

Kevin M. Nickels

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EDUCATION

Ph.D. 1998, M.S. 1996, Electrical Engineering, University of Illinois at Urbana-Champaign

B. S. 1993 Computer and Electrical Engineering, Purdue University

EMPLOYMENT

Trinity University, San Antonio TX:

- 2005-present: Associate Professor of Engineering Science
- 1998-2004: Assistant Professor of Engineering Science

Fellowships and Academic Leaves:

- June 2013 - July 2014: Research Fellow in Advanced Sonar Division, Applied Research Laboratories, The University of Texas at Austin (ARL:UT) (“Simultaneous Localization and Mapping”)
 - Enabled navigation of an underwater robot over very long distances utilizing a reference map (without GPS) by leveraging Markov Random Set theory.
 - Automatic Mapping of detected targets and their use in navigation by combining with a particle filter.
- June 2005 - July 2006 : Senior Engineer in Avionics Systems and Space Technology, Jet Propulsion Laboratory, Pasadena CA. (“Vision Guided Manipulation”)
 - Implemented Hybrid Image-Plane Stereo (HIPS) on the Limbed Exploration Robotic Utility Rover (LEMUR-IIa, or LIIA).
 - Implemented tools to analyze Vision-Kinematic Residuals over time for Mars Exploration Rovers (MER), including comparison of different camera models, effect of automatic vs manual acceptance of EPEC fiducial detector on residuals, and computation of new (HIPS) camera models.
 - Designed and implemented comprehensive comparison of the positioning accuracy and precision of various vision-guided manipulation algorithms.
- Summer 2003 : Faculty Fellow in Aeronautics and Space Research, Johnson Space Center, Houston TX. (“Hand-Eye Calibration for Robonaut”)
 - Designed and Implemented 3D fiducial finder, utilizing disparity maps as input
 - Designed and Implemented method for improved alignment of visual and manipulator kinematic systems, improving look-and-grab accuracy of Robonaut by factor of four.

- Summer 2002 : Faculty Fellow in Avionics Systems and Space Technology, Jet Propulsion Laboratory, Pasadena CA. (“Fusion of LIDAR and stereo range data for JPL’s URBIE mobile robot”)
- Summer 2000 : Faculty Fellow in Aeronautics and Space Research, Johnson Space Center, Houston TX. (“Vision System Stabilization for Mobile Robot Base and Ground Movement”)

EXPERIENCE

Algorithmic Domains: Particle Filters, Markov Random Sets, 3D Machine Vision, Kinematics, Image Processing, PID Control, Real-Time and Embedded Systems

Software Architectures/OSs:

Robot Operating System (ROS), FIDO Software Architecture (VxWorks OS), Linux, Windows, SunOS, Solaris, IRIX, Darwin/OSX, QNX,

Programming Languages: Matlab, Python, C++, C, Assembly, Machine Code, . . .

RESEARCH INTERESTS

Vision for Mobile Robots, Image & Scene Analysis, Kalman & Optimal Filtering, Mobile Robotic Motion Planning & Execution

Education in Digital Design, Effective Classroom/Laboratory Teaching, Design-Oriented Education, Active Learning, Learning Modes/Styles

PROFESSIONAL MEMBERSHIPS

Member, American Society for Engineering Education (ASEE), since 1998

Senior Member, Institute of Electrical and Electronics Engineers (IEEE), Robotics & Automation, and Computer Societies, since 2003 (member since 1995)

Member, Council on Undergraduate Research (CUR), since 2009

TEACHING EXPERIENCE

Course Instructor:

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| • Electric Circuits (ENGR 2320) | • Embedded Microcomputer Systems (ENGR 4369) |
| • Electric Circuits Lab (ENGR 2120) | • Mechatronics (ENGR 4190/ENGR 4390/ENGR 4367) |
| • Electronics I (ENGR 2364) | • Senior Design (ENGR 4381/4832) |
| • Electronics I Lab (ENGR 2164) | • Junior Design (ENGR 3181) |
| • Modern Controls (ENGR 4356) | |
| • Digital Logic Design (ENGR 4365) | |
| • Digital Logic Design Lab (ENGR 4165) | |

Laboratory Development:

