MARJORIE SKUBIC

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EDUCATION

Ph.D.   Computer Science, Aug., 1997, Texas A&M University, College Station, TX
         Dissertation: *Transferring Assembly Skills to Robots: Learning Force Sensory Patterns and Skills from Human Demonstration*; Richard Volz, advisor
M.S.   Computer Science, May, 1992, Texas A&I University, Kingsville, TX
         Thesis: *A Computer Architecture for a Robot Control System*; S. Omar, advisor
B.S.   Engineering Physics, May, 1976, South Dakota State University, Brookings, SD

WORK EXPERIENCE

Jan., 2017--   Professor
                Dept. of Electrical Engineering and Computer Science (department merger)
                University of Missouri, Columbia, MO 65211

Sept., 2009--   Professor
Dec., 2016   Dept. of Electrical and Computer Engineering
                Dept. of Computer Science (joint appointment)
                Sinclair School of Nursing (adjunct appointment)
                University of Missouri, Columbia, MO 65211

July, 2006--   Director, Center for Eldercare and Rehabilitation Technology
                University of Missouri, Columbia, MO 65211
                www.eldertech.missouri.edu

2003 – 2009   Associate Professor
                Dept. of Electrical and Computer Engineering (department restructure)
                Dept. of Computer Science (joint appointment)
                Sinclair School of Nursing (adjunct appointment)
                University of Missouri, Columbia, MO 65211

1997 – 2003   Assistant Professor
                Dept. of Computer Engineering and Computer Science
                University of Missouri, Columbia, MO 65211

1993 – 1997   Assistant Lecturer; Graduate Research Assistant, Robotics Lab
                Dept. of Computer Science, Texas A&M University, College Station, TX

1991 – 1992   Graduate Research Assistant, Intelligent Controls Lab
                Electrical Eng. and Computer Science Dept., Texas A&I University, Kingsville, TX

1986 – 1990   Software Consultant, San Diego, CA
                Emphasis on real-time control, embedded systems, and device drivers

1984 – 1986   Product Manager; Project Leader
                Quantitative Technology Corporation, Beaverton, OR

| 1983 – 1984 | Technical Support Manager |
| | Infosphere, Portland, OR |

| 1980 – 1983 | Software Engineering Supervisor |
| | Staefa Control System, San Diego, CA |

| 1979 – 1980 | Software Engineer |
| | IRT Corporation, San Diego, CA |

| 1977 – 1979 | Product Engineer |
| | TRW, Corpus Christi, TX |

| 1976 – 1977 | Systems Engineer |
| | Space Systems Division, Texas Instruments, Dallas, TX |

| 1975 | Research assistant in an Undergraduate Research Program |
| | Dept. of Physics, Montana State University, Bozeman, MT |

HONORS
Tau Beta Pi
General Electric Foundation Academic Fellowship, 1992-1993
U.S. Dept. of Education Graduate Fellowship, 1993-1995
NSF Graduate Engineering Education Fellowship, 1995-1996
Chosen for participation in the Japan-U.S. Graduate Student Forum, Osaka, Japan, Nov., 1996
University of Missouri, Columbia, College of Engineering Faculty Fellowship, 2004-2007
University of Missouri, Columbia, College of Engineering C.W. LaPierre Professorship, 2007-present
University of Missouri, Columbia, Sinclair School of Nursing, Honorary Alumna Award, April, 2013
Texas A&M University, Computer Science & Engineering Dept., Distinguished Former Student Award,
    April, 2013
University of Missouri, Columbia, Endowed Professorship, Fall, 2013 - present

PROFESSIONAL SOCIETIES AND CERTIFICATION
IEEE (Institute of Electrical and Electronics Engineers), Senior Member
E.I.T. Certificate

TEACHING HIGHLIGHTS
1. Developed a new lab course, CECS 373 Building Intelligent Agents, which provides hands-on experience in creative design and integration of sensing and control, as students build and program small mobile robots.
2. Developed a new lab and project sequence for CECS 332 Software Engineering I, which emphasizes event-driven programming utilizing a home automation testbed. (Funded by the NSF)
3. Developed an outreach program to introduce computer programming to junior high school students, providing hands-on experience in programming robots. (Funded by the NSF) These robots were redesigned and rebuilt in summer, 2004, and were used in 3 workshops for high school students, including a workshop targeting minority students (over 50 minority students attended).
4. Voted Outstanding Teacher by graduating seniors of the Dec., 1999 and Dec., 2000 classes, CECS Dept., College of Engineering, MU
5. Developed a new introductory course and labs for computer science and computer engineering students, the new CECS 103 Algorithm Design and Programming I, which uses the java language (taught for the first time in Fall, 2002).

6. Redesigned CECS 373 as a 4-credit course with a two-hour lab, now called Building Intelligent Robots, cross-listed as ECE 4340/7340 and CS 4730.
7. Developed a new lab course for Computer Engineering students, ECE 4220 Real Time Embedded Computing, which replaces Software Engineering as a requirement and introduces the C++ programming language and software engineering concepts within the embedded systems context.
8. Fall, 2012: Redesigned the ECE freshman course, ECE 1000, Introduction to Electrical and Computer Engineering to include a Matlab programming lab with projects based on a simple Theremin kit (developed by MU students).
9. Fall, 2015: Developed a new interdisciplinary lab course for Engineering, Computer Science, and Architectural Studies students on Architectural Robotics, based on the studio style course format.

COURSES TAUGHT: *University of Missouri*
CECS 103 Algorithm Design and Prog. I
CECS 231 Systems Analysis (*Writing Intensive)*
CECS 301 Robotics and Spatial Intelligence
CECS 301 Building Intelligent Robots
CECS 332 Software Engineering I
CECS 373 Building Intelligent Agents
CECS 375 Artificial Intelligence I
CECS 432 Software Engineering II
CECS 433 Object Oriented Design II
ECE 1000 Introduction to Electrical and Computer Engineering
ECE 3220 Software Design in C and C++
ECE 4220 Real Time Embedded Computer Systems
ECE 4330/7330 Robotic Control & Intelligence
ECE 4340/7340 and CS 4730/7730 Building Intelligent Robots
ECE 4001/8001 Architectural Robotics (approved as ECE 4320/7320)
ECE 8820 Pattern Recognition
ECE 4870/7870 and CS 4770/7770 Introduction to Computation Intelligence

COURSES TAUGHT: *Texas A&M University*
CPSC 452 Robotics and Spatial Intelligence

TEACHING AWARDS
Voted Outstanding Teacher by the Dec., 1999 graduating seniors, CECS Dept., College of Engineering, University of Missouri
Voted Outstanding Teacher by the Dec., 2000 graduating seniors, CECS Dept., College of Engineering, University of Missouri
Senior Faculty Excellence in Teaching Award, College of Engineering, University of Missouri, March, 2013

STUDENT SUPERVISION

M.S. DEGREES AWARDED
1. George Chronis, "Akretas: An Intelligent Mobile Robot Video Probe," Aug., 1998.
2. Archil Kublashvili, "Collision Detection and Deformation Modeling for Voxelized Polygonal Structures," May, 1999.
3. Ritesh Patel, "Constructing a Home Automation Testbed for Event-Driven Programming," Aug., 2002
4. Grant Scott, "Face Recognition with Morphological Shared-Weight Neural Networks", May, 2003
5. Craig Bailey, "A Sketch Interface for Understanding Hand-Drawn Route Maps," Dec., 2003

6. Byron Dill, "Human-Robot Interaction Using a PDA Interface: A Study of Feedback Modes," Dec., 2003
7. Justin Satterley, "Determining Direction and Magnitude of Hoof Breakover in Horses Using Accelerometers," May, 2004
8. Samuel Blisard, "Modeling Spatial References for Unoccupied Spaced for Human-Robot Interaction," Dec., 2004.
9. Derek Anderson, "An Investigation of Humanoid Skill Primitives as Sensory Patterns," Aug, 2005
10. Shuang Wang, "Fuzzified Scoring of the Functional Assessment Instrument," May, 2007
11. Gaurav Parekh, "Scene Matching between a Quantitative Map and a Qualitative Hand Drawn Sketch," December, 2007.
12. Arthur Charles Huggard, "A Framework for Eldercare Monitoring and Alerting," May, 2008.
13. Erik Stone, "Adaptive Temporal Difference Learning of Spatial Memory in the Water Maze Task," May, 2009.
14. Kevin Reed, "Type-1 and Type-2 Fuzzy Systems for Detecting Visitors in an Uncertain Environment," August, 2009.
15. Tanvi Banerjee, "Activity Segmentation with Special Emphasis on Sit-to-Stand Analysis," May, 2010.
16. Michael Moore, "PIR Sensing Array for Fall Detection," May, 2011.
17. R. Dane Guevara, "Sensor Networks for Early Illness Detection in the Elderly," August, 2011.
18. Licet Rosales, "Exploring Passive Heartbeat Detection Using a Hydraulic Bed Sensor System," December, 2011.
19. Mohammad Alharbi, "Analysis of alert and gait data of the residents of TigerPlace and connecting these data to find out distinctive parameter to identify abnormal days from normal days," MS project, August, 2012, co-advisor with Dr. Bill Harrison as primary advisor.
20. Chinonye Echebiri, "Investigation of the Relative Amplitude Method in Detecting Early Illness," May, 2013.
21. Zhiyu Huo, "Robot Methods for Human-Robot Spatial Language Interaction," May, 2013.
22. Mark Schaumberg, "An Embedded System for Wireless Collection of Hydraulic Bed Sensor Signals," May, 2015.
23. Mary Sheahen, "Design and Usability of Eldertech Health Monitoring Sensor Interface," May, 2015.
24. Mengyuan Li, "The Detection of Potentially Harmful Hand Postures in Pianists Using Kinect Depth Images," May, 2015.
25. Anup Mishra, "Development and Validation of an Interactive Remote Physical Therapy System," May, 2015.
26. Yueqi Yu, "A Fast and Accurate Robotic Grasp Method Using Deep Learning." December, 2016.

PH.D. DEGREES AWARDED
1. Samer Arafat, "Uncertainty Modeling for Classification and Analysis of Medical Signals," Dec., 2003
2. George Chronis, "Sketch-Based Navigation for Mobile Robots Using Qualitative Landmark States," May, 2007
3. Derek Anderson, "Linguistic Summarization of Human Activity," August, 2010. (co-advised with J. Keller)
4. Samuel Blisard, "Spatial Referencing Language, Verification, and Common Ground for Human-Robot Interaction," December, 2010
5. Fang Wang, "Motion Analysis for In-Home Gait and Balance Assessment Using Inexpensive Video Sensors," August, 2011.
6. Shuang Wang, "Change Detection for Eldercare Using Passive Sensing," December, 2011.
7. Erik Stone, "Unobtrusive In-Home Gait Measurement, Fall Risk Assessment and Fall Detection Using Depth Imagery," December, 2013.

