J. Merino, J. Manganelli, J.O. Brooks, K.E. Green, and I.D. Walker. A Method for Lifelong Gesture Learning Based on Growing Neural Gas. In *Proc. of the 2014 International Conference on Human-computer Interaction (HCII2014)*, pages 191–202, Heraklion, Crete, Greece, Jun. 2014. Springer.

[21] V.Y. Flamenco, R.D. Adams, P.M. Yanik, and M.L. Tanaka. An Automated Method for Evaluating the Accuracy of ASL Static Gestures. In *Proc. of the Intl. Conference on Computational Science and Computational Intelligence (CSCI'14)*, pages 173–177, Las Vegas, NV, Mar. 2014.

[22] P.M. Yanik, I.D. Walker, J. Merino, K.E. Green, A.L. Threatt, J. Manganelli, and J.O. Brooks. A Gesture Learning Interface for Assistive Robotics Using a Growing Neural Gas Approach. In *Proc. of the 2013 IUI Machine Learning Workshop (IUIMLW '13)(Poster Paper)*, Santa Monica, CA, Apr. 2013.

[23] A.L. Threatt, K.E. Green, J.O. Brooks, J. Merino, I.D. Walker, and P. Yanik. Design and Evaluation of a Nonverbal Communication Platform between Assistive Robots and their Users. In *Proc. of the 2013 15th International Conference on Human-computer Interaction (HCI 2013)*, pages 505–513, Las Vegas, NV, Jul. 2013.

[24] A.L. Threatt, J. Merino, K.E. Green, I.D. Walker, J.O. Brooks, S. Ficht, R. Kriener, M. Mossey, A. Mutlu, D. Salvi, G. Schafer, S. Pallavi, P. Xu, J. Manganelli, and P. Yanik. A Vision of the Patient Room as an Architectural-Robotic Ecosystem. In *Proc. of the 2012 IEEE/RSJ International Conference on Robots and Systems (IROS 2012)*, pages 3322–3323, Vila Moura, Algarve, Portugal, 2012.

[25] P. Yanik and A. Ball. Implementing the Design-Build-Instrument-Test Approach for Curriculum Integration in Engineering Technology. In *Proc. of the American Society for Engineering Education Southeast Section Conference*, Cookeville, TN, 2013.

[26] P.M. Yanik, J. Manganelli, J. Merino, A.L. Threatt, J.O. Brooks, K.E. Green, and I.D. Walker. Use of Kinect Depth Data and Growing Neural Gas for Gesture Based Robot Control. In *Proc. of the 6th International Conference on Pervasive Computing Technologies for Healthcare (PervasiveHealth 2012)*, pages 283–290, La Jolla, CA, 2012.

[27] J.O. Brooks, I.D. Walker, K.E. Green, J. Manganelli, J. Merino, L. Smolentzov, T. Threatt, and P.M. Yanik. Robot Bedside Environments for Healthcare. In *Proc. of the 11th WSEAS International Conference on Signal Processing, Robotics and Automation (ISPRA '12)*, pages 32–37, Cambridge, UK, 2012. WSEAS.

[28] J. Manganelli, K. Green, J. Brooks, G. Mocko, I. Walker, S. Healy, K. Kopera, A. Threatt, J. Merino, and P. Yanik. Patterns in architecture, cognition, systems, and software: representing and analyzing cognition during the design process. In *Proc. of Annual Academy of Neuroscience for Architecture Conference (ANFA) (Poster Paper)*, La Jolla, CA, Sep. 2012.

[29] P.M. Yanik, J. Manganelli, L. Smolentzov, J. Merino, I.D. Walker, J.O. Brooks, and K.E. Green. Toward active sensor placement for activity recognition. In *Proc. of the 10th WSEAS International Conference on Signal Processing, Robotics and Automation (ISPRA '11)*, pages 231–236, Cambridge, UK, 2011.

[30] I.D. Walker, J.O. Brooks, K.E. Green, J. Manganelli, L. Smolentzov, A. Threatt, P.M. Yanik, and J. Merino. Interactive Robotic Environments in Healthcare. In *Workshop on Interactive Systems in Healthcare (Poster Paper)*, pages 1–5, 2011.

