

Curriculum Vitae
ERIC R. BACHMANN

Department of Computer Science
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EDUCATION

Ph.D. Computer Science	Naval Postgraduate School	December 2000
M.S. Computer Science	Naval Postgraduate School	September 1995
B. A. Mathematics	University of Cincinnati	June 1983

PROFESSIONAL EXPERIENCE

Department Chair	Miami University	2020 - 2024
Professor	Miami University	2014 – Present
Outdoor Instructor	Miami University	2015 – Present
Associate Professor	Miami University	2001 – 2014
Research Assistant Professor	Naval Postgraduate School	2000 – 2022
Lecturer	Naval Postgraduate School	1997 – 2000
Naval Officer, Naval Aviator	U.S. Navy	1985 – 1997
Systems Analyst	RCA Missile Test Project	1984 – 1985

PROFESSIONAL ACTIVITIES

Miami University, Oxford, OH	2001 - Present
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*Department of Computer Science and Software Engineering (CSE)***Formal Administrative Service:**

Department Chair	2020 – 2024
University Promotion and Tenure Committee – member	2018 – 2020
CSE Promotion and Tenure Committee – chair	2015 – Present
CSE Graduate Director	2015 – Present
CSE Graduate Committee – chair	2015 – Present
CSE Undergraduate Committee – member	2014 – 2015
CSE Search Committee – chair and member	2013 – Present
LEAN Committee – University Degree Certification Process - member	2017
CEC Engineering Grand Challenge Scholars Committee – member	2016-2017
Alcohol Academic Support Work group	2015 – 2017
SEAS Research Committee – member	2002, 2010 – 2011, 2013
SEAS Executive Council – member	2013
University Senate – member	2009 - 2011
University Academic Policy Committee – member	2009 – 2011
Initiative to Create Digital Game Studies Minor – initiated and lead	2006
CSE Undergraduate Committee – chair and member	2004 – 2008
University Graduate Council – alternate	2007 – 2011

Notable Administrative Accomplishments:

As CSE Graduate Director:

- Developed RA and TA evaluation rubrics that were later adopted by the division
- Instituted “Research Methods” course to guide students through proposal process.
- Revised curriculum to be “thesis only” in order to support CSE research

As Chair CSE Undergraduate Committee:

- Revised undergraduate curriculum to include “success skills” to take students beyond technical competence
- Revised undergraduate curriculum to diversify programming language exposure

As leader of Initiative to Create Digital Game Studies Minor

- Initiated, and lead successful inter-disciplinary effort to create digital game studies minor

Researcher: Research in collaboration with colleagues in the departments of Computer Science and Software Engineering, Psychology, and Armstrong Institute for Interactive Media Studies, Naval Postgraduate School, and the Health Effects Laboratory Division (HELD) of NIOSH in Morgantown, West Virginia. Focus on creating low-cost portable virtual environments. Led research effort that resulted in the construction of the largest immersive virtual environment in the world. Work funded by Army Research Office (ARO) and the National Science Foundation (NSF).

Instructor: Develop course material for and teach undergraduate and graduate courses in programming, data communication and networking, computer graphics, game engine design and virtual environments. Specific courses are listed below.

Average Instructor Rating: 3.4 / 4.0

Average for all “Professor Evaluation” questions: 3.5 / 4.0

Outdoor Pursuit Center (OPC)

Outdoor Leader: Plan and lead adventure trips for student participants. Spring Break Backpacking Trip (2016, 2017, 2018, 2019, 2020, 2023), Fall Break Backpacking Trip (2016, 2017, 2018, 2019, 2022), Miami Bound (2019, 2024)

Instructor: Develop course material for and teach courses in beginning backpacking.

Naval Postgraduate School, Monterey, CA

1997 – Present

Department of Computer Science (CS)

Researcher: Research in the areas of graphics, networked virtual environments, robotics, and optimal filter design to achieve real time measurement of human body segment motion for immersive networked virtual reality and augmented reality applications. Work funded by Army Research Office (ARO) and the Navy Modeling and Simulation Office.

Instructor: Develop course material for and teach graduate level courses in algorithms, computer programming, computer graphics, and digital logic. Specific courses are listed below.

Average Instructor Rating: 4.3 / 5.0

Quality of course question average: 4.4 / 5.0

United States Navy

1985 – 1997

Highest Rank: Lieutenant Commander, USNR

Unrestricted Naval Aviator: (Wings August 1986) Aircraft flown: SH-60B, CH-53E, and SH-3G. Designated Aircraft Commander, Mission Commander, and Functional Check Pilot.

Naval Officer: (Commissioned July 1985) Major billets: Quality Assurance Officer, Line Division Officer, Assistant Administration Officer and Public Affairs Officer. Managed budgets up to \$500,000 and supervised up to 25 personnel. Responsible for the quality of maintenance on ten SH-60B aircraft.