8. Tanvi Banerjee, "Combining Activities of Daily Living and Scene Understanding for Continuous Assessment of Behavior Patterns Using Depth Data," August, 2014 (co-advised with J. Keller)
9. Licet Rosales Paniagua, "Short-Term Heart Rate Variability as a General Indicator of Health Estimated by Ballistocardiography Using a Hydraulic Bed Sensor in Eldercare," August, 2016.
10. Zhiyu Huo, "Spatial Language Driven Robot", May, 2017.
11. Robert Wallace, "Development of Centroid Based Metrics to Provide Personalized Monitoring and Assessment of Gait," December, 2017

UNDERGRADUATE STUDENT RESEARCH PROJECTS
1. Chuan Eng Ong, "Building a Mobile Robot", Honors Project, B.S., Aug., 1998
2. Ben Forrester, "Competitive Agglomeration Clustering of Qualitative Contact States for an Automotive Transmission Assembly", Honors Project, B.S., Dec., 1998
3. Lakesha Brown, "A Study to Determine the Design Feasibility of a Burn Care Instrument", McNair Scholar, B.S., Dec., 1999
4. Kristi Hummel, "Morphological Neural Network Vision Processing for Mobile Robots", independent study project, B.S., Dec., 2000
5. Peter Parker, "Home Automation using X10 and Basic Stamp", Honors Project, B.S. 2001
6. Laura Heffernan, "Home Automation Testbed", undergraduate RA, B.S., 2002
7. Matt Aubuchon, "Low-Level Robot Control Using the Tiny Tiger Microcontroller", undergraduate RA, B.S., 2002
8. Andy Carle, "Analyzing Hand-Drawn Route Maps," UMC Undergraduate Discovery Fellow, 2001-2002
9. Robert Luke, "From Remote-Controlled Truck to Vision-Guided Robot," B.S., Aug., 2002
10. Mohammed Kahlilia, undergraduate honors project, "A Sketch Interface for a Robot Team," 2004.
11. John Ball, ECE, independent research (Winter, 2005)
12. Erik Stone, "Building Three-Dimensional SIFT Keypoint Clouds for Object Recognition," Honors project, Winter 2006.
13. Nick Harvey, Andrew Holt, Chinonye Echebiri, Sarah Berry, summer interns for eldertech project, Summer, 2006.
14. Brad Wentz, Extended Autism Therapy Robot, honors project, Fall, 2006.
15. Kevin Stone, ECE undergraduate RA for working memory project, summer and fall, 2006.
16. Mark Busch, CS undergraduate RA for working memory project, summer and fall, 2006
17. Chinonye Echebiri, Nick Harvey, Jordan Smarr, undergraduate research interns, summer, 2007
18. Jairon Scott, Emerge undergraduate summer program, eldertech project, summer 2007.
19. Chinonye Echebiri, ECE, UG research assistant, eldertech project, 2006-2007
20. Jordan Smarr, CS, UG research assistant on sketch interface project, Fall, 2007
21. Matt Nevels, ECE, UG research assistant on eldertech project, Spring, 2008
22. Dan Lopez, Matt Nevels, Jun Liang, summer interns, eldertech project, 2008
23. Cyrille Goldstein, summer undergraduate intern, bed sensor project, 2009
24. Tatiana Alexenko, UG research: Electronic Health Record and web interface, Fall, 2009-Fall, 2011.
25. Mark Schaumberg, UG research: bed load cells for sleep restlessness, pulse and respiration, Spring, 2010
26. Matthew Johnson, UG research, eldertech, Spring, 2010
27. Brian Satzinger and Matthew Mazzola, UG research: motion sensor design with Zigbee, Spring, 2010
28. Emily Christ, UG research: web interface for eldertech sensor database and iPhone app, Spring, 2010-Spring, 2011
29. Patrick Ashby, UG research: Zigbee motion sensor, Summer, 2010
30. Oleg Izyumin, UG research, ZigBee motion sensor , Summer-Fall, 2011.
31. Andrew Shannon, UG research, Vision-based fall detection, Fall, 2011-Spring, 2013.

32. Zachary Legenzoff, Discovery Fellow, Radar fall detection and fall risk assessment project, Fall, 2011-Spring, 2012; UG research, Fall, 2012.
33. Benjapon Hotrabhavananda, UG research, Fall detection using a PIR array, 2011-Spring, 2012.
34. Xin Du, UG research, Radar-based fall detection, Fall, 2011-Spring, 2012.
35. Xiang Wang, UG research, Fall, Radar-based fall detection, 2011-Spring, 2012.
36. Megan Biondo and Deya Banisakher, REU summer students, Android-based speech processing for eldercare robotics (resulted in conference paper), Summer, 2012.
37. Aaron McRuer, UG research, Kinect-based sports injury assessment for female athletes, Spring, 2012-Spring, 2014.
38. Michael Butler, UG research, Kinect-based motion analysis on fractional dimension for fall risk assessment; Kinect-based sports injury assessment, Spring, 2013 - Summer, 2013.
39. Daniel Pelzer, UG research, Webcam-based gait analysis and fall detection in senior housing, Fall, 2013 – Fall, 2014.
40. Jie Chen, UG research, Rewind and replay depth image video for hospital falls, Fall, 2013.
41. Nijaporn Hotrabhavananda, UG research, Automated Timed Up and Go (TUG) Using Kinect and Smartphone Sensing, Spring, 2014 – Spring, 2015.
42. Anthony Forsythe, UG research, Smart App for creating a digital scrapbook with embedded stories, 2014, Sensor and EHR Database project, Summer, 2016.
43. Zac Crane and Gary Grimm, Jr., REU summer students, Video interface for older adults to review depth videos, Summer, 2014
44. Alice Wong, Brian On, and Chandler Mendenhall, REU summer students, Mobile app and visualization of in-home sensor data for older adults, Summer, 2014
45. Taylor Rydahl, REU summer student, Networked Exercise Game for Preventing ACL Injuries
46. Benjaviicha Hotrabhavananda, UG help with Eldertech System Admin, 2014-2015
47. Sean O'Day, UG research on bed sensor, 2012-2015
48. Shining Sun, UG research on ACL project, 2015
49. Zac Crane, UG help with Eldertech System Admin, Fall, 2015.
50. Lemeng Zhang (ECE), UG research on bed sensor study, 2015.
51. Ethan Currier, UG research on accelerometer sensor project, Spring & Fall, 2016
52. Karen Ai and Jordan Hubbard, REU summer students, The Angel-Echo Project, 2016
53. Ariel Virgulto and Aaron Little, REU summer students, Rehabilitation Exercises for Environment Control, 2016
54. Princess Lyons, UG research, MIL algorithms for automated BCG processing, fall, 2016-spring, 2017
55. Joseph Warren and Jaired Collins, REU summer students, Daily Activity Observation System for Stroke Patients, 2017
56. Gbenga Omotara, UG research in ECE, bed sensor data analysis, summer and fall, 2017
57. Matthew Moore, UG research in CS, ECHO Consumer Interface to a Sensor-Based Early Illness Alert System, Fall, 2017
58. Trevor Levins, UG research in CS, Generating Natural Language Summaries of In-Home Sensor Data, Fall, 2017
59. Haiyan Hu, UG research in ECE, In-Home Assessment for Stroke Rehabilitation, Fall, 2017
60. Trey Shaw, Discovery Fellow, Automated Hand Measurement, Fall, 2017

UNDERGRADUATE CAPSTONE PROJECTS
1. Justin Satterley and Kristopher Stice, "Visualization of Equine Hoof Movement", capstone project, 2001-2.
2. Laura Heffernan, Karen Casey, Kenneth Estes, "Simultaneous Localization and Map Building System for Prototype Mars Rover," capstone project, 2001-2002.

3. S. Bucher, J. Hamilton, B. Watkins, A. Helfrich, "Home Automation and Security System," capstone project, 2002.
4. Jason Green, David Mueller, Todd Schwentker and Anthony Baker, "Robotics Tower," capstone project, 2004.
5. John Ball, Tim Evans, Michael Mittermeyer, and Eric Rolfe, "2005 IEEE Region 5 Robots Competition," capstone project, 2004-5.
6. Brian Claywell, Chris Pate, and Kevin Smith, "Sensing Floor Vibration for Fall Detection," 2005.
7. Elijah Kerry, Jeremy Billheimer, Pascal Ruzigana, Brad Wentz , "Interactive Robot to Aid in Treatment and Diagnosis of Autism," capstone team, Fall 2005- Winter 2006.
8. Mike Verlinden, Grant Hoberock, Nattaphong Boriraksantikul, Huei-Ping Liew, "Robots for the Autistic," capstone project, Winter-Fall, 2006.
9. Adam Lodes, Adam Storm, Tim Grier, Tyler Faulstich, "Fall Detection Using Thermal Sensors," capstone group, Fall 2006-Winter 2007
10. Misty Fletcher, Andy Holt, Kevin Allen, Adam Roth, "Robotic Audio Localization, "capstone group, Winter-Fall 2007
11. Clay Staley, Sam Johnson, Adam Rankin & Chris Scheetz, capstone project, power-assist wheelchair, 2009
12. Patrick Ashby, Gregory Christ, Scott Haefele, and Daniel Walton, Wii Controlled Mobile Robotic Arm, Capstone project, 2010
13. Mark Schaumburg, Bryan Bajier, Evan Pierce, and Mujtaba Alkhars, SAE Formula Car Transmission Control Module, Capstone project, 2010
14. Jeff Huhman, Justin Myers, Michael Sutton, Ben Yi, Building Automation for Mizzou Arena, Capstone project, Fall, 2010-Spring, 2011
15. Lauren Griggs, Clark Buckles, Qinyuan Sun, Jing Lu, Hydraulic Infant Respiratory and Movement Monitor, Capstone project, Spring, 2012.
16. Shining Sun, Yousif Abdulreheim, Michael Bowers, Fadi Muqeem, Undergraduate Capstone project, Device Free WLAN Walking Speed and Localization Detection for Activity Level Monitoring in Elderly People, Fall, 2015.
17. Nijaporn Hotrabhavananda, Andrew Dytuco, Nahom Ghirmatzion, David Nash, Undergraduate Capstone project, Intrusion Detection using IR CCTV, Spring, 2016.
18. Benjavicha Hotrabhavananda, Mark Goldstein, Bryan Patten, Eric Sullentrup Undergraduate Capstone project, Contact to First Base Time Measurement System for Baseball Programs (with Dr. Aaron Gray), Fall, 2016
19. Jeffrey King, Angelino Lefevers, Zachary Rump, Accelerometer-Based Sensor with Energy Harvesting for Non-Invasive Medical Monitoring (ECE Capstone), Fall, 2017
20. Alyssa Nielson, Clark Walters, David Duenow, Chris Harling, Nicholas Toeniskoetter, Anthony Stegall, Keith Compton, Multi-Media Apps for Older Adults (IT Capstone), Fall, 2017

CURRENT ADVISEES
Doctoral Students:
Robert Wallace, CS – passed his defense; will graduate in December, 2017
Benjamin Hotrabhavananda, ECE
Moein Enayati, ECE
Awss Anaz, ECE
Anup Mishra, ECE
Mengxuan (Mary) Ma, ECE
Nuerzati Resuli, ECE

Masters Students:
Akshith Ullal, ECE
Shawn Fernandes, ECE

EXTERNAL GRANTS AWARDED (as PI)

21.   Funding agency: Medtronic (Award in progress)
        Project title: Fall Detection Study
        Total amount: $185,643
        Total grant duration: 12/01/2017 – 11/30/2018
        PI: M. Skubic

20.   Funding agency: AHRQ
        Project title: Self-Management via Health Kiosk by Community-Residing Older Adults
                             (supplemental funding)
        Total amount: $40,579 (for MU)
        Total grant duration: 7-1-2017 to 9-30-2017
        PI: J. Matthews, University of Pittsburgh
        Your role (if not PI): PI for MU subcontract

19.   Funding: Nokia Bell Labs
        Project title: Monitoring Vital Signs and Activity of Psychiatric Patients
        Total amount: 50K Euros (~$54,640)
        Project duration: 07/01/2017 – 06/30/2018
        PI: M. Skubic

18.   Funding agency: AHRQ
        Project title: Self-Management via Health Kiosk by Community-Residing Older Adults
        Total amount: $102,677 for MU (total is $2,498,737)
        Total grant duration: 12-1-2014 to 11-30-2019
        PI: J. Matthews, University of Pittsburgh
        Your role (if not PI): PI for MU subcontract

17.   Funding agency: National Science Foundation
        Project title: US-Ignite: EAGER: GENI-Enabled In-Home, Personalized Health
                             Monitoring and Coaching
        Total amount: $300,000
        Total grant duration: 10-1-2013 to 9-30-2015
        PI: M. Skubic

16.   Funding agency: National Science Foundation
        Project title: EAGER: An In-Home Health Alert System with Remote Care Coordination
        Total amount: $299,654
        Total grant duration: 7-1-2012 to 6-30-2014
        PI: M. Skubic

15.   Funding agency: National Science Foundation
        Project title: HCC: Human-Driven Spatial Language for Human-Robot Interaction
        Total amount: $499,512
        Total grant duration: 9-1-2010 to 8-31-2014
        PI: M. Skubic