[31] A. Kapadia, I. Walker, K.E. Green, J. Manganelli, H. Houayek, A.M. James, V. Kanuri, T. Mokhtar, I. Siles, and P. Yanik. Architectural Robotics: An Interdisciplinary Course Rethinking the Machines We Live In. In *Proc. of the 2010 International Conference on Robotics and Automation (ICRA'10)*, pages 48–53, Anchorage, AK, 2010.

[32] P. Yanik, G. Ford, and W. McDaniel. An Introduction and Literature Review of Fuzzy Logic Applications for Robot Motion Planning. In *Proc. of the American Society for Engineering Education Southeast Section Conference*, Blacksburg, VA, 2010.

[33] G. Ford, W. McDaniel, and P. Yanik. Directions for engineering and technology educators to improve program enrollments. In *Proc. of the American Society for Engineering Education Southeast Section Conference*, Blacksburg, VA, 2010.

[34] P. Yanik, G. Ford, and B. Howell. An Introduction to Fuzzy Logic Applications for Robot Motion Planning. In *Proc. of the American Society for Engineering Education Southeast Section Conference*, Marietta, GA, 2009.

[35] H. Houayek and P. Yanik. Towards the Future of Collaboration: Two Cases on the Design of Architectural Robotics. In *Proc. of the ARCHIBOTS Workshop on Architectural Robotics (UBICOMP '09)*, Orlando, FL, 2009.

[36] R.L. Anderson, G. Ford, and P. Yanik. Service Learning in the Kimmel School at Western Carolina University. In *Proc. of the International Conference on Electrical and Computer Engineering*, Buenos Aires, Argentina, 2009.

[37] G. Ford and P. Yanik. A fuels cost comparison of gasoline and electric powered vehicles. In *Proc. of the American Society of Mechanical Engineering*, Jacksonville, FL, 2008.

[38] R.D. Adams, J.Z. Zhang, K. Burbank, and P. Yanik. A Digital Logic Based Experimental Design of a DSP/Communication System for ECET Students. In *Proc. of the 2006 American Society for Engineering Education (ASEE) Annual Conference and Exposition, Session 1029*, 2006.

Grants and Contracts

[39] P.M. Yanik. Research in Human-Robot Interaction for Assistive Devices. *Kimmel School Early Career Minigrant.* Proposal submitted May, 2015. ($2,847). Dr. Yanik: Principal Investigator.

[40] P.M. Yanik, B. Collins, and P. Gardner (in collaboration with I.D. Walker, Clemson University). Use of Continuum Robotic Agents for Environmental Monitoring. *NSF – Robust Intelligence.* Proposal submitted November, 2015. ($500,000). Dr. Yanik: Principal Investigator.

[41] P.M. Yanik. FPGA Implementation of a High-Speed Fiber Optic Data Transmission Interface. *Optical Cable Corporation Funded Project.* Contract signed May, 2015. ($12,500). Dr. Yanik: system architect.

[42] P.M. Yanik and C. Drawdy. Non-verbal Human-Robot Interaction (HRI) Based on Eye Gaze. *UNC Research Opportunity Initiative.* Proposal submitted November, 2014. (Proposed budget: $50,000).

[43] P.M. Yanik. *Kimmel School Outstanding Early Career Award - Faculty Travel Grant.* Awarded April 2014. ($500).

[44] P.M. Yanik. *Kimmel School Excellence in Mentoring and Advising - Faculty Travel Grant.* Awarded April 2014. ($500).

[45] C. Ferguson, P. Yanik, S. Kaul and A. Chang. SPIRIT: Scholarship Program Initiative via Recruitment, Innovation, and Transformation. *NSF Scholarships in Science, Technology, Engineering, and Mathematics Grant (S-STEM 1355872).* Awarded June 2, 2014. ($625,179).

[46] P.M. Yanik. *Kimmel School Summer Graduate Student Mentorship Award.* Awarded April 2014. ($2,000). This award was given in support of research funded by the WCU Graduate School and performed by student Cole Drawdy.

[47] P.M. Yanik. *WCU Chancellor's Travel Award.* Awarded April 2014. ($1,200).

[48] P.M. Yanik. Enhancing Research in Assistive Robotics at WCU. *WCU Graduate School Faculty Research and Creative Activities Grant.* Awarded February 2014. ($5,000).