RCA Missile Test Project, Patrick AFB, FL

1984 – 1985

Systems Analyst: Design, maintain and test real-time FORTRAN and Assembler software to control missile tracking radars on the Atlantic Missile Test Range.

Funded Grant Proposals

Totals:

Miami University as PI or Co-PI:	\$1,960,388
Naval Postgraduate School as PI or Co-PI:	\$1,634,627
Naval Postgraduate School Primary Grant Author:	\$318,381
 Total Reimbursable Research Funding:	 \$ 3,595,015

Individual Grants:

“Realistic Simulation of Slope and Vertical Navigation in Low Cost, Portable, Wearable Immersive Environment Systems for Education and Training,” NSF, Cyber-Human Systems (CHS) Program, Three Year Grant, \$364,116, FY 2014 - 2017, Principal Investigators: Eric Bachmann and Eric Hodgson.

“HCC: Medium: Collaborative Research: Low Cost, Portable, Multi-user, Immersive Virtual Environment Systems for Education and Training in Worlds of Unlimited Size,” National Science Foundation’ NSF, IIS- Human-Centered Computing, Four Year Grant 1.2 million (\$659,999, Miami University; \$540,000, Naval Postgraduate School), FY 2010, Principle Investigators: Eric Bachmann and Xiaoping Yun.

“Enabling Large-Scale Multi-User Immersive Virtual Reality Simulations,” Army Research Office (ARO) Defense University Research Instrumentation Program (DURIP) Equipment Grant, \$150,000, FY 2010, Principle Investigators: Eric Bachmann and David Waller.

“Enabling Large-Scale Multi-User Immersive Virtual Reality Simulations,” National Science Foundation’ NSF, CCF- Computing Infrastructure, \$312,672, FY 2010, Principle Investigators: Eric Bachmann and David Waller.

“Initial Development of Miami’s Interdisciplinary Center for Virtual Environment Research and Scholarship,” Armstrong Interactive Media Studies (AIMs), One-year grant for \$50,000, Principle Investigators: Eric Bachmann & David Waller.

- “Portable Virtual Environment for Training in Transit,” Navy Modeling and Simulation Office, One-year grant for \$70,000, FY 2009, Principal Investigators: Eric Bachmann, & Xiaoping Yun.
- “Realistic Simulation of Environments of Unlimited Size in Immersive Virtual Environments,” Army Research Office (ARO), Three-year grant for \$300,000, August 1, 2008 - January 31, 2011, Principal Investigators: Eric Bachmann and David Waller.
- “Sourceless Position Tracking Using Small Inertial/Magnetic Sensors,” Navy Modeling and Simulation Office, One-year grant for \$90,000, FY 2007, Principle Investigators: Eric Bachmann, & Xiaoping Yun.
- “Very Large Immersive Virtual Environment for Multiple Users Based on Wireless Full Body Posture and Position Tracking,” Defense University Research Instrumentation Program (DURIP) Equipment Grant, \$196,056, May 2005 – April 2006, Principal Investigator: Eric Bachmann, Co-Investigator: David Waller.
- “Implementation of a Very Large Immersive Virtual Environment (VLIVE),” Shoup Award, \$8,136, Summer 2005 - Spring 2006, Principal Investigator: Eric Bachmann, Co-Investigator: David Waller (Miami University Dept. of Psychology).
- “Inertial Motion Tracking for Inserting Humans into a Networked Synthetic Environment,” Army Research Office (ARO), Two-year grant for \$49,528, September 1, 2004 - August 31, 2005, Principle Investigator: Eric Bachmann.
- “The Role of a Simulated Body in Increasing Presence and Task Performance within Virtual Environments,” One-year grant for \$10,186, P&G Fellows in Interactive Media, Spring 04 – Fall 04, Principle Investigator: Eric Bachmann. Co-Investigators: Dr. Yvonne Lippa & Dr. David Waller.
- “Immersive Technologies,” Navy Modeling and Simulation Office, One-year grant for \$55,000, FY 2004, Principle Investigators: Eric Bachmann & Xiaoping Yun.
- “Hybrid Inertial Motion Tracking for Inserting Humans into Networked Synthetic Environments,” Navy Modeling and Simulation Office, One-year grant for \$60,000, FY 2003, Principle Investigators: Eric Bachmann & Xiaoping Yun.
- “Inertial Motion Tracking for Inserting Humans into a Networked Synthetic Environment,” Army Research Office (ARO), Three-year grant for \$358,996, September 1, 2002 - August 31, 2005, Principle Investigators: Eric Bachmann, Xiaoping Yun, & Michael Zyda.
- “Hybrid Inertial Motion Tracking for Inserting Humans into Networked Synthetic Environments,” Navy Modeling and Simulation Office, One-year grant for \$72,250, FY 2001, Principle Investigators: Eric Bachmann & Xiaoping Yun.
- “Inertial and Magnetic Posture Tracking for Inserting Humans into Networked Virtual Environments (Student Support),” One-year grant for \$9,695, P&G Fellows in Interactive Media, Fall 2001 – Spring 2002, Principle Investigator: Eric Bachmann.
- “Hybrid Inertial Motion Tracking for Inserting Humans into Networked Synthetic Environments,” Navy Modeling and Simulation Office, One-year grant for \$70,000, FY 2000, Principle Investigators: Eric Bachmann & Xiaoping Yun.
- “Inertial Motion Tracking for Inserting Humans into a Networked Synthetic Environment,” Army Research Office (ARO), Two-year grant for \$141,885, January 1, 1998 - December 31, 1999, Principle Investigators: Michael Zyda & Robert McGhee.