14.   Funding agency: National Science Foundation
        Project title: CPS: Medium: Active Heterogeneous Sensing for Fall Detection and Fall
                            Risk Assessment
        Total amount: $1,409,965
        Total grant duration: 9-1-2009 to 8-31-2013
        PI: M. Skubic

13.   Funding agency: National Science Foundation
        Project title: REU Supplement: HCC: Elder-Centered Recognition Technology for the
                            Assessment of Physical Function
        Total amount: $12,000
        Total grant duration: 9-1-2008 to 8-31-2010
        PI: M. Skubic

12.   Funding agency: National Science Foundation
        Project title: HCC: Elder-Centered Recognition Technology for the Assessment of
                            Physical Function
        Total amount: $900,000
        Total grant duration: 9-1-2007 to 8-31-2011
        PI: Skubic

11.   Funding agency: National Science Foundation
        Project title: ITR: Technology Interventions for Elders with Mobility and Cognitive
                            Impairments
        Total amount: $1,200,000
        Total grant duration: 11-15-2004 to 10-31-2009
        PI: Skubic

10.   Funding agency: National Science Foundation
        Project title: ITR: A Biologically Inspired Adaptive Working Memory System for
                            Efficient Robot Control and Learning
        Total amount: $1.6M ($485,991 for MU),
        Total grant duration: 12-01-2003 to 11-30-2009
        PI: M. Wilkes, Vanderbilt University
        Your role (if not PI): PI for MU subcontract

9.   Funding agency: Naval Research Lab
        Project title: Sketch-Based Interfaces for a Robot Team with Integrated Speech
                            Commands
        Total amount: $47,790
        Total grant duration: 9-1-2006 to 8-31-2007
        PI: Skubic

8.   Funding agency: Naval Research Lab
        Project title: Sketch-Based Interfaces for a Robot Team with Scene Matching
        Total amount: $46,551
        Total grant duration: 09-1-2005 to 5-31-2006
        PI: Skubic

7.   Funding agency: Naval Research Lab
        Project title: Sketch-Based Interfaces for a Robot Team

	Total amount:	$46,489
	Total grant duration:	09-1-2004 to 05-31-2005
	PI:	Skubic

6. Funding agency: Naval Research Lab
    Project title: Using Spatial Reasoning in Robot Behaviors
    Total amount: $38,624
    Total grant duration: 12-1-2003 to 8-31-2004
    PI: Skubic

5. Funding agency: Naval Research Lab
    Project title: Using Sketched Maps and Spatial References for Human-Robot Interaction
    Total amount: $34,509
    Total grant duration: 12-30-2002 to 9-30-2003
    PI: Skubic

4. Funding agency: Naval Research Lab
    Project title: Using Spatial Analysis for Tactical Navigation of Semi-Autonomous Ground Vehicles
    Total amount: $34,030
    Total grant duration: 9-1-2001 to 5-31-2002
    PI: Skubic

3. Funding agency: National Science Foundation
    Project title: Event-Driven Computing Projects for Software Engineering Education
    Total amount: $74,997
    Total grant duration: 9-1-2000 to 8-31-2002
    PI: Skubic

2. Funding agency: IEEE Robotics and Automation Society
    Project title: RAS Education Web Site Development
    Total amount: $1200
    Total grant duration: 1-1-2001 to 12-31-2001
    PI: Skubic

1. Funding agency: IEEE Robotics and Automation Society
    Project title: RAS Education Web Site Development
    Total amount: $1200
    Total grant duration: 1-1-2000 to 12-31-2000
    PI: Skubic

EXTERNAL GRANTS AWARDED (as co-PI)

21. Funding agency: National Science Foundation
    Project title: REU SITE: Research in Consumer Application Networking Technologies
    Total amount: $250,647
    Total grant duration: 2/01/2017 – 1/30/2020
    PI: Prasad Calyam

20. Funding agency: National Library of Medicine

	Project title:	Linguistic Summarization of Sensor Data for Early Illness Recognition in Eldercare
	Total amount:	$911,988
	Total grant duration:	8-1-2016 to 7-31-2019
	PI:	Mihail Popescu

19.
	Funding agency:	National Institutes of Health
	Project title:	Intelligent Sensor System for Early Illness Alerts in Senior Housing
	Total amount:	$1,762,444
	Total grant duration:	5-16-2013 to 3-15-2017
	PI:	M. Rantz

18.
	Funding agency:	National Science Foundation
	Project title:	REU Site: Research in Consumer Networking Technologies
	Total amount:	$359,993
	Total grant duration:	2-1-2014 to 1-31-2017
	PI:	Y. Shang

17.
	Funding agency:	National Science Foundation
	Project title:	MRI: Acquisition of Instrument for Data-Intensive applications with Hybrid Cloud Computing Needs
	Total amount:	$600,000
	Total grant duration:	9-1-2014 to 8-31-2017
	PI:	C.-R. Shyu

16.
	Funding agency:	National Science Foundation
	Project title:	CC-NIE Integration: Creation of an Institutional Cyberinfrastructure to Enable Researcher-Oriented, Federated Environment for Large, Collaborative Science Projects
	Total amount:	$986,776
	Total grant duration:	1/1/2013 to 12/31/2014
	PI:	G. Springer

15.
	Funding agency:	National Science Foundation
	Project title:	SHB: Small: Computational Algorithms for Predictive Health Assessment
	Total amount:	$150,000
	Total grant duration:	9-1-2011 to 8-31-2014
	PI:	M. Popescu

14.
	Funding agency:	National Science Foundation
	Project title:	REU SITE: Research in Home and Consumer Networking Technologies
	Total amount:	$340,000
	Total grant duration:	3-1-2010 to 2-28-2013
	PI:	W. Zeng

13.
	Funding agency:	Leonard Wood Institute
	Project title:	Vision based Vehicle Occupants Counting System with Online Learnability
	Total amount:	$491,852
	Total grant duration:	9-1-2010 to 8-31-2011
	PI:	Xu (Tony) Han

12.	Funding agency:	AHRQ (Agency for Healthcare Research and Quality)
	Project title:	Technology to Automatically Detect Falls and Assess Fall Risk in Senior Housing
	Total amount:	$1,989,442
	Total grant duration:	9-1-2009 to 8-31-2013
	PI:	M. Rantz

11.	Funding agency:	National Institutes of Health
	Project title:	Technology to Automatically Detect Early Signs of Illness or Functional Decline in Older Adults with Chronic Disease in Senior Housing
	Total amount:	$404,592
	Total grant duration:	8-13-2009 to 8-12-2012
	PI:	M. Rantz

10.	Funding agency:	Leonard Wood Institute
	Project title:	Suspicious Activity Detection for Perimeter Safety and Force Protection
	Total amount:	$498,759
	Total grant duration:	9-1-2009 to 8-31-2010
	PI:	Z. He

9.	Funding agency:	National Geospatial Intelligence Agency
	Project title:	Linguistic Spatial Reasoning
	Total amount:	$682,407
	Total grant duration:	8-5-2008 to 8-4-2012
	PI:	J. Keller

8.	Funding agency:	Rand / Hartford Foundation
	Project title:	Building Interdisciplinary Geriatric Health Care Research Centers Initiative
	Total amount:	$200,000
	Total grant duration:	1-1-2007 to 12-31-2008
	PI:	M. Rantz

7.	Funding agency:	National Science Foundation
	Project title:	Mizzou ADVANCE Partnerships for Adaptation, Implementation and Dissemination: Promoting Institutional Change at the University of Missouri
	Total amount:	$499,993
	Total grant duration:	1-1-2007 to 12-31-2010
	PI:	J. Litt

6.	Funding agency:	U.S. Administration on Aging
	Project title:	Technology to Enhance Aging in Place at Tiger Place
	Total amount:	$979,104
	Total grant duration:	09-29-2005 to 12-31-2009
	PI:	M. Rantz

5.	Funding agency:	National Science Foundation
	Project title:	GK-12: Engineering Fellows in G6-9 Science Education
	Total amount:	$1,560,439
	Total grant duration:	4-15-2005 to 12-31-2009
	PI:	S. Nair

4.	Funding agency:	National Science Foundation
	Project title:	Acquisition of a 3D Motion Analysis System
	Total amount:	$127,329
	Total grant duration:	8-1-2003 to 7-31-2007
	PI:	F. Pai

3.	Funding agency:	U.S. Army Night Vision Lab
	Project title:	Nonlinear Signal Processing of Ground Penetrating SAR Sensor Data for Land Mine Detection
	Total amount:	$143,218
	Total grant duration:	10-1-2002 to 9-30-2003
	PI:	J. Keller

2.	Funding agency:	U.S. Army Night Vision Lab
	Project title:	Nonlinear Signal Processing of Ground Penetrating SAR Sensor Data for Land Mine Detection
	Total amount:	$200,000
	Total grant duration:	2-14-2002 to 8-14-2002
	PI:	J. Keller

1.	Funding agency:	Morris Animal Foundation
	Project title:	Quantification of Spinal Ataxia in Horses Using Kinematic Analysis of Gait
	Total amount:	$22,819
	Total grant duration:	9-1-2001 to 8-31-2003
	PI:	K. Keegan

INTERNAL GRANTS

6.	Funding agency:	Mizzou Advantage Media of the Future
	Project title:	Measuring the Alignment of Piano Students for Injury Prevention
	Total amount:	$25,000
	Total grant duration:	4-24-2013 to 12-31-2015
	PI:	P. Savvidou

5.	Funding agency:	Mizzou Advantage Media of the Future
	Project title:	Portable Inexpensive Motion Analysis System to Identify Female Athletes at High Risk of Knee ACL Tear
	Total amount:	$49,969
	Total grant duration:	2-1-2012 to 12-31-2015
	PI:	A. Gray

4.	Funding agency:	PRIME
	Project title:	CPS: Medium: Active Heterogeneous Sensing for Fall Detection and Fall Risk Assessment
	Total amount:	$181,221
	Total grant duration:	9-1-2009 to 8-31-2013
	PI:	M. Skubic

3.	Funding agency:	Research Council
	Project title:	Faculty International Travel Grant
	Total amount:	$1500

Total grant duration:	2001
PI:	Skubic

2.
Funding agency:	Big 12 Faculty Fellowship Program
Project title:	Collaborative Work with Texas A&M University
Total amount:	$2500
Total grant duration:	1998
PI:	Skubic

1.
Funding agency:	University of Missouri Research Board
Project title:	Acquiring Mobile Robot Skills Using Human Demonstration
Total amount:	$47,000
Total grant duration:	1-1-1997 to 12-31-1998
PI:	Skubic

PATENT APPLICATIONS

1. Anonymized Video Analysis Methods and Systems. US 8,890,937. **Patent Issued: Nov. 18, 2014**.
2. Integrated Sensor Network Methods and Systems. US 20100302043. *Pending*
3. Hydraulic Bed Sensor and System for Non-Invasive Monitoring of Physiological Data. US 20130197375. *Pending*
4. Activity Analysis, Fall Detection and Risk Assessment Systems and Methods. US 9,408,561. **Patent Issued: August 9, 2016**
5. Activity Analysis, Fall Detection and Risk Assessment Systems and Methods. US 9,597,016. **Patent Issued: March 21, 2017**
6. Non-wearable Heart Rate, Respiratory Rate and Motion Monitoring System Using Accelerometers for Smart Chairs and Beds, MU Software Disclosure submitted Dec. 23, 2016. Provisional Patent Application filed, April 11, 2017.
7. Non-Contact Measurement of Hand Range of Motion, MU Invention Disclosure submitted July 13, 2017. Provisional patent application filed August 10, 2017.

PUBLICATIONS (student names are underlined)

Journal publications

J1. Grace Campbell and Marjorie Skubic, "New Frontiers in Functional Assessment for Cancer Survivors: Sensor-Based Assessment of Neuropathy-Related Balance and Gait Impairment," *Clinical Journal of Oncology Nursing, accepted with minor revisions*

J2. B.W. Willis, S. Razu, K. Baggett, A. Jahandar, A.D. Gray, M. Skubic, S.L. Sherman, K. Blecha, T.M. Guess, "Sex Differences in Frontal and Transverse Plane Hip and Knee Kinematics During the Modified Star Excursion Balance Test," *Human Movement*, (in press).