- Mechatronics (ENGR 4190/ENGR 4390/ENGR 4367)
- Digital Logic Design Lab (ENGR 4165)
- Modern Controls (ENGR 4356)
- Electric Circuits Lab (ENGR 2120)
- Electronics I Lab (ENGR 2164)
- Embedded Microcomputer Systems (ENGR 4369)

Senior Design Advisor (ENGR 4381/4382):

- MicroMouse (Maze-Solving Robot), Fall 2012, with Kevin Gaughan, Carter Payne, Kenny Saiz, Daniel Villamizar
- Robokey (Robot Hockey), 2011-2012, with Rachel Alley, Alex Butler, Matt Galla, John Kerr, and Nathaniel Richison
- Development of Automatic Shifter and Anti-Lock Brakes for Road Bicycle, 2006-2007, with Drew Wimpy, Jeff Wedelich, Scott Rivet, and Travis Dubose
- Automation of Core Sample Removal for Mars Drill, 2004-2005, with Jeffrey Bennett, Konrad Izbinski, Eric Mullen, Michael Pickford, and Lindsay Wetzel,
- Design of a Mars Rover, 2003-2004, with Roberto Aranibar, Kathleen Lachance, Landon Nemoto, and Michael Poteet.
- Active Tether Design for Search and Rescue Robot, 2002-2003, with Eric Barta, Christopher Kruzell, Mason McIntire, and Laura Wille.
- Fast Pan-Tilt-Verge Motion Tracker, 2001-2002, with Chuck Divin, Jason Frederick, Luke Powell, and Christina Soontornvat.
- Mobile Robot Motion Planning & Path Execution, 2000-2001, with Daniel Houy, Andrew Leininger, Jeffrey Liddle, and Michael Sutton.
- Environment Mapping Mobile Robot, 1999-2000, with Brian Deaton, Jeff Dickerson, and Jared Newton
- Wireless Digital Communication, 1998-1999, with Brian Davidson, Jim Flaherty, and Omar Ihsan.

Undergraduate Research Advisor

- “Simultaneous Localization and Mapping” with Roland Green (Spring 2014, Summer 2014, Fall 2015)
- “Robotic Mapping with EPucks” with Stefan Schluter, University of Colorado (Summer 2014)
- “Robot Operating System” with Niti Nararidh and Eric Kang (Summer 2014)
- “Robotic Mapping with EPucks” with Pablo Tarquino (Summer 2013)
- “Underwater Robotic Autonomy” with Harold (Abe) Garza (Applied Research Laboratories: University of Texas, Summer 2012)
- “Python Clients with Robot Operating Systems,” with Eric Kang (Summer 2012)
- “Robot Operating Systems,” with John Kerr (Summer 2011)
- “Modernization of Capek (TCR),” with Matthew Meador (Trinity) and Travis Blankenship (St. Stephen’s Episcopal School) (Summer 2007)
- “Improved Camera Calibration,” with Brandi C. House (Fall 2004)
- “Development of the TCR (Trash-Can Robot),” with Nicholas Jones, Elliot Johnson, Trey Miller, Graham Moore, and Matthew Vrugink (Fall 2003)

- “Design of the TCR (Trash-Can Robot),” with Roberto Arinabar and Khiem Lam (Spring 2003)
- “Development of a Walking Robot,” with Elliot Johnson (Fall 2002, Spring 2003)
- “Design of the TCR (Trash-Can Robot),” with Roberto Arinabar, Kathleen LaChance, and Khiem Lam (Fall 2002)
- “MAPS - Maps as Portable Sensor data,” with Christopher Cianci (Calif. Inst. Technology/JPL) (Spring/Summer 2002)
- “Kalman Filter-Based Sensor Fusion for Estimation of Mobile Robot Location and Orientation,” with Luke Powell, Daniel DiPaolo, and Jason Frederick (Spring 2001)
- “Evaluation of two Pan-Tilt-Verge stereo heads,” with Daniel DiPaolo (Summer 2000)
- “Mobile Robot Motion Planning,” with Michael Sutton (Spring 1999 - Fall 2000)
- “Analysis of LEGO MINDSTORMS as an Pedagogical Tool in a science course for nonmajors” with Rick Kimpel and Matthew Buehner (Fall 1999)

HONORS AND AWARDS

National Aeronautics and Space Administration (NASA) Group Achievement Award, 2005-2006, as member of MER 3rd and 4th Extended Mission Team