Service

University

2015–present	WCU Institutional Review Board (IRB) (Member)
2015–present	WCU Committee on Nominations, Elections, and Committees (CONEC) (Member)
2015	Board of Governors Teaching Award Committee (Member)
2015	WCU Math Tutoring Center Director Search Committee (Position 1312) (Member)
2015	WCU Graduate School Tuition Award (Application Reviewer)
2014, 2015	WCU Chancellor's Distinguished Teaching Award Committee (Member)
2011–2014	University Athletics Committee (Member)
2013–present	University Faculty Affairs Council (Member)
2014	University Faculty Affairs Council Subcommittee on Student Assessment of Instruction (SAI) Transparency (Chair)
2013–present	WCU 125^{th} Anniversary Marketing Committee (Member)
2008	Academic and Admission Appeals Board (Member)

College

2015	Kimmel School Outstanding Early Career Faculty Award Committee (Chair)
2015–present	Kimmel School Curriculum Committee (Member)
2015	Kimmel School Excellence in Mentoring and Advising Award Committee (Chair)
2015	Kimmel School Distinguished Research and Scholarly Engagement Award Committee (Member)
2015	Kimmel School Student Engagement Award Committee (Member)
2015	Kimmel School Board of Governors Distinguished Teaching Award Committee (Member)
2014	Kimmel School Board of Governors Distinguished Teaching Award Committee (Chair)
2013–2015	Kimmel School Dean's Faculty Advisory Council (Member)
2011-2014	Kimmel School Elections Committee (Member, Chair 2013–2014)

Department

2015–present	Dept. of Engineering and Technology Peer Review of Teaching Committee (Member)
2015–present	Dept. of Engineering and Technology Graduate Program Committee (Member)
2015	Faculty Search Committee (EE Position 150798) (Member)
2014–present	Dept. of Engineering and Technology Project-Based Learning Curriculum Committee (Member, Chair 2016–present)
2014	Faculty Search Committee (E&T Position 150796) (Member)
2013	Faculty Search Committee (ECET Position 0607) (Member)
2013–2015	Dept. of Engineering and Technology Collegial Review Document Committee (Member)
2007–present	Institute of Electrical and Electronics Engineers (IEEE) Student Branch (Faculty Mentor)
2007–present	IEEE Student Branch, Women in Engineering (WIE) Affinity Group (Faculty Mentor)
2011–present	National Society of Black Engineers (NSBE) Collegiate Chapter (Faculty Advisor)
2012–present	Dept. of Engineering and Technology Assessment Committee (Member)
2009-2011	ECET Program Director

External Entities

2016–present	Journal of Human-Robot Interaction (Reviewer)
2015–present	IEEE Transactions on Image Processing (Reviewer)
2015–present	Journal of Intelligent and Fuzzy Systems (Reviewer)
2014–present	NC FIRST Robotics, Board of Directors (Member, Executive Secretary (2015–2016))
2013–2014	2014 3rd International Conference on Mechanics and Control Engineering (ICMCE 2014) (Conference Technical Committee Member)
2013–2015	Webster Enterprises of Jackson County, Inc., Board of Directors (Member)

2013–present	IEEE Transactions on Human–Machine Systems (Reviewer)
2013	IEEE SoutheastCon 2014 (Reviewer)

Courses Taught

ECET 341	Advanced Circuit Analysis (Spring 2006–16, Summer 2013)
ECET 331	Digital Integrated Circuits (Fall 2005–10)
ECET 321	Circuit Analysis II (Fall 2013–14)
ECET 301	Electrical Systems (Fall 2005)
ECET 290	Computer Engineering Fundamentals (Spring 2016)
ECET 242	Electronic Circuits (Spring 2006–12)
ECET 231	Circuit Analysis I (Fall 2006–12)
ECET 221	Digital Integrated Circuits Laboratory (Fall 2012–16)
ECET 211	Electronic Drafting and Fabrication (Spring 2006)
EE 421	Digital Systems Design (Fall 2015) (course developed by Dr. Yanik)
EE 312	Electronic and Electromagnetic Devices Laboratory (Spring 2007)
EE 311	Systems and Electronics Laboratory (Spring 2011–12)
EE 222	Electrical Engineering Design I (Spring 2009–11)
EE 221	Logic Systems Design I (Fall 2010–15)
EE 211	Instrumentation and Networks Laboratory (Fall 2011–15)
EE 200	Computer Utilization (Spring 2013, 2015)
ET 472	Integrated Control Systems (Spring 2006–08)
ET 480	Independent Study (Fall 2015, Spring 2009, 10, 13, 14, 16)
ET 571	Linear Systems Analysis (Spring 2014, 16) (course developed by Dr. Yanik)
ENGR 400/450	Engineering Senior Capstone Project (project mentor) (2010–16)
ENGR 300	Professional Development (Spring 2012)
ENGR 200	Introduction to Engineering Principles and Practices II (Spring 2015)
ENGR 199	Introduction to Engineering Principles and Practices I (Fall 2005–08, Spring 2012–14,16, Summer 2015)