J3. Newland, Pamela; Kimutis, Alyssa; Salter, Amber; Flick, Louise; Thomas, Florian P.; Rantz, Marilyn; Skubic, Marjorie, Continuous In-Home Symptom and Mobility Measures for Individuals With Multiple Sclerosis: A Case Presentation. *Journal of Neuroscience Nursing*. 49(4):241-246, 2017. doi:10.1097/JNN.0000000000000299. PubMed PMID: 28661948

J4. B.-Y. Su, K.C. Ho, M. Rantz, and M. Skubic, "Radar Placement for Fall Detection: Signature and Performance," *Journal of Ambient Intelligence and Smart Environments*, in press.

J5. Gray AD, Willis BW, Skubic M, Huo Z, Razu S, Sherman S, Guess T, Jahandar A, Gulbrandsen T, Miller S, Siesner N. "Development and Validation of a Portable and Inexpensive Tool to Measure the Drop Vertical Jump using the Microsoft Kinect^{TM} V2." *Sports Health*, August, 2017, DOI: 10.1177/1941738117726323.

J6. R. Wallace, C. Abbott, C. Gibson-Horn, M. Rantz, and M. Skubic, "Metrics from In-Home Sensor Data to Assess Gait Change Due to Weighted Vest Therapy," *Smart Health*, vol. 3-4, Sept., 2017.

J7. C. Galambos, M. Rantz, J. Back, J.S. Jun, M. Skubic, and S. Miller, "Older Adults' Perceptions and Preferences of a Fall Risk Assessment System: Exploring a Stages of Acceptance Model," *Computers, Informatics, Nursing*, vol. 35, no. 7, pp. 331-337, July 2017, doi: 10.1097/CIN.0000000000000330.

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J9. Banerjee T, Yefimova M, Keller J, Skubic M, Woods DL, & Rantz M, "Exploratory analysis of older adults' sedentary behavior in the primary living area using Kinect depth data," *Journal of Ambient Intelligence and Smart Environments*, vol. 9, pp. 163-179, 2017.

J10. Rui L, Chen S, Ho KC, Rantz M, & Skubic M. Estimation of human walking speed by Doppler radar for elderly care," *Journal of Ambient Intelligence and Smart Environments*, vol. 9, pp. 181-191, 2017

J11. L. Rosales, Bo-Yu Su, M. Skubic, and K.C. Ho, "Heart Rate Monitoring Using Hydraulic Bed Sensor Ballistocardiogram," *Journal of Ambient Intelligence and Smart Environments,* vol. 9, pp. 193-207, 2017.

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J15. Phillips, L. J., Deroche, C., Rantz, M., Alexander, G. L., Skubic, M., Despins, L., Abbott, C., Harris, B. H., Galambos, C., & Koopman, R. "Using embedded sensors in independent living to predict gait changes and falls," *Western Journal of Nursing Research*, July, 2016 (epub).

J16. P. Calyam, A. Mishra, R. B. Antequera, D. Chemodanov, A. Berryman, K. Zhu, C. Abbott, and M. Skubic, "Synchronous Big Data Analytics for Personalized and Remote Physical Therapy," *Pervasive and Mobile Computing* – Special Issue on Big Data Analytics for Smarter Health Care, June, 2016, vol. 28, issue C, pp. 3-20, available on-line, Sept. 28, 2015.

J17. M. Rantz, K. Lane, L.J. Phillips, L.A. Despins, C. Galambos, G.L. Alexander, R.J. Koopman, M. Skubic, and S.J. Miller, "Enhanced RN Care Coordination with Sensor Technology: Impact on Length of Stay in Aging in Place Housing," *Nursing Outlook*, 2015, vol. 63, pp.650-655. Available online 8 Sept 2015, http://www.sciencedirect.com/science/article/pii/S0029655415002675

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J22. M. Rantz, M. Skubic, C. Abbott, C. Galambos, M. Popescu, J. Keller, E. Stone, J. Back, S.J. Miller, and G.F. Petroski, "An automated in-home fall risk assessment and detection sensor system for older adults," *The Gerontologist*, 2015, vol. 55, no. S1, pp. S78-S87.

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J25. M.J. Rantz, M. Skubic, M. Popescu, C. Galambos, R.J. Koopman, G.L. Alexander, L. Phillips, K. Musterman, J. Back, and S.J. Miller, "A New Paradigm of Technology-Enabled "Vital Signs" for Early Detection of Health Change," *Gerontology,* 2015, vol. 61, no. 3, pp. 281-290 (published on-line Nov., 2014).

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J31. J. Krampe, S. Miller, C. Echebiri, M. Rantz, and M. Skubic, "Nighttime Restlessness During Daytime Dance Therapy: An Exploratory Study Using Bed Sensors" *Western Journal of Nursing Research*, 2014, 36(3): 362-373.

J32. E. E. Stone and M. Skubic, "Unobtrusive, Continuous, In-Home Gait Measurement Using the Microsoft Kinect," *IEEE Transactions on Biomedical Engineering*, 2013, 60(10): 2925-2932.

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J37. C. Galambos, M. Skubic, S. Wang, and M. Rantz, "Management of dementia and depression utilizing in-home passive sensor data," *Gerontechnology,* 2013, 11(3):475-468.

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Abstracts in Journals

K1. G. Alexander, C. Galambos, M. Skubic, and <u>S. Wang</u>, "Density Map Visualization as a Tool to Monitor Activity Levels of Older Adults," *Gerontechnology*, 2010, 9(2):186.
K2. G.L. Alexander, T.C. Havens, M. Skubic, M.J. Rantz, J.M. Keller, and C. Abbott, "Markerless human motion capture-based exercise feedback system to increase efficacy and safety of elder exercise routines", *Gerontechnology, 7*(2): 67.
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Short Articles, not peer reviewed

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S2. M. Skubic, "University of Missouri Eldertech Research at TigerPlace," IEEE Communications Society. eHealth Technical Committee Newsletter, 1(2), Sept-Oct, 2012.
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Book Chapters

B1. M.J. Rantz, K.R. Lane, L.L. Popejoy, C. Galambos, L.J. Phillips, L. Hicks, G. Alexander, L. Despins, R. Koopman, M. Skubic, M. Popescu, J. Keller, "Aging in Place: Adapting the Environment," In P.A. Grady & A.S. Hinshaw (Eds.) *Using Nursing Research to Shape Health Policy*. New York, NY: Springer Publishing, 2017.
B2. Skubic M, & Rantz MJ, TigerPlace (2014). In *Handbook of Smart Homes, Health Care and Well-Being*, J. van Hoof, G. Demiris, & E. Wouters (Eds.) Cham, Switzerland: Springer International Publishing.
B3. Alexander, G.L., Rantz, M., Skubic, M., Koopman, R.J., Phillips, L.J., <u>Guevara, R.D.</u>, and Miller, S.J., "Evolution of an Early Illness Warning System to Monitor Frail Elders in Independent Living." In Ming-Chien Chyu Editor. *Advances in Engineering for Healthcare Safety-From Surgery Ergonomics to Computational Fluid Dynamics,* Multi-Science Publishing; United Kingdom, 2013, pp 249-275.
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C101. G. Demiris, M. Skubic, M.J. Rantz, K.L. Courtney, M.A. Aud, H.W. Tyrer, Z. He, and J. Lee, "Facilitating interdisciplinary design specification of "smart homes" for aging in place," In *Proc. of the International Congress of the European Federation of Medical Informatics,* Maastricht, Netherlands, August, 2006, IOS Press, pp. 45-50.

C102. M. Skubic, D. Anderson, S. Blisard, D. Perzanowski, and A. Schultz, "Using a Qualitative Sketch to Control a Team of Robots," In *Proc. of the IEEE International Conference on Robotics and Automation*, Orlando, FL, May, 2006, pp. 3595-3601.

C103. S. Arafat, M. Dohrmann, and M. Skubic, "Classification of Coronary Artery Disease Stress ECGs using Uncertainty Modeling," In *Proc. of the ICSC Congress on Computational Intelligence: Methods and Applications*, Istanbul, Turkey, December, 2005.

C104. S. Blisard and M. Skubic, "Modeling Spatial Referencing Language for Human-Robot Interaction," In *Proc. of the IEEE International Workshop on Robot and Human Interactive Communication*, Nashville, TN, August, 2005, pp. 698-703. (Best student paper award).

C105. R. Luke, S. Blisard, J. Keller, and M. Skubic, "Linguistic Descriptions of Three Dimensional Scenes Using SIFT Keypoints," In *Proc. of the IEEE International Workshop on Robot and Human Interactive Communication*, Nashville, TN, August, 2005, pp. 704-709.

C106. R.H. Luke, J.M. Keller, M. Skubic, and S. Senger, "Acquiring and Maintaining Abstract Landmark Chunks for Cognitive Robot Navigation," In *Proc. of the IEEE International Conference on Robots and Intelligent Systems*, Edmonton, Alberta, Canada, July, 2005, pp. 2566-2571.

C107. G. Chronis and M. Skubic, "Robot Navigation Using Qualitative Landmark States from Sketched Route Maps," In *Proc. of the IEEE International Conference on Robotics and Automation*, New Orleans, LA, April, 2004, pp. 1530-1535.

C108. D. Sofge, D. Perzanowski, J.G. Trafton, N. Cassimatis, D. Brock, M. Skubic, M. Bugajska, W. Adams and A. Schultz, "Collaborating with a Dynamically Autonomous Cognitive Robot," In *Proc. of the 1st IFAC Symposium on Telematics Applications in Automation and Robotics*, 2004.

C109. D. Sofge, D. Perzanowski, M. Skubic, M. Bugajska, J.G. Trafton, N. Cassimatis, D. Brock, W. Adams, and A. Schultz, "Cognitive Tools for Humanoid Robots in Space," In *Proc. of the16th IFAC Symposium on Automatic Control in Aerospace*, Elsevier Science Ltd, Oxford, UK, 2004.

C110. D. Sofge, D. Perzanowski, M. Skubic, N. Cassimatis, J.G. Trafton, D. Brock, M. Bugajska, W. Adams, and A. Schultz, "Achieving Collaborative Interaction with a Humanoid Robot," In *Proc. of the 2nd International Conference on Computational Intelligence, Robotics and Autonomous Systems*, Singapore, December, 2003.

C111. S. Arafat and M. Skubic, "Combined Uncertainty Model for Best Wavelet Selection," In *Proc. of the IEEE 2003 International Conference on Fuzzy Systems*, St. Louis, MO, May, 2003, pp. 1195-1199.

C112. G. Chronis and M. Skubic, "Sketch-Based Navigation for Mobile Robots," In *Proc. of the IEEE 2003 International Conference on Fuzzy Systems*, St. Louis, MO, May, 2003, pp. 284-289.

C113. G. Scott, J. Keller, and M. Skubic, "Face Recognition for Homeland Security: A Computational Intelligence Approach," in *Proc. of the IEEE 2003 International Conference on Fuzzy Systems*, St. Louis, MO, May, 2003, pp. 1268-1273.

C114. M. Skubic, D. Perzanowski, A. Schultz, and W. Adams, "Using Spatial Language in a Human-Robot Dialog", In *Proc. of the IEEE 2002 International Conference on Robotics and Automation*, Washington, D.C., May, 2002, pp. 4143-4148.

C115. M. Skubic, P. Matsakis, B. Forrester, and G. Chronis, "Extracting Navigation States from a Hand-Drawn Map", In *Proc. of the IEEE 2001 International Conference on Robotics and Automation*, Seoul, Korea, May, 2001, vol. 1, pp. 259-264.

C116. M. Skubic, G. Chronis, P. Matsakis, and J. Keller, "Generating Linguistic Spatial Descriptions from Sonar Readings Using the Histogram of Forces", in *Proc. of the IEEE 2001 International Conference on Robotics and Automation*, Seoul, Korea, May, 2001, vol. 1, pp. 485-490.

C117. G. Chronis, J. Keller, and M. Skubic, "Learning Fuzzy Rules by Evolution for Mobile Agent Control", In *Proc. of the 1999 IEEE International Symposium on Computational Intelligence in Robotics and Automation*, Monterey, CA, November, 1999, pp. 70-76.