Elected Senior Member of IEEE in 2003 (only 7% of IEEE members are elected to this level)

Best paper Award, in PIC II of 2002 ASEE Annual Conference for “Herding Cats: A case study of a capstone design course,” (with Paul Giolma, 2002, \$1,000)

FELLOWSHIPS AND VISITING APPOINTMENTS

Trinity University Academic Leave. “Simultaneous Localization and Mapping” – Research Fellow at ARL:UT (Applied Research Laboratories, University of Texas at Austin). — see “Employment” above (2013-2014 Academic Year)

ARL:UT (Applied Research Laboratories, University of Texas at Austin). University Affiliate with Advanced Sonar Division. “Autonomy for Underwater Robotics,” (Summer 2012)

Trinity University Summer Stipend. “Quantitative modeling of a schlieren optics system,” (Summer 2007)

Trinity University Academic Leave. “Vision-Guided Manipulation,” — Senior Engineer in Avionics Systems and Space Technology, Jet Propulsion Laboratory, Pasadena CA — see “Employment” above (2005-2006 Academic Year)

Trinity University Summer Stipend. “Improved Hand-Eye Calibration for Robonaut,” (Summer 2004)

NASA-ASEE-USRA (National Aeronautics and Space Administration, American Society for Engineering Education, Universities Space Research Association) Summer Faculty Fellow in Aeronautics and Space Research, Engineering Directorate, Johnson Space Center, Houston. “Hand-Eye Calibration for Robonaut” (Summer 2003, \$12,000)

NASA-ASEE-USRA (National Aeronautics and Space Administration, American Society for Engineering Education, Universities Space Research Association) Summer Faculty Fellow in Avionics Systems and Space Technology, Engineering and Science Directorate, Jet Propulsion Laboratory, Pasadena. "Fusion of LIDAR and stereo range data for JPL's URBIE mobile robot" (Summer 2002, \$12,000)

NASA-ASEE (National Aeronautics and Space Administration, American Society for Engineering Education) Summer Faculty Fellow in Aeronautics and Space Research, Engineering Directorate, Johnson Space Center, Houston. "Vision System Stabilization for Mobile Robot Base and Ground Movement" (Summer 2000, \$10,000)

William Liston Zander Faculty Fellow - Trinity University (Summers of 1999-2001, \$5,000 ea.)

GRANTS

"Kalman Filter-Based Sensor Fusion for Estimation of Mobile Robot Location and Orientation," NASA JSC Summer Faculty Fellows Director's Grant Program, 2000-2002, \$15,500.
(Research Grant)

"Embedded System Portability," 2008-2009
Genesi, Inc, \$ 37k; Freescale Semiconductor, Inc, \$ 20k
(Educational Research Grants)

EDUCATIONALLY ORIENTED GRANTS AND DONATIONS

QNX Inc: real-time operating system for robot control, 2007-2009, 1 license, \$4,300/year

Genesi, Inc: EFIKA5K2 Embedded Computer, 2007, \$200

Texas Space Grant Design Challenge, 2004-2005, \$2,900

Texas Space Grant Design Challenge, 2003-2004, \$2,900

Kinetic Concepts, Inc: PC/104 Single-Board Computers, 2003, 14 boards, est. \$12,000

Kinetic Concepts, Inc: LCD Displays and Touch-Panels, 2003, 10 sets, est. \$10,000

Xilinx, Inc: Xilinx DigiLabXLA Prototyping Stations, 2001, 6 items, est. \$ 600

Xilinx, Inc: Xilinx XISE Circuit design software, 2001, 20 licenses, est. \$12,000

Motorola, Inc: Seiko RT-3200 robotic arms, 1999, 2 arms & controllers, est. \$100,000

Visual Solutions, Incorporated: VisSim/Comm Simulation Software, 1999, 1 license.