“Inertial Motion Tracking for Inserting Humans into a Networked Synthetic Environment,” Army Research Office (ARO), Two-year grant for \$176,496, January 1, 2000 - December 31, 2001, Principle Investigators: Michael Zyda & Xiaoping Yun.

PUBLICATIONS

Citations: 5432

h-index: 29

i10-index: 42

Student names are bolded in the following listings.

Peer-reviewed Journal Publications:

L.J. Smart, A. Drew, **T. Hadidon**, M. Teaford, and E. Bachmann, “Simulation and Virtual Reality Using Nonlinear Kinematic Parameters as a Means of Predicting Motion Sickness in Real-Time in Virtual Environments” *Human Factors*. December 2021.

<https://doi.org/10.1177/00187208211059623>

E. R. Bachmann, E. Hodgson, **C. Hoffbauer**, and **J. Messinger**, “Multi-User Redirected Walking and Resetting Using Artificial Potential Fields,” *IEEE transactions on visualization and computer graphics*, Vol. 25 No. 5, 2019, pp 2022-203. <https://doi.org/10.1109/tvcg.2019.2898764>

E Hodgson, E. R. Bachmann, **D. Vincent**, M. Zmuda, D. Waller, and J. Calusdian, “WeaVR: A Self-Contained and Wearable Immersive Virtual Environment Simulation System,” *Journal of Behavioral Research Methods, Instruments, and Computers*, April 2014. (2015 Psychonomic Society Best Article Award) <https://doi.org/10.3758/s13428-014-0463-1>

E. Hodgson, E. R. Bachmann, and **T. Thrash**, “Performance of Redirected Walking Algorithms in a Constrained Virtual World,” in press *IEEE Transactions on Computer Visualization and Computer Graphics*, Vol. 20, No. 4, 2014. <https://doi.org/10.1109/tvcg.2014.34>

M. A. Zmuda, **J. L. Wonser**, E. R. Bachmann, and E. Hodgson, “Optimizing Constrained-Environment Redirected Walking Instructions Using Search Techniques,” in press *IEEE Transactions on Computer Visualization and Computer Graphics*, Vol. 17, No. 11, 2013.

<https://doi.org/10.1109/tvcg.2013.88>

E. Hodgson and E. R. Bachmann, “Comparing Four Approaches to Generalized Redirected Walking: Simulation and Live User Data,” *IEEE Transactions on Computer Visualization and Computer Graphics*, Vol. 19, No. 4, 2013. <https://doi.org/10.1109/tvcg.2013.28>

X. Yun, J. Calusdian, and E. R. Bachmann, and R. McGhee, “Estimation of Human Foot Motion During Normal Walking Using Inertial and Magnetic Sensor Measurements,” *IEEE Transactions on Instrumentation and Measurement*, Vol. 61, No. 3, 2012, pp. 1-14.

<https://doi.org/10.1109/tim.2011.2179830>

E. Hodgson, E. Bachmann, and D. Waller, “Redirected Walking to Explore Virtual Environments: Assessing the Potential for Spatial Interference,” *ACM Transactions on Applied Perception*, Vol. 8 Issue 4, November 2011. <https://doi.org/10.1145/2043603.2043604>

X. Yun, E. R. Bachmann, and R. B. McGhee, “A Simplified Quaternion-based Algorithm for Orientation Estimation from Earth Gravity and Magnetic Field Measurements,” *IEEE Transactions on Instrumentation and Measurement*, Vol. 57, No. 3, 2008.

<https://doi.org/10.1109/tim.2007.911646>

D. Waller, E. R. Bachmann, **E Hodgson**, and A. C. Beall, “The HIVE: A Huge Immersive Virtual Environment for research in spatial cognition,” *Journal of Behavioral Research Methods, Instruments, and Computers*. Vol. 39, No. 4, November 2007, pp. 835-843.

<https://doi.org/10.3758/bf03192976>

E. R. Bachmann, X. Yun, A. Brumfield, Limitations of Attitude Estimation Algorithms for Inertial/Magnetic Sensor Modules, Vol. 14, No. 3, September 2007, pp. 76-87.

<https://doi.org/10.1109/MRA.2007.901320>

X. Yun, and E. R. Bachmann, "Design, Implementation, and Experimental Results of a Quaternion-Based Kalman Filter for Human Body Motion Tracking," *IEEE Transactions on Robotics*