C118. M. Skubic, "Building Intelligent Robots in a Cooperative Learning Environment", In *Proc. of the 1999 ASEE Annual Conference*, Charlotte, NC, June, 1999. (reviewed for a special session)

C119. M. Skubic, B. Forrester, and B. Nowak, "Clustering of Qualitative Contact States for an Automotive Assembly," In *Proc. of the 1999 IEEE International Conference on Robotics and Automation*, Detroit, MI, May, 1999, pp. 2103-2109.

C120. M. Skubic and R. Volz, "Learning Force-Based Assembly Skills from Human Demonstration for Execution in Unstructured Environments", In *Proc. of the 1998 IEEE International Conference on Robotics and Automation*, Leuven, Belgium, May, 1998, pp. 1281-1288.

C121. M. Seif El-Nasr and M. Skubic, "A Fuzzy Emotional Agent for Decision-Making in a Mobile Robot", invited paper in the *Proc. of the 1998 IEEE International Conference on Fuzzy Systems*, Anchorage, Alaska, May, 1998, pp. 135-140.

C122. M. Skubic and R. Volz, "Learning Force Sensory Patterns and Skills from Human Demonstration", In *Proc. of the 1997 IEEE International Conference on Robotics and Automation*, Albuquerque, NM, April, 1997, vol. 1, pp. 284-290.

C123. M. Skubic, S. Castrianni, and R. Volz, "Identifying Contact Formations from Force Signals: A Comparison of Fuzzy and Neural Network Classifiers", In *Proc. of the 1997 IEEE International Conference on Neural Networks*, Houston, TX, June, 1997, vol. 3, pp. 1623-1628.

C124. M. Skubic and R. Volz, "Identifying contact formations from sensory patterns and its applicability to robot programming by demonstration", In *Proc. of the 1996 IEEE International Conference on Intelligent Robots and Systems*, Osaka, Japan, November, 1996, vol. 2, pp. 458-464.

C125. M. Skubic and R. Volz, "Fuzzy Classification of Contact Formations from Sensor Patterns", *Proc. of the U.S.-Japan Graduate Student Forum in Robotics*, sponsored by RSJ and NSF, Osaka, Japan, November, 1996.

C126. M. Skubic, G. Kondraske, J. Wise, G. Khoury, R. Volz and S. Askew, "A Telerobotics Construction Set with Integrated Performance Analysis", In *Proc. of the 1995 IEEE/RSJ International Conference on Intelligent Robots and Systems*, Pittsburgh, PA, August, 1995, vol. 3, pp. 20-26.

C127. M. Skubic, S. Graves, and J. Mollenhauer, "Design of a Two-Level Fuzzy Controller for a Reactive Miniature Mobile Robot," In *Proc. of the Third International Conference on Industrial Fuzzy Control and Intelligent Systems*, Houston, TX, December, 1993.

Other Conference Papers, refereed by abstract

A1. Skubic M, Mishra A, Harris B, Abbott C, Craver A, Musterman K, and Rantz M, HCI Challenges for Consumer-Based Aging in Place Technologies, In Proc., Intl. Conf. on Human Aspects of IT for the Aged Population, Toronto, Canada, July, 2016.

A2. T. Alexenko, M. Biondo, D. Banisakher, and M. Skubic, "Android-Based Speech Processing for Eldercare Robotics," In *Proc., Intl. Conf. on Intelligent User Interfaces*, Santa Monica, CA, March, 2013.

A3.   M. Skubic, Z. Huo, L. Carlson, X.O. Li and J. Miller, "Human-Driven Spatial Language for Human-Robot Interaction," AAAI Workshop on Human-Robot Interaction in Eldercare, Aug., 2011, San Francisco, CA.

A4.   G.L. Alexander, B.J. Wakefield, M.J. Rantz, M.A. Aud, M. Skubic, and S. Erdelez, "Usability Analysis of a Passive Sensor Technology Interface to Assess Elder Activity in an Independent Living Facility," In *Proceedings from Midwest Nursing Research Society Symposium on Nursing Informatics Research*, Kansas City, MO, April, 2010.

A5.   G.L. Alexander, T.C. Havens, M. Skubic, M. Rantz, J.M. Keller, and C. Abbott, "Markerless Human Motion Capture-Based Exercise Feedback System to Increase Efficacy and Safety of Elder Exercise Routines," In *Proc. of the International Conference of the International Society for Gerontechnology*, Pisa, Italy, June, 2008, pp. 73-78.

A6.   D. Anderson, R. Luke, M. Skubic, J.M. Keller, M. Rantz, and M. Aud, "Evaluation of a Video Based Fall Recognition System for Elders Using Voxel Space," In *Proc. of the International Conference of the International Society for Gerontechnology*, Pisa, Italy, June, 2008, pp. 77-82.

A7.   M.A. Aud, G.L. Alexander, M.J. Rantz, and M. Skubic, "Use of Sensor System Data for Early Detection of Health Status Changes in Older Adult Residents of a Retirement Community," In *Proc. of the Midwest Nursing Research Society*, Omaha, Nebraska, March, 2007.

A8.   G. Demiris, K.L. Courtney, M. Skubic, and M. Rantz, "An Evaluation Protocol of a Smart Home Application for Older Adults," In *Proc. of the 2007 International Conference Addressing Information Technology and Communications in Health*, Victoria, BC, Canada, February, 2007, pp. 319-323.

A9.   G. Demiris, M. Skubic, M. Rantz, J. Keller, M. Aud, B. Hensel, and Z. He, "Smart Home Sensors for the Elderly: A Model for Participatory Formative Evaluation," In *Proc. of the IEEE EMBS International Special Topic Conference on Information Technology in Biomedicine,* Ioannina Greece, October, 2006, pp.1-4.

A10.   G. Demiris, M. Skubic, M. Rantz, and B. Hensel, "Smart Home Sensors for Aging in Place: Older Adults' Attitudes and Willingness to Adopt," *The Gerontologist* 2006; 46 (Special Issue 1): 430.

A11.   G. Demiris, M. Skubic, D.R. Oliver, J. Keller, M.J. Rantz, M.A. Aud, J. Lee, K. Burks, N. Green, "End-User Involvement in Interface Design of Smart Home Applications: The Nursing Perspective," In *Proc. of the International Conference on Aging Disability and Independence*, St. Petersburg, FL, February, 2006.

A12.   G. Demiris, M. Skubic, M.J. Rantz, K. Harris, B. Hensel, M.A. Aud, J. Lee, K. Burks, D.R. Oliver, Z. He, H.W. Tyer, J. Keller, "Older Adults Attitudes Towards Smart Home Features," In *Proc. of the International Conference on Aging Disability and Independence*, St. Petersburg, FL, February, 2006.

A13.   M. Skubic, "Assessing Mobility and Cognitive Problems in Elders," In *Proc. of the AAAI 2005 Fall Symposium, Caring Machines: AI in Eldercare*, Arlington, VA, November, 2005.

A14.   M. Skubic, D. Anderson, S. Blissard, D. Perzanowski, W. Adams, J.G. Trafton, A. Schultz, S. Thomas, and E.V. Cross II, "Using a Sketch Pad Interface for Interacting with a Robot Team," *AAAI Mobile Robot Competition 2005: Papers from the AAAI Workshops*, Pittsburgh, PA, July.

A15.   M.J. Rantz, G. Demiris, M.A. Aud, K.D. Marek, H.W. Tyer, M. Skubic, and A.A. Hussam, "Seniors' attitudes towards home-based assistive technologies," In *Proc. of the 29th Annual MNRS Research Conference*, Cincinnati, OH, April, 2005.

A16.   D. Perzanowski, D. Brock, M. Bugajska, S. Thomas, D. Sofge, W. Adams, M. Skubic, S. Blisard, N. Cassimatis, J.G. Trafton, and A.C. Schultz, "Toward Multimodal Human-Robot Cooperation and Collaboration," *American Institute of Aeronautics and Astronautics*, Chicago, IL, September, 2004.

A17.   M. Skubic, D. Noelle, M. Wilkes, K. Kawamura, and J. Keller, "A Biologically Inspired Adaptive Working Memory for Robots," In *Proc. of the AAAI 2004 Fall Symposium, The Intersection of Cognitive Science and Robotics: From Interfaces to Intelligence*, Washington, D.C, October, 2004.

A18.   R. Luke, J. Keller, P. Gader, M. Skubic, and T. Wang, "Experiments in tripwire detection using visible and near-IR imagery," In *Proc. of the SPIE Conference on Detection and Remediation Technologies for Mines and Minelike Targets IX*, Orlando, FL, April, 2004, pp. 754-762.

A19. D. Anderson, C. Bailey, and M. Skubic, "Hidden Markov Model Symbol Recognition for Sketch-Based Interfaces," In *Proc. of the AAAI Fall Symposium, Making Pen-Based Interaction Intelligent and Natural*, Washington, DC, October, 2004.

A20. M. Skubic, D. Anderson, M. Khalilia, and S. Kavirayani, 2004, A Sketch-Based Interface for Multi-Robot Formations, *AAAI Mobile Robot Competition 2004: Papers from the AAAI Workshops*, San Jose, CA, July, 2004.

A21. G. Demiris, M.J. Rantz, M.A. Aud, K.D. Marek, H.W. Tyrer, M. Skubic, and A.A. Hussam, "Smart Home Technologies for Aging in Place," Abstract in *Telemedicine Journal and e-Health* (*Proc. of the 9th Annual Meeting of the American Telemedicine Association*, Tampa FL, May 2-5, 2004)

A22. K. Keegan, S. Arafat, M. Skubic, D.A. Wilson, J. Kramer, N.T. Messer IV and P.J. Johnson, "Detection of Spinal Ataxia in Horses Using Fuzzy Clustering of Body Position Uncertainty," in *Proc. of the 2004 International Conference on Equine Locomotion*.

A23. D. Perzanowski, D. Brock, W. Adams, M. Bugajska, S. Blisard, M. Skubic, A.C. Schultz, J.G. Trallon, "Finding the FOO a pilot study for a multimodal interface," in *Proc. of the IEEE 2003 International Conference on SMC*, Washington, DC, Oct., 2003, pp. 3218-3223.

A24. M. Skubic, C. Bailey, and G. Chronis, "A Sketch Interface for Mobile Robots," in *Proc. of the IEEE 2003 International Conference on SMC*, Washington, DC, Oct., 2003, pp. 918-924.

A25. J. Keller, M. Skubic, P. Gader, T. Wang, and R. Luke, "Real-Time Tripwire Detection on a Robotic Testbed," in *Proc. of the SPIE Conference on Detection and Remediation Technologies for Mines and Minelike Targets VIII*, Orlando, FL, April, 2003, pp. 1287-1297.

A26. M. Skubic and S. Blisard, "Go to the Right of the Pillar: Modeling Unoccupied Spaces for Robot Directives," AAAI 2002 Fall Symposium, Human-Robot Interaction, Nov., 2002.

A27. M. Skubic, S. Blisard, A. Carle, P. Matsakis, "Hand-Drawn Maps for Robot Navigation", AAAI 2002 Spring Symposium, Sketch Understanding, Stanford Univ., March, 2002.

A28. M. Skubic and J. Laffey, "Event-Driven Programming Projects for Software Engineering Students", in *Proc. of the 2002 ASEE Conference*, Montreal, Canada, June, 2002.

A29. D. Perzanowski, A Schultz, W. Adams, M. Bugajska, E. Marsh, G. Trafton, D. Brock, M. Skubic, and M. Abramson, "Communicating with Teams of Cooperative Robots." In *Multi-Robot Systems: From Swarms to Intelligent Automata.* Kluwer: The Netherlands, pp. 185-193, from the NATO Workshop on Multi-Robot Systems, Washington, D.C., March, 2002.

A30. A. Schultz, D. Perzanowski, W. Adams, M. Skubic, M. Bugajska, and E. Marsh, "Multi-modal Interfacing and Spatial Reasoning for Human-Robot Interactions," in *Augmented Cognition Conference 2001: Improving Net Human-Machine Information Capacity,* December 2-5, 2001, Austin, TX.