QNX Inc: real-time operating system for robot control, 1998, 1 license

PUBLICATIONS

REFEREED PUBLICATIONS IN COMPUTER VISION & ROBOTICS JOURNALS

- “Vision Guided Manipulation for Planetary Robotics - Position Control,” by Kevin Nickels, Matthew DiCicco, Max Bajracharya, and Paul Backes, *Journal of Robots and Autonomous Systems*, Volume 58, Issue 1, Jan 2010, pp. 121-129.
(Peer-Reviewed Journal Paper, Primary Author)
- “Hybrid Image Plane/Stereo (HIPS) Manipulation for Robotic Space Applications”, by M. Robinson, E. Baumgartner, K. Nickels, and T. Litwin, in *Autonomous Robots Journal*, Volume 23, Number 2, p. 83-96, August 2007.
(Peer-Reviewed Journal Paper, Co-Author)
- “Visual End-Effector Position Error Compensation for Planetary Robotics,” by Max Bajracharya, Matt DiCicco, Paul Backes, and Kevin Nickels in *Journal of Field Robotics*, Volume 24, Issue 5, p 399-420, May 2007
(Peer-Reviewed Journal Paper, Contributing-Author)
- “Increased Automation in Stereo Camera Calibration Techniques,” by Brandi C. House and Kevin Nickels, in *Journal of Systemics, Cybernetics and Informatics*, Volume 4, Number 4, November 2006.
(Peer-Reviewed Journal Paper, Co-Author, **Undergraduate Co-author**, also appeared in *Proceedings, 3rd International Conference on Computer, Communications, and Control Technologies*, July 24-27, 2005, Austin, Texas, USA)
- “Estimating Uncertainty in SSD-Based Feature Tracking,” by Kevin Nickels and Seth Hutchinson, *Image and Vision Computing*, Vol. 20, 2002, pp. 47-58.
(Peer-Reviewed Journal Paper, Principal Author)
- “Model-Based Tracking of Complex Articulated Objects”, by Kevin M. Nickels and Seth Hutchinson, *IEEE Transactions on Robotics and Automation*. Volume 17, Number 1, February 2001, pp. 28-36.
(Peer-Reviewed Journal Paper, Principal Author)
- “Textured Image Segmentation: Returning Multiple Solutions,” by Kevin Nickels and Seth Hutchinson, *Image and Vision Computing*, Vol. 15, 1997, pp. 781-795.
(Peer-Reviewed Journal Paper, Principal Author)

REFEREED PUBLICATIONS IN COMPUTER VISION & ROBOTICS PROCEEDINGS

- “Programming an E-Puck Robot to Create Maps of Virtual and Physical Environments,” by Pablo Tarquino and Kevin Nickels, in Proceedings, 2nd International Conference on Robot Intelligence Technology and Applications, Dec 18-20, 2013, Denver, CO, USA.
(Peer-Reviewed Conference Paper, Co-Author, **Undergraduate Author**)
- “Robot Operating Systems: Bridging the Gap between Human and Robot, by John Kerr and Kevin Nickels, in Proceedings, 44th Southeastern Symposium on System Theory, May 11-13, 2012, Jacksonville, FL, USA.
(Peer-Reviewed Conference Paper, Co-Author, **Undergraduate Author**)
- “Hybrid Image-Plane/Stereo (HIPS) for Orientation Control of Manipulators,” by Kevin Nickels, in *Proceedings, IEEE International Conference on Robotics and Automation*, May 19-23, 2008, Pasadena, CA, USA.
(Peer-Reviewed Conference Paper, Sole Author)