Advising

Undergraduate	Advise fifteen to thirty students (typically) in the ECET and EE programs. Support student honors contracts. Mentor senior capstone projects.
Graduate	Serve on thesis committees of students in the Master of Science in Technology degree (M.S.T.) program. Committee memberships include:
	Stephen McNeil (in progress)
	Yang Zhou (in progress)
	Kenyatta Fortune (M.S.T. 2016) Thesis title: A Local Positioning System for AGV Navigation
	Shahab Karimi (M.S.T. 2016) Thesis title: Diagnosing Human Control System Capability Utilizing Bandwidth
	Cole Drawdy (M.S.T. 2015) (committee chair) Thesis title: Plane-by-plane Depth Approximation for Three Dimensional Gaze Estimation
	Ainhoa Iglesias (M.S.T. 2014) Thesis title: Investigating the Effect of Ball Impact Location on the Overhead Motion in Tennis During Game Play
	Veronica Flamenco (M.S.T. 2014) Thesis title: Finger Placement Correction for Static Gesture Recognition in American Sign Language
	Walter Fox (M.S.T. 2013)

Thesis title: Evaluation of Torso Stability Using the Basin of Stability Chair

Andrew Kerfonta (M.S.T. 2013) (committee chair)
Thesis title: A Novel Memory-Based Pattern Recognition System

Jaying Han (M.S.T. 2013)
Thesis title: Network Traffic Anomaly Detection Using EMD and Hilbert-Huang Transform

Matthew Proffitt (M.S.T. 2011)
Thesis title: The Optimization of Swarm Robotic Constellation Communication for Object Detection and Event Recognition

Kirke Shouse (M.S.T. 2011)
Thesis title: Activity Recognition Using a Grey-Markov Model

Honors and Awards

2015–2016	Kimmel School Distinguished Research and Scholarly Engagement Award
2013–2014	Kimmel School Excellence in Mentoring and Advising Award
2013–2014	Kimmel School Outstanding Early Career Faculty Award
2014	WCU Innovative Scholar Award (Nominee)
2014	WCU Graduate School Faculty Research and Creative Activities Award (*Graddy*)
2010–2011	Kimmel School Board of Governors Distinguished Teaching Award
1993	Harris Corporation Hawk Award for Significant Project Contribution

Affiliations

2005–present	IEEE (Senior Member)
2007–present	IEEE Student Branch WIE Affinity Group (Member)
2013–present	IEEE Computational Intelligence Society (Member)
2013–present	American Society for Engineering Education (ASEE) (Member)
2013–present	NSBE (Member)

Computing Hardware and Software Skills

HW Design	Electronics Design Automation (EDA) tools: Mentor Graphics (ModelSim, Questa), Cadence, Synopsys (VCS, Design Compilier), Quartus II, PSpice. Hardware Description Languages (HDL): System Verilog, Verilog, VHDL, ABEL, Vera. Programmable logic device families: Altera, Xilinx, Atmel.
SW Paradigms	Programming languages: C, C++, Matlab, LabVIEW, ladder logic, Pascal, Basic, Lisp, Perl, Unix shell scripting, make, TCL. Operating systems: Unix (Solaris, Linux, Qnix, and variants), ROS, Windows.
Instrumentation and Control	Data acquisition and process control: Robot Operating System (ROS), OpenNI, Kinect, LabVIEW, Siemens PLCs, MicroWin, Arduino.
Miscellaneous	Most major office productivity tools for Windows and Unix environments.