A31. M. Skubic, P. Matsakis and J. Keller. Spatial Relations for Tactical Robot Navigation, in *Proc. of the SPIE Conference Unmanned Ground Vehicle Technology III*, April, 2001, Orlando, FL.

A32. M. Skubic. "Saturday Science for Junior High Students", in Technical Report, AAAI 2001 Spring Symposium, Robotics and Education Workshop, March, 2001, Stanford University, CA.

A33. G. Chronis and M. Skubic, "Experiments in Programming by Demonstration: Training a Neural Network for Navigation Behaviors", in the *Proc. of the International Symposium on Robotics and Automation*, Nov., 2000, Monterrey, Mexico.

A34. M. Skubic, G. Kondraske, G. Khoury, P. Fiedler, B. Morgan and S. Graves, "Performance Measurement and Prediction in a Distributed Telerobotics System", In *Proc. of the 1995 IEEE International Conference. on Systems, Man, and Cybernetics*, vol. 3, pp. 2121-2126, Vancouver, BC, Oct., 1995.

Other Presentations at Conferences (Abstracts only)

P1. M. Ma, R. Proffitt, and M. Skubic, "Quantitative Assessment and Validation of a Stroke Rehabilitation Game," IEEE/ACM Conference on Connected Health: Applications, Systems and Engineering Technologies, Philadelphia, PA, July, 2017.

P2.   M. Ma, M. Skubic, K. Ali, and J. Hubbard, "Angel-Echo: A Personalized Healthcare Application," IEEE/ACM Conference on Connected Health: Applications, Systems and Engineering Technologies, Philadelphia, PA, July, 2017.

P3.   M. Ma, B. Hotrabhavananda, J. Hall, and M. Skubic, "Assistive Adjustable Smart Shower System," IEEE/ACM Conference on Connected Health: Applications, Systems and Engineering Technologies, Philadelphia, PA, July, 2017.

P4.   M. Enayati, B-Y Su, L. Despins, and M. Skubic, "Investigating the Interaction between Ballistocardiogram and Cardiac Age," invited session, European Medical and Biological Engineering Conference, Tampere, Finland, June, 2017.

P5.   M. Enayati, B-Y Su, L. Despins, M. Skubic, J.M. Keller and M. Popescu, "Investigating the Interaction between Ballistocardiogram and Respiratory Phases," IEEE Intl. Conf. on Biomedical and Health Informatics, Orlando, FL, Feb., 2017.

P6.   M. Skubic, "Squaring the Life Curve: How Can Robots Help?" Panel on Assistive and Rehabilitative Robotics: Potential and Challenges, Annual Meeting of American Association for the Advancement of Science (AAAS), Boston, Feb., 2017.

P7.   L. Davis, B. Willis, A. Gray, S. Sherman, S. Razu, A. Jahandar, M. Skubic, K. Blecha, and T. Guess, "Simplifying Anterior Cruciate Ligament Injury Screening: A Jump in the Right Direction," *American Physical Therapy Association Combined Sections Meeting*. Poster Presentation (National) San Antonio, TX. February, 2017.

P8.   M. Skubic, B.-Y. Su, M. Enayati, A. Zare, C. Jiao, P. Lyons and K.C. Ho, "Multimedia Investigation of BCG and SCG Signals," BCG-SCG Workshop, Vancouver, B.C., Sept. 10, 2016.

P9.   Sherman, S. Gulbrandsen T, Miller S, Guess T, Willis B, Blecha K, Huo Z, Skubic M, Gray A. "Mass Screening of Youth Athletes for High Risk Landing Patterns using a Portable and Inexpensive Motion Sensor Device." AOSSM. Poster Presentation for the Annual AOSSM Meeting. Colorado Springs, CO. July 2016

P10. Willis BW, Razu S, Jahandar A, Gray A, Skubic M, Sherman S, Blecha K, Guess T. "Gender Differences During the Modified Star Excursion Balance Test." GCMAS, Poster Presentation. Memphis, TN May 2016.

P11. Sherman S, Willis BW, Guess T, Gray A, Skubic M, Blecha K. "Mass Screening of Youth Athletes for High Risk Landing Patterns Using a Portable and Inexpensive Motion Sensor Device: Efficiency, Gender Disparities and Continued Validity of the Xbox Kinect for Assessing ACL Injury Risk," ACL Study Group. Are, Sweden. March 13-17. 2016.

P12. M. Skubic, "Intelligent Sensor System for Early Illness Alerts in Senior Housing," Medicine-X Conference, Stanford University, Paolo Alto, CA, Sept., 2015.

P13. C. Galambos, M. Skubic, M.J. Rantz, S. Miller, G.L. Alexander, J.M. Keller and M. Popescu, "TigerPlace: Supporting Aging in Place with Technology," 2014 Annual Scientific Meeting, The Gerontological Society of America, Nov., 2014, Washington, DC.

P14. Sherman, Gray, Skubic, Willis, et al. Validation of Xbox Kinect as Portable, Inexpensive Tool for ACL Injury Risk, Poster Presentation, AOSSM, 2014, Seattle, WA

P15. E. Stone and M. Skubic, "Capturing In-Home Gait Parameters Using Vision Based Sensing," poster presentation of the 2012 International Conference of the International Society for Gerontechnology, Eindhoven, Netherlands, June, 2012.

P16. C. Galambos, M. Skubic, M. Rantz, and S. Wang, "Using Density Map Visualization for Early Detection and Management of Dementia and Depression, oral presentation of the 2012 International Conference of the International Society for Gerontechnology, Eindhoven, Netherlands, June, 2012.

P17. L. Carlson, M. Skubic, J. Miller, Z. Huo, and X.O. Li, "A Corpus of Spatial Descriptions for the Development of Human-Driven Spatial Language Algorithms," poster presentation at the Psychonomics Conference, Nov., 2011, Seattle, WA.

P18. M. Skubic, S. Blisard, R.H. Luke, E. Stone, D. Anderson, and J.M. Keller, "Generating 3D Spatial Descriptions from Stereo Vision Using SIFT Keypoint Clouds," poster presentation at the Annual Meeting of the Cognitive Science Society, Boston, July, 2011.

P19. D. Heise, L. Rosales, and M. Skubic, "Hydraulic Bed Sensor for Monitoring Heartbeat and Respiration," AAAI Spring 2011 Symposium, Computational Physiology, Stanford University, March, 2011.

P20. F. Wang and M. Skubic, "Body Sway Measurement During Standing and Walking for Fall Risk Assessment Using Inexpensive Webcam," 2010 International Conference of the International Society for Gerontechnology, Vancouver, BC, May, 2010.

P21. E. Stone, D. Anderson, M. Skubic, J. Keller. "Footfall extraction and visualization from voxel data," 2010 International Conference of the International Society for Gerontechnology, Vancouver, BC, May, 2010.

P22. G. Alexander, C. Galambos, M. Skubic, S. Wang, "Density Map Visualization as a tool to monitor activity levels of older adults," 2010 International Conference of the International Society for Gerontechnology, Vancouver, BC, May, 2010.

P23. G. Demiris, D. Parker Oliver, M. Skubic, M.J. Rantz, "Older Adults' Privacy Considerations for Vision Based Recognition Methods," 2009 Annual Scientific Meeting, The Gerontological Society of America, Nov., 2009, Atlanta, GA.

P24. M. Skubic, D. Anderson, J.K. Keller, M.J. Rantz, M. Aud, "Vision-Based Fall Recognition for Elders," 2009 Annual Scientific Meeting, The Gerontological Society of America, Nov., 2009, Atlanta, GA.

P25. F. Wang, M. Skubic, E. Stone, J. Krampe, W. Dai, T. Banerjee, "Automatic Gait Analysis Using Vision-Based Monitoring," 2009 Annual Scientific Meeting, The Gerontological Society of America, Nov., 2009, Atlanta, GA.

P26. M.J. Rantz, M. Skubic, G. Alexander, M. Aud, B. Wakefield, S. Miller, J. Krampe, "Using Integrated Sensor Networks for Early Illness Detection," 2009 Annual Scientific Meeting, The Gerontological Society of America, Nov., 2009, Atlanta, GA.

P27. S. Wang, C. Galambos, M. Aud, M. Skubic, "Monitoring Activity Level with Density Map Visualization," 2009 Annual Scientific Meeting, The Gerontological Society of America, Nov., 2009, Atlanta, GA.

Local Presentations and Posters

L1. Beamer, L., Burgoyne, S., Chandrasekhar, M., Deakyne, C., Felts, K. S., Hart, J., Hermsen, J. M., Litt, J., Lorenzen, C., Middleton, M., Skubic, M., & Tucker, S. (April 2009). *Mizzou ADVANCE: A gender equity initiative at the University of Missouri.* Poster presented at the annual University of Missouri Life Sciences Week Poster Session, Columbia, Missouri.

L2. J. Litt, L. Beamer, S. Burgoyne, M. Chandrasekhar, C. Deakyne, J. Hart, J. Hermsen, C. Lorenzen, M. Middleton, M. Skubic, S. Tucker, "Mentoring Senior Faculty: Highlights of the Mizzou ADVANCE Mentoring Program," presented at the 7th Annual ADVANCE Principal Investigators Meeting, Alexandria, Virginia, May12-13, 2008.

L3. J. Litt, L. Beamer, S. Burgoyne, M. Chandrasekhar, C. Deakyne, J. Hart, J. Hermsen, C. Lorenzen, M. Middleton, M. Skubic, S. Tucker, "Mizzou ADVANCE: A gender equity initiative in science, technology, engineering and mathematics at the University of Missouri," Life Sciences Week Poster Session, University of Missouri, Columbia, MO, April 16, 2008.

Technical Reports

T1. R.H. Luke, D.T. Anderson, J.M. Keller, and M. Skubic, "Human segmentation from video in indoor environments using fused color and texture features," Technical Report, Dept. of ECE, University of Missouri, Columbia, MO, 2008.

T2. M. Skubic, C. Bailey, S. Blisard, G. Chronis, C. Huggard, R. Luke, G. Scott, M. Williams, "Guinness Phase I," Technical Report, Dept. of CECS, University of Missouri, Columbia, MO, June 20, 2003.

T3.   S. Arafat, M. Skubic, K. Keegan, and D. Wilson, "Wavelet Selection Methods for Kinematic Gait Analysis," Technical Report, Dept. of CECS, University of Missouri, Columbia, MO, 2003.

T4.   D. Haun, K. Hummel and M. Skubic, "Morphological Neural Network Vision Processing for Mobile Robots", Technical Report, Dept. of CECS, University of Missouri, Columbia, MO, 2000.

T5.   M. Skubic and B. Forrester, "Competitive Agglomeration Clustering of Qualitative Contact States for an Automotive Transmission Assembly", Technical Report TR-98-005, Department of Computer Engineering and Computer Science, University of Missouri, Columbia, MO, 1998.

T6.   M. Skubic and S. Graves, "Force Sensor Characterization", Technical Report 96-010, Department of Computer Science, Texas A&M University, April, 1996.

T7.   P. Schilling, M. Skubic and G. Kondraske, "Shared Human Autonomous Control: TATP1 Demo 5 Report", Technical Report 94-003R, Human Performance Institute, University of Texas at Arlington, 1994.

T8.   S. Graves, M. Skubic and J. Mollenhauer, "The FuzzBug Mobile Robot", Technical Report 93-041, Department of Computer Science, Texas A&M University, May, 1993.

T9.   M. Skubic, "Using TelRIP with Ada: A Prototype Implementation", Technical Report 93-031, Department of Computer Science, Texas A&M University, May, 1993.

Invited Talks

1.   "Squaring the Life Curve: Helping Lou and Mary Ann Age in Place," University of Tampere, Finland, December 14, 2017.

2.   "Personalized Healthcare where People Live and Play," Digital Healthcare Design Colloquium, Florida International University, Miami, FL, November 3, 2017

3.   "Senior Living Design Options for the Future Consumer," Leading Age Annual Meeting and Expo, given with Cecily Laidman and J.D. Landis, New Orleans, LA, October 29, 2017.

4.   "Personalized Proactive Healthcare where People Live and Play," Panel: Role of Technology in the Future of Healthcare, National TeleHealth Conference, Cincinnati, OH, October 10, 2017.

5.   "Squaring the Life Curve: Helping Lou and Mary Ann Age in Place," Invited talk, Wright State University, Dayton, OH, October 9, 2017.

6.   "Technological Innovations: Early Illness Detection in the Frail Elderly," given with Dr. Marilyn Rantz, Caring for the Frail Elderly Conference, Columbia, MO, August 18, 2017.

7.   "A Vision for Proactive Healthcare," University of Missouri Chancellor's Fund Committee, Columbia, MO, April 28, 2017.

8.   "Improving Seniors' Health Span with Supportive Technology," Invited talk with Vernon Feather and J.D. Landis for 32nd By Design Conference, Roanoke, VA, Feb. 22, 2017.

9.   "Squaring the Life Curve with Supportive Technology: Helping Lou and Mary Ann Age in Place," Invited Keynote for Global Telehealth Conference, Auckland, New Zealand, November 1, 2016.

10. "Using In-Home Sensor Data for Early Detection of Health Change," Boston Scientific, August, 2016.

11. "Using In-Home Sensor Data for Early Detection of Health Decline," Medtronic, August, 2016.

12. "Squaring the Life Curve with Supportive Technology," Invited Keynote for RVA Conference, Auckland, New Zealand, June 21, 2016 (delivered via video conferencing)

13. "Eldercare and Rehabilitation Technology for Better Health," Invited talk, Columbia, MO, May 26, 2016 (presented to Kiwanis).

14. "Eldercare and Rehabilitation Technology for Better Health," Invited talk, Columbia, MO, May 24, 2016 (presented to REU students).

15. "Eldercare and Rehabilitation Technology," Invited talk, Apple, Cupertino, CA, May 19, 2016.

16. "Squaring the Life Curve: Helping Lou and Mary Ann Age in Place" Invited talk, Lafayette College, April 14, 2016.

17. "Squaring the Life Curve: Helping Lou and Mary Ann Age in Place" Invited talk, Texas A&M University – Corpus Christi, March 10, 2016

18. "A Vision for Proactive Healthcare: Helping Lou and Mary Ann Age in Place," Keynote for Workshop on Applications and Services in the Year 2021, Washington, DC, January 28, 2016.
19. "Smart Health Vital Signs from the Smart Home," Invited talk for Retired Ag Professors, Columbia, MO, December 2, 2015.
20. "Squaring the Life Curve: How Can Robots Help?", Keynote for NSF National Robotics Initiative PI Meeting, Nov. 6, 2015
21. "Smart Health Vital Signs from the Smart Home," Invited talk for Osher, Columbia, MO, Oct. 20, 2015
22. "Aging in Place and Eldertech Research at the University of Missouri," Testimony at the Hearing on Aging in Place Technology, Special Committee on Aging, U.S. Senate, Washington, D.C., May 6, 2015.
23. "Remote Physical Therapy as a Service," Invited talk and demo, US Ignite Application Summit, Washington, DC, March 25, 2015.
24. "Smart Health Vital Signs from the Smart Home," Invited keynote, Workshop on Smart Environments: Closing the Loop, International Conference on Pervasive Computing, St. Louis, MO, March 23, 2015.
25. "Eldercare as a Service," Kansas City Digital Health Innovation Forum, Kansas City, MO, February 26, 2015.
26. "New Vital Signs and New Paradigms for Eldercare and Rehabilitation," University of Florida, Gainesville, FL, January 30, 2015.
27. "New Technologies to Support Aging in Place," University of Florida, Gainesville, FL, January 29, 2015.
28. "Supporting Proactive Models for Eldercare and Rehabilitation," Veterans Health Administration, Center of Innovation on Disability and Rehabilitation Research, Gainesville, FL, January 29, 2015.
29. "Successful University-Industry Partnerships," I-70 Corridor Network on Aging Research event, St. Louis, MO, Sept. 24, 2014
30. "Successful University-Industry Partnerships," I-70 Corridor Network on Aging Research event, Mid-America Regional Council, Kansas City, MO, Sept. 3, 2014
31. "Physical Therapy as a Service," US Ignite Application Summit, San Jose, CA, June, 2014 (joint with Prasad Calyam)
32. "Proactive Health Management Using In-Home Sensing and Recognition Technology," Design of Medical Devices Conference, Technology Needs for Geriatric Care session, April 9, 2014
33. "A New Paradigm of New, More Sensitive Vital Signs: Automated Fall Detection and Fall Risk Assessment with Non-Wearable Sensors for In-home and Hospital Application," Interdisciplinary Center on Aging, University of Missouri, April 1, 2014 (joint with Marilyn Rantz)
34. "Proactive Health Management Using In-Home Sensing and Recognition Technology," Computer Science Dept., Missouri University of Science and Technology, February 25, 2014
35. "Improving Healthcare and Quality of Life for Seniors," Florida Philanthropic Network Summit, Orlando, FL, January, 2014
36. "Proactive Health Management Using In-Home Sensing and Recognition Technology," Society of Women Engineers, Columbia, MO, November, 2013.
37. "Proactive Health Management Using In-Home Sensing and Recognition Technology," ECE Seminar, University of Missouri, Columbia, October, 2013.
38. "Technology for Health: Current Work and Future Possibilities," Texas A&M University, College Station, TX, July, 2013.
39. "Technology for Early Health Change Detection," US Ignite Application Summit, Chicago, IL, June, 2013. *Awarded best US Ignite Health Application.*
40. "Proactive Health Management Using In-Home Sensing and Recognition Technology, Texas A&M University, College Station, TX, April, 2013.
41. "The Future is NOW – Technology for Health Alerts for Early Detection of Changes in Health Conditions, Western Home Communities, Cedar Falls, IA (with Dr. Marilyn Rantz), April, 2013.
42. "Proactive Health Management Using In-Home Sensing and Recognition Technology, Carnegie Mellon University, Pittsburgh, PA, March, 2013.

43. "Proactive Health Management Using In-Home Sensing and Recognition Technology, University of Kansas, Lawrence, KS, October, 2012.
44. "Proactive Health Management Using In-Home Sensing and Recognition Technology, Microsoft Research, Bellevue, WA, October, 2012.
45. "Proactive Health Management Using In-Home Sensing," Brookings, SD, July, 2012.
46. "Proactive Health Management to Support Aging in Place," Amsterdam, Netherlands, June, 2012.
47. "Non-Wearable Sensing for In-Home Gait Analysis," Invited session, National Physical Therapy Conference, Chicago, IL, Feb., 2012.
48. "Proactive Health Management to Support Aging in Place," Georgia Tech University, Atlanta, GA, November, 2011
49. "Proactive Health Management to Support Aging in Place," US Ignite Workshop, Case Western University, Cleveland, OH, June 9, 2011.
50. "Research for Aging in Place," Appreciation Luncheon for TigerPlace Residents, Columbia, MO, May 18, 2011.
51. "Proactive Health Management through Integration of Sensor Data and Health Data," US Ignite Workshop, Washington, D.C., May 16, 2011.
52. "Recognition Technology to Support Aging in Place," Washington State University, Pullman, WA, March 24, 2011.
53. "Recognition Technology to Support Aging in Place," Oregon Health Science University, Portland, OR, Oct. 29, 2010.
54. "Continuous Monitoring in the Home," NIH Workshop, Bethesda, MD, June 16, 2010.
55. "Recognition Technology for Aging in Place," Bio-Engineering, University of Missouri, April, 2010.
56. "Recognition Technology to Support Aging in Place," Volz Festschrift, Texas A&M University, College Station, TX, April 10, 2010.
57. "How Home Sensors Can Help Keep People Independent," Forum on Technology and Design for Healthy Aging, University of Washington, Seattle, WA, May, 2009.
58. "Recognition Technology for Aging in Place," Carnegie Mellon University, Pittsburgh, PA, March 27, 2009.
59. "Assessing Eldercare Technology in the Real World," AAAI Spring Symposium, Stanford University, Palo Alto, CA, March 25, 2009.
60. "New Technologies to Keep Elders Independent," Saturday Morning Science series, University of Missouri, Columbia, MO, Feb., 2009.
61. "Recognition Technology for Aging in Place," Bio-Rob Conference, Oct., 2008.
62. "New Technologies to Enhance Aging," 18th Annual Caring for the Frail Elderly Conference, Columbia, MO, Aug. 15, 2008.
63. "Technology to Enhance Aging in Place," University of Washington, Seattle, WA, July 23, 2008.
64. "Recognition Technology for Aging in Place," Hogeschool van Amsterdam, Almere, Netherlands, March 17, 2008.
65. "Technology and Aging: The University of Missouri Eldertech Initiative," ICOA Aging Seminar, Jan, 2008
66. "Technology and Aging: The University of Missouri Eldertech Initiative," Mizzou Alumni Association, January 14, 2008
67. "Recognition Technology for Functional Assessment of Older Adults," University of Missouri-Rolla, Nov. 26, 2007
68. "Recognition Technology for Functional Assessment of Older Adults," Brooklyn College, May 3, 2007
69. "Recognition Technology for Functional Assessment of Older Adults," Utah State University, Feb. 8, 2007.
70. "Technology for Successful Aging," MU Libraries Faculty Lecture Series, University of Missouri, Columbia, Dec. 5, 2006.
71. "Monitoring Older Adults with Mobility and Cognitive Impairments," National Science Foundation, Sept. 18, 2006.

72. "Environmental Awareness of People," ROSE 2006 Workshop, Orebro, Sweden, May, 2006.
73. "Assessing Mobility and Cognitive Problems in Elders," ICOA Seminar, University of Missouri, Columbia, April 20, 2006.
74. "Using Robots in Autism Therapy: A Survey of Ongoing Research," HMI Seminar, University of Missouri, Columbia, Oct. 18, 2005.
75. "A Biologically Inspired Working Memory for Robots," University of Notre Dame, Jan. 15, 2005.
76. "A Biologically Inspired Working Memory for Robots," Cognition and Neuroscience seminar, Psychology Dept., University of Missouri, Columbia, Nov. 12, 2004
77. "Projects in Human-Robot Interaction," ACM Chapter, Truman State University, March 29, 2004.
78. "Projects in Human-Robot Interaction," ACM Chapter, UM-C, March 2, 2004.
79. "Spatial Reasoning for Robots", NASA Johnson Space Center, March 12, 2003.
80. "High Resolution Simulation Environments for Training," Ft. Leonard Wood, Jan. 23, 2003.
81. "Spatial Modeling and Reasoning for Robots", Vanderbilt University, Oct. 24, 2002.
82. "Spatial Modeling and Reasoning for Robots", Ft. Leonard Wood, Sept. 12, 2002.
83. "Botball", Building for Tomorrow Robotics Workshop, St. Louis, MO, June 10, 2002.
84. "The Robot Ramble Competition for the Science Olympiad 2000", workshop for Missouri teachers, Columbia, MO, Sept. 29, 2000.
85. "Training Intelligent Robotic Assistants", DARPA Workshop on Exoskeletons for Human Performance Augmentation, Washington, DC, March 2, 2000.
86. "Making Robots Easier to Use in the Real World", Truman State University, March 29, 1999.
87. "Acquiring Robust Robot Skills from Human Demonstration", Texas A&M University, Feb. 18, 1999.
88. "Acquiring Robust Robot Skills from Human Demonstration", University of Minnesota, Nov. 17, 1998.
89. "How Teaching Writing Intensive Courses Affects Faculty Writing and Research", University of Missouri, Columbia, Nov. 13, 1998.
90. "Making Robots Easier to Use in the Real World", University of Missouri, Columbia, Nov. 4, 1998.
91. "Acquiring Robust Robot Skills from Human Demonstration", Colorado School of Mines, March 6, 1998.
92. "Learning Force Sensory Patterns and Skills from Human Demonstration", Texas A&M University, Nov., 1996.
93. "Direct Manipulation in Virtual Environments", Texas A&M University, April, 1995.
94. "Human-Robot Interaction: Principles and Applications", Texas A&M University, March, 1995.