- “HIPS-Assisted Target Handoff between Camera Pairs,” by K. Nickels, in *Proceedings, 2007 IEEE/RSJ International Conference on Intelligent Robots and Systems*, October 29–November 2, 2007, San Diego, CA, USA
(Peer-Reviewed Conference Paper, Sole Author)
- “Kinematic-Vision Residuals Analysis,” by K. Nickels, M. Bajracharya, A. Trebi-Ollennu, and R. Liebersbach, in *Proceedings, 2007 IEEE Aerospace Conference*, March 3–10, 2007, Big Sky, MT, USA
(Peer-Reviewed Conference Paper, Principal Author)
- “Hand-Eye Calibration Using Active Vision,” by K. Nickels, E. Huber, and M. DiCicco, in *Proceedings, 2007 IEEE Aerospace Conference*, March 3–10, 2007, Big Sky, MT, USA
(Peer-Reviewed Conference Paper, Principal Author)
- “End-Effector Pose Error Compensation – Error Analysis,” by M. DiCicco, M. Bajracharya, K. Nickels, and P. Backes, in *Proceedings, 2007 IEEE Aerospace Conference*, March 3–10, 2007, Big Sky, MT, USA
(Peer-Reviewed Conference Paper, Contributing Author)
- “In-Space Robotic Assembly with LEMUR II-a,” by K. Nickels, B. Kennedy, H. Aghazarian, C. Collins, M. Garrett, L. Magnone, A. Okon, and J. Townsend, in *Proceedings, 2006 IEEE/RSJ International Conference on Intelligent Robots and Systems*, October 9–15, 2006, Beijing, China
(Peer-Reviewed Conference Video, Principal Author)
- “LEMUR II-a Capabilities,” by K. Nickels, B. Kennedy, H. Aghazarian, C. Collins, M. Garrett, L. Magnone, A. Okon, and J. Townsend, in *Proceedings, 2006 IEEE/RSJ International Conference on Intelligent Robots and Systems*, October 9–15, 2006, Beijing, China
(Peer-Reviewed Conference Video, Principal Author)
- “Vision-Guided Self-Alignment and Manipulation in a Walking Robot,” by K. Nickels, B. Kennedy, H. Aghazarian, C. Collins, M. Garrett, A. Okon, and J. Townsend, in *Proceedings, 2006 IEEE International Conference on System of Systems Engineering*, April 24–26, 2006, Los Angeles CA
(Peer-Reviewed Conference Paper, Principal Author)
- “Increased Automation in Stereo Camera Calibration Techniques,” by Brandi C. House and Kevin Nickels, in *Proceedings, 3rd International Conference on Computer, Communications, and Control Technologies*, July 24–27, 2005, Austin, Texas
(Peer-Reviewed Conference Paper, Co-Author, **Undergraduate Co-author**, reprinted in *Journal of Systemics, Cybernetics and Informatics*)
- “Fusion of Lidar and Stereo Range for Mobile Robots,” by Kevin Nickels, Andrés Castaño and Christopher Cianci, in *Proceedings, 11th International Conference on Advanced Robotics*, June 30 – July 3, 2003, University of Coimbra, Portugal, Vol. 1, pp. 65–70
(Peer-Reviewed Conference Paper, Principal Author, **Undergraduate Co-author**)
- “Design of a low-power motion tracking system,” by Kevin Nickels, Jeffrey Graham, Christina Soontornvat, Luke Powell, Jason Frederick, and Chuck Divin, in *Proceedings, 11th International Conference on Advanced Robotics*, June 30 – July 3, 2003, University of Coimbra, Portugal, Vol. 1, pp. 83–87
(Peer-Reviewed Conference Paper, Principal Author, **Undergraduate Co-author**)
- “Path following for a poorly controlled mobile robot,” by Kevin Nickels, in *Proceedings, 6th World Multiconference on Systemics, Cybernetics and Informatics*, July 14–18, 2002, Or-

lando, Florida, USA

(Peer-Reviewed Conference Paper, Principal Author)

“Pan-tilt-vergence stereo heads for mobile robots: The use of software components in driver design,” by Kevin Nickels and Daniel DiPaolo, in *Proceedings, 5th World Multiconference on Systemics, Cybernetics and Informatics*, July 22-25, 2001, Orlando, Florida, USA, Volume VII, pp. 455-460.

(Peer-Reviewed Conference Paper, Principal Author, **Undergraduate Co-author**)

“Inertially Assisted Stereo Tracking for an Outdoor Rover,” by Kevin Nickels and Eric Huber, in *Proceedings, IEEE International Conference on Robotics and Automation*, May 21-26, 2001, Seoul, Korea, pp. 3078-3083.

(Peer-Reviewed Conference Paper, Principal Author)

“Evaluation of feature-based room maps,” by Kevin Nickels and Michael Sutton, in *Proceedings, 4th World Multiconference on Systemics, Cybernetics and Informatics*, July 23-26, 2000, Orlando, Florida, USA, Volume IV, pp. 150-155.

(Peer-Reviewed Conference Paper, Principal Author, **Undergraduate Co-author**)

“Measurement error estimation for feature tracking,” by Kevin Nickels and Seth Hutchinson, in *Proceedings IEEE International Conference on Robotics and Automation*, May 10-15, 1999, Detroit, Michigan, pp. 3230-3235.

(Peer-Reviewed Conference Paper, Principal Author)

“Development of a Visual Space-Mouse,” by Tobias Kurpjuhn, Kevin Nickels, Alexa Hauck, and Seth Hutchinson, in *Proceedings IEEE International Conference on Robotics and Automation*, May 10-15, 1999, Detroit, Michigan, pp. 2527-2532.

(Peer-Reviewed Conference Paper, Co-Author)

“Weighting Observations: The use of Kinematic Models in Object Tracking,” by Kevin Nickels and Seth Hutchinson, in *Proceedings IEEE International Conference on Robotics and Automation*, May 16-20, 1998, Leuven, Belgium, pp. 1677-1682.

(Peer-Reviewed Conference Paper, Principal Author)

REFEREED PUBLICATIONS IN FILM EVAPORATION

“Vapor Distribution above an Evaporating Sessile Drop” by P.L. Kelly-Zion, C. J. Pursell, N. Hasbramrer, B. Cardozo, and K. Nickels, *International Journal of Heat and Mass Transfer*, Volume 65, Oct 2013, pp. 165-172

(Peer-Reviewed Journal Paper, **Undergraduate Co-Author**, Contributing Author)

“Measurement of the Vapor Distribution above an Evaporating Sessile Drop” by P.L. Kelly-Zion, C. J. Pursell, N. Hasbramrer, B. Cardozo, K. Gaughan and K. Nickels, *Proceedings, ILASS Americas, 25th Annual Conference on Liquid Atomization and Spray Systems, May 2013, Pittsburgh, PA*

(Peer-Reviewed Conference, **Undergraduate Co-Author**, Contributing Author)

REFEREED PUBLICATIONS IN ENGINEERING EDUCATION PROCEEDINGS

“Transplanting a Robotic Hockey Competition between Universities” by Kevin Nickels, *Proceedings, 2012 Capstone Design Conference*, May 30 - June 1, 2012, Champaign IL

(Peer-Reviewed Conference Paper, Sole Author)

- “Making ‘Realistic Constraints’ more real,” by Kevin Nickels, *Proceedings, 2010 Capstone Design Conference*, June 7-9, 2010, Boulder CO
(Peer-Reviewed Conference Paper, Sole Author)
- “Embedded Systems in an Engineering Science Curriculum,” by Kevin Nickels and Matt Sealey, *Proceedings 2009 American Society for Engineering Education / Institute of Electrical and Electronics Engineers Frontiers in Education Conference*, October 18-21, 2009, San Antonio, TX.
(Peer-Reviewed Conference Paper, Principal Author)
- “What are the ”Fundamentals” of Modern Digital Logic Design? The evolving content of Trinity’s one-semester course in Digital Logic Design,” by Kevin Nickels *Proceedings 2005 American Society for Engineering Education - Gulf-Southwest Annual Meeting*, March 23-25, 2005, Corpus Christi, TX.
(Peer-Reviewed Conference Paper, Sole Author)
- “The impact on student learning of resubmission of work and flexible deadlines”, by Kevin Nickels and Mahbub Uddin, in *Proceedings 2003 American Society for Engineering Education - Gulf-Southwest Annual Meeting*, March 19-21, 2003, Arlington, TX.
(Peer-Reviewed Conference Paper, Principal Author)
- “Herding cats : a case study of a capstone design course,” by J. Paul Giolma and Kevin M. Nickels, in *Proceedings, 2002 American Society for Engineering Education Annual Conference, June 16-19, 2002, Montréal, Quebec, Canada*
(Peer-Reviewed Conference Paper, Co-Author)
- “Bridging the gap between discrete and programmable logic in introductory digital logic laboratories,” by Kevin Nickels, Farzan Aminian, and J. Paul Giolma, in *Proceedings, 2001 American Society for Engineering Education Annual Conference, June 24-27, 2001, Albuquerque, NM*
(Peer-Reviewed Conference Paper, Principal Author)
- “Pros and Cons of replacing discrete logic with programmable logic in introductory digital logic courses,” by Kevin Nickels, in *Proceedings 2000 American Society for Engineering Education Annual Conference, June 18-21, 2000, St. Louis, MO*
(Peer-Reviewed Conference Paper)
- “Do’s and Don’ts of Introducing Active Learning Techniques,” by Kevin Nickels, in *Proceedings 2000 American Society for Engineering Education Annual Conference, June 18-21, 2000, St. Louis, MO*
(Peer-Reviewed Conference Paper)
- “Using robots to teach non-engineers about science and technology,” by Kevin Nickels and J. Paul Giolma, in *Proceedings 2000 American Society for Engineering Education - Gulf-Southwest Annual Meeting*, April 5-8, 2000, Las Cruces, New Mexico
(Peer-Reviewed Conference Paper, Co-Author)
- “Change Agents: Immediately Implementable Teaching and Educational Hints from the Engineering Education Scholars Program,” by S. Courter, R. Lyle, K. Nickels, D. Noyce, A. Pearce, J. Reeves, L. Schaefer, R. Wickramasinghe, in *Proceedings 1999 American Society for Engineering Education Annual Conference* June 20-23, 1999, Charlotte, North Carolina
(Peer-Reviewed Conference Paper, Contributing Author)