International Robot Competitions

1. AAAI 2005 Robotic Competition: Exhibition, July, 2005, Pittsburgh, PA, *awarded the technical innovation award for the sketch interface*
2. AAAI 2004 Robotic Competition: Exhibition and Open Interaction events, July, 2004, San Jose, CA, *awarded the technical innovation award for robot interface design*

SERVICE HIGHLIGHTS

NATIONAL / INTERNATIONAL
Search Committee for NSF CISE IIS Division Director, 2017
Data Safety Monitoring Board for University of Miami study: A non-pharmacological intervention for patients with Alzheimer's disease and family caregivers, 2017-present
Invited participant for CCC Visioning Workshop on Discovery and Innovation in Smart Health, December, 2016.
Editorial board, Smart Health Journal, 2016-present
Steering committee, IEEE Intl. Conf. on Connected Health, 2015-present.
Technical Program Committee for the IEEE Symposium on Computational Intelligence in Healthcare and e-health, 2015

Program Committee, Conference on Pervasive Health, 2016.

Co-lead, I-70 Corridor Network on Aging, 2013-present.

Invited participant for CLSA-TECH Workshop and Follow-up, Toronto, Canada, 2014-2015.

Invited participant for NIH Aging in Place Workshop, September, 2014.

Co-Lead, SmartAmerica Challenge team: Closed Loop Healthcare, 2013-2014.

Scientific Advisory Board, Quality of Life Technology Center, Carnegie Mellon Univ. and Univ. of Pittsburgh, 2010-2014.

Co-organizer, AAAI Symposium, AI for Gerontechnology, Fall, 2012.

Co-editor, Special issue on Pervasive Healthcare, *Journal of Pervasive and Mobile Computing*, 2012.

Co-organizer, SmartE Workshop, IEEE International Pervasive Computing Conference, March 2011

Advisory Board for new journal: *Journal of Human-Robot Interaction*, 2010-2011.

Invited participant for NIH Workshop, June, 2010

Invited participant for AARP Workshop, 2010

Invited participant for Intel Workshop, Dec., 2010

Chair, Association for the Advancement of Artificial Intelligence (AAAI) Spring and Fall Symposium Series, Washington, DC (fall) and Stanford University (spring), Fall, 2008 to 2011

Chair, organizing committee for Symposium on AI in Eldercare: New Solutions to Old Problems, to be held at the AAAI Fall 2008 Symposium series, Washington, DC, Nov. 7-9, 2008

Co-Chair, AAAI Spring and Fall Symposium Series, Washington, DC (fall) and Stanford University (spring), fall, 2006 to fall, 2008

Organizer for CogRIC Workshop (International Workshop on Cognitive Robots, Intelligence and Control), Windsor, U.K., Aug., 2006. *We secured funding from the National Science Foundation for an invitation-only workshop, inviting the top researchers in the world.*

Registration Co-Chair, 2007 Human-Robot Interaction Conference, Washington, DC.

Registration Chair, 2006 Human-Robot Interaction Conference, Salt Lake City, UT.

Program Co-Chair, 2005 IEEE Workshop on Robot-Human Communication (RO-MAN 2005), Nashville, TN.

Reviewer for the Annual International Conference of the IEEE Engineering in Medicine and Biology Society (ongoing)

Reviewer for the National Science Foundation and the NIH (ongoing)

Guest Editor, *IEEE Transactions on SMC-Part A*, special issue on Human-Robot Interaction, 2005.

External Reviewer for Promotion and Tenure (ongoing)

Co-Chair, Education Committee, IEEE Robotics and Automation Society, 2000-2003

Membership Activities Board, IEEE Robotics and Automation Society, 2002-2004

Technical Program Committee for the International Conference on Human-Robot Interaction, 2008.

Technical Program Committee for the AAAI Conference, 2007.

Technical Program Committee for the Fourth International Conference on Intelligent Technologies, 2003.

Technical Program Committee for the 2003 IEEE International Conference on Robotics and Automation

Technical Program Committee for the 2002 IEEE/RSJ International Conference on Intelligent Robots and Systems

Technical Program Committee for the 2001and 2002 IEEE International Conference on Fuzzy Systems

Technical Committee on Fuzzy Systems (IEEE Neural Network Council), 1999-2000

Associate Editor for the *IEEE Transactions on Fuzzy Systems*

Reviewer for the *IEEE Transactions on Robotics and Automation*

Reviewer for the *IEEE Transactions on Systems, Man, and Cybernetics*

Reviewer for the *IEEE Transactions on Biomedical Engineering*

Reviewer for the *IEEE Journal of Biomedical and Health Informatics*

Reviewer for the *Journal of Ambient Intelligence and Smart Environments*

Reviewer for the *IEEE Robotics and Automation Magazine*

Reviewer for the *IEEE Transactions on Knowledge and Data Engineering*

Review for the *ACM Transactions on Accessible Computing*

Review for the *International Journal of Social Robotics*
Reviewer for the *Journal of Pervasive and Mobile Computing*
Reviewer for the *Open Access Sensors Journal*
Reviewer for the International Conference of the IEEE Engineering in Medicine and Biology Society
Reviewer for the IEEE International Conference on Biomedical and Health Informatics
Reviewer for the International Conference on Human-Robot Interaction
Reviewer for the IEEE International Conference on Robotics and Automation
Reviewer for the IEEE/RSJ International Conference on Intelligent Robots and Systems
Session Organizer for the IEEE International Conference on Robotics and Automation
Session chair, IEEE International Conference on Robotics and Automation
Session chair, IEEE International Conference on Neural Networks
Session chair, IEEE International Conference on Fuzzy Systems
Session chair, International Conference of the IEEE Engineering in Medicine and Biology Society

UNIVERSITY OF MISSOURI
Panel participant, "She Means Business," UM System Women in Leadership Conference, June 21, 2016
Aging in Place Board, 2010-present
Organizing Committee, Saturday Morning Science, 2011
Steering Board, Mizzou ADVANCE Project, 2007-2010. *The board was presented with a "Tribute to MU Women" award, March, 2008.*
Mizzou ADVANCE Council, 2007-2010
MU Information Technology Committee, 2001-2004.
Reviewer for University of Missouri Research Board

UNIVERSITY OF MISSOURI, College of Engineering
Chair, Faculty Search Committee for AOI Biosensing Chair, Fall, 2017-present
MU College of Engineering Faculty Search committee for Biomedical Innovations (2016)
MU College of Engineering Search committee for grant writer (2016)
MU College of Engineering Task Force to Discuss CS-ECE Merger (2016)
MU College of Engineering P&T Committee (fall, 2015-2017)
Director, Center for Eldercare and Rehabilitation Technology (2006-present)
MU College of Engineering Search committee for grant writer (2004-2005)
MU College of Engineering Research Council (2004-present)
MU College of Engineering Policy Committee (2005-2007)
Affirmative Action Committee, College of Engineering, 1997-2004

UNIVERSITY OF MISSOURI, EECS Department
Lead, Plan for EECS Achieving Collaborative Excellence (PEACE), 2017
Chair, Hiring Advisory Committee, Fall, 2017-present
Bylaws committee (2017)
Faculty Search committee for EECS Chair (2017)
Faculty Search committee for Computer Engineering (2016-2017)

UNIVERSITY OF MISSOURI, ECE Department
Department Web Committee (2015)
Strategic Planning Committee (2014-2015)
Chair, Intelligent Systems Group, ECE Department (Spring, 2010 – 2016)
Faculty Search Committee for ECE Chair (2011-2012)
Chair, P&T Committee, ECE Department (2011)
Faculty Search Committee, ECE Department (Fall, 2009 – Spring, 2010)
Course and Curriculum Committee, ECE Department (Fall, 2008 – Spring, 2010)

Graduate Student Committee, ECE Department (Fall, 2008 – Spring, 2009)
Chair, Student Recruiting Committee, ECE Department (Fall, 2007 – Spring, 2008)
Chair, Faculty Search Committee, ECE Department (Fall, 2006 – Winter, 2007)
Graduate Review Committee, ECE Department (Fall, 2006)
Chair, Hiring Committee, ECE Department (Winter, 2006)
Chair, Graduate Committee, ECE Department (2003-2004)
Faculty Search Committee, ECE Department (2003-2004)

UNIVERSITY OF MISSOURI, CECS Department
Faculty Adviser, Student ACM Chapter, UMC, 1999-2002 (co-adviser with J. Keller, April, 1999-2001).
Qualifying Committee, CECS Department, 2001-2002
Educational Lab Committee, CECS Department, 2001-2002
Space Committee, CECS Department, 2001-2002
Undergraduate Committee, CECS Department, 1997-2000
Faculty Search Committee, CECS Department, 1998-9
Curriculum Committee, CECS Department, 1998-2000
Advisor for Computer Engineering Undergraduates, 1998-2003

EDUCATIONAL OUTREACH
Advising, FIRST Lego team, May, 2012
Teleconference for FIRST Robotics Competition, Kansas City, MO, March, 2008.
Advisor for the Columbia Robotics Team, Botball, 2002. *The team won the National Tournament!*
State judge for the Science Olympiad Robot Ramble competition, April, 2001
Saturday Science program, Spring, 2000, 2001, 2004, 2006: Hands-On Session for Programming Robots –
     program for junior high students in the Columbia Public Schools, initially funded by the NSF. Exercises,
     lab equipment, and software were developed to offer pre-college students hands-on lab experience and to
     encourage interest in math and science. Approximately 90 junior high students participated in the
     program each year, in three sessions. More than half of the participants were young women. The
     curriculum introduced the junior high students to programming concepts by providing an easy and
     intuitive programming base and an intriguing platform to observe immediate feedback on the success of
     their programs. See also the web page: http://www.cecs.missouri.edu/~skubic/kids/ss/. The robots were
     redesigned and rebuilt in summer, 2004, and also used for a workshop targeting minority students (over
     50 minority students attended).

STUDENT MENTORING
Discovery Fellowship program mentor for Freshman Trey Shaw, EECS Dept, 2017
Mentoring Jasmine Jalai, high school student for Engineering internship, Hickman High School, 2016-2017
Mentoring Katy Lydon, high school student in pre-Engineering class, Rockbridge High School, 2014-2016.
Job shadowing mentor for Brad Wansing, Fatima High School, Westphalia, MO, 2014.
Discovery Fellowship program mentor for Freshman Zachary Legenzoff, ECE Dept, 2011-2012.
Mentor for Jairon Scott (minority student from Jackson State University), Emerge summer fellow, 2007
Mentor for Sarah Berry (Computer Engineering undergrad from Texas A&M University) through the CRA-
   W summer program, 2006
Discovery Fellowship Program mentor for Andy Carle (MU Freshman) (academic year 2001-2002). *Andy
   earned his PhD at UC-Berkeley.*
McNair Scholars Program mentor for Lakesha Brown and Maria Jackson (academic year 1998-1999)
Job shadowing mentor for Noah Medling, West Jr. High School, Columbia, MO, Oct., 1997
Job shadowing mentor for Abby Dunn, West Jr. High School, Columbia, MO, Oct., 1998
Job shadowing mentor for Daniel Lopez, West Jr. High School, Columbia, MO, Oct., 2002. *Daniel became
   a student at Stanford University and worked at MU as a summer intern in our lab in 2008.*

<u>SERVICE EXHIBITS</u>

MU College of Engineering Open House Exhibits, 1998, 1999, 2000, 2001, 2002, 2003 (*top CECS department exhibit*), 2004, 2005 (*ECE Dept. won second place*), 2006 (*won the top prize for the college*), 2007, 2008 (*ECE Dept. won second place*), 2009, 2010 (*ECE Dept. won first place*), 2011, 2012, 2015, 2016 (*The Smart Bed exhibit won the top prize in the College of Engineering; ECE was the top department winner*), 2017.

MU College of Engineering, Demonstration for Missouri Scholars (high school students), July, 1999.

Project ENTER: Expanding Your Horizons, UM-C, March 13, 1999

MU College of Engineering High School Weekend, Feb. 5, 1999

Girl Scout Day, Sponsored by MU Society of Women Engineers, Jan. 23, 1999