INVITED CONFERENCE PUBLICATIONS AND BOOK CHAPTERS

- “Integrated Object Models for Robust Visual Tracking”, by Kevin Nickels and Seth Hutchinson, in M. Vincze & G. Hager (Eds.), *Robust Vision for Vision-Based Control of Motion* (pp. 45-60) 1999 Piscataway, NJ: IEEE Press, Inc.
(Book Chapter (Reprint of invited conference paper), Principal Author)
- “Integrated Object Models for Robust Visual Tracking”, by Kevin Nickels and Seth Hutchinson, in *Proceedings Workshop on Robust Vision for Vision-based Control of Motion*, in association with 1998 IEEE International Conference on Robotics and Automation, May 16-20, 1998, Leuven, Belgium.
(Invited Conference Paper, Principal Author)
- “Characterizing the Uncertainties in Point Feature Motion for Model-Based Object Tracking”, by Kevin M. Nickels and Seth Hutchinson, *Proc. Workshop on New Trends in Image-Based Robot Servicing*, in association with 1997 IEEE-RSJ International Conference on Intelligent Robots and Systems. Grenoble, France, pp. 53-63.
(Invited Conference Paper, Principal Author)

TECHNICAL REPORTS

- Kevin M. Nickels. “Hand-Eye Calibration for Robonaut,” In Research Reports - 2003 NASA/ASEE Summer Faculty Fellowship Program, NASA Contractor Report, 2003.
(Technical Report)
- Kevin M. Nickels. “Kalman Filter-Based Sensor Fusion for Estimation of Mobile Robot Location and Orientation,” In Research Reports - 2000 NASA JSC Summer Faculty Fellows Director’s Grant Program
(Technical Report)
- Kevin M. Nickels. “EVA Robotic Assistant Project: Platform Attitude Prediction,” In Research Reports - 2000 NASA/ASEE Summer Faculty Fellowship Program, NASA Contractor Report, 2000.
(Technical Report)

STUDENT-AUTHORED PUBLICATIONS

- “Modified Stereo Camera Calibration Techniques for use in Robotic Vision,” by Brandi C. House, in *Proceedings, 19th National Conference on Undergraduate Research*, April 21-23, 2005, Lexington Virginia
(Peer-Reviewed Conference Paper, **Undergraduate Author**, Faculty Advisor)
- “Performance Evaluation and Software Design for EVA Robotic Assistant Stereo Vision Heads,” by Daniel DiPaolo, in Research Reports - 2000 NASA/ASEE Summer Faculty Fellowship Program, NASA Contractor Report, 2000.
(Technical Report, **Undergraduate Author**, Faculty Advisor)

SOFTWARE MODULES

- “KLD Sampling for Particle Filters - using Kullback-Leibler Distance,” by Kevin Nickels. Published on Mathworks File Exchange 18 Dec 2013.

This MATLAB module implements a handle class to facilitate the use of adaptive population size in particle filters. It includes a 1D and a 2D sample. It is based on Dieter Fox's 2003 Paper "Adapting the sample size in particle filters through KLD-sampling" International Journal of Robotics Research (IJRR), and Patrick Beeson's C++ implementation at openslam.org.

(Non-Refereed Software Module, Sole Author)

SOFTWARE CURRENTLY UNDER REVIEW

"KLD Sampling for Particle Filters - using Kullback-Leibler Distance," by Kevin Nickels. Under review by openslam.org

This MATLAB module implements a handle class to facilitate the use of adaptive population size in particle filters. It includes a 1D and a 2D sample. It is based on Dieter Fox's 2003 Paper "Adapting the sample size in particle filters through KLD-sampling" International Journal of Robotics Research (IJRR), and Patrick Beeson's C++ implementation at openslam.org.

(Non-Refereed Software Module, Sole Author, same as KLD-Sampling on Matlab File Exchange)

Publication Annotations:

- Invited Conference Paper — Not peer-reviewed, Published in conference proceedings
- Peer-Reviewed Conference Paper — Full paper peer-reviewed, Published in conference proceedings
- Journal Paper — Full paper peer-reviewed, Published in journal
- Principal Author — 70-100 % contribution
- Co-Author — 30-70 % contribution
- Contributing Author — 0-30% contribution

SERVICE ACTIVITIES (Selected - Last 5 Years)**SERVICE TO THE UNIVERSITY****Activities**

- Member of “Mellon Group” which proposed and was awarded \$50k grant to utilize “Ideas Lab” concept to kick off innovative review and revision of Trinity’s Curriculum (Summer 2011). Resultant new curriculum passed by faculty in January 2014, and will begin with the 2015-2016 academic year.
- Participated in Trinity in Focus (2011, 2012, 2013, 2014)

Committees

- Member, Committee for Curriculum Review (May 2011-August 2012)
- Member, University Curriculum Council (2009-2011)
Vice-Chair, 2009-2010
- Member, Faculty Development Committee (2006-2009)
- Member, Faculty Senate (2002-2005,2007-2009)
Secretary, 2003-2004, 2004-2005

Seminars

- Speaker, Physics/Astronomy Departmental Seminar. “Autonomous Map-Building for Underwater Robots” (Feb 2013)

SERVICE TO THE DEPARTMENT**Activities**

- Organized Review Sessions for Fundamentals of Engineering (Professional Engineering’s Licensing Exam) (2007-2011)
- Coordinated 5 year capital equipment plan for departmental computing (1999-present)
- Webmaster and primary author, departmental web pages (2007-2011)
- Coordinated webpage transition to CMS (Content Management System) (2011)

Committees

- Member, EE Search Committee (2009-2010, Tenure-Track)
- Member, Departmental Assessment Committee (2006-2011)

Seminars

- Taught Review Sessions for Fundamentals of Engineering (Professional Engineering’s Licensing Exam) (1999-present)

SERVICE TO THE PROFESSION**Professional Organizations**

- Chair, Computer Society, Central Texas Section, Institute of Electrical and Electronics Engineers (IEEE) (2008-2009, 2009-2010)

Reviewer

- IEEE/RSJ International Conf. on Intelligent Robots and Systems (IROS) (2014)
- Robotics (Open Access Journal) (2013)
- Journal of Intelligent and Robotic Systems (2014, 2013)

- IEEE Transactions on Education (2011,2012)
- IEEE Transactions on Robotics (2010)

Seminars

- Speaker, Southwest Research Institute, Technical Seminar Series, “Hand-Eye Calibration” (2012)
- Speaker, ARL:UT Advanced Sonar Division Technical Seminar Series, “Hand-Eye Calibration” (2012)

SERVICE TO THE COMMUNITY

Webmaster, Encino Park Homeowners Association (<http://www.encinoparkhoa.org>) (2008-2013)

Regular Blood and Platelet Donor

American Heritage Girls Troop 0138 Leadership

- Camping/Outdoors Chair (2013, 2014)
- Webmaster (2012)
- Created Inaugural Website (2012)

Assistant Scoutmaster, Boy Scout Troop 360 (1998-2005,2010-present)

- Adult Quartermaster (2013-2014)
- Trail to First Class Mentor (2012-2013)
- Life to Eagle Scout Mentor (2010-2012, 2014-present)
- IT Support Team (2011-present)

Cub Scout Pack 75 Leadership (2006-2012)

- Den Leader, Bulldogs Webelos Den (2010-2011, 2011-2012)
- Cubmaster (Pack Leader) (2008-2009, 2009-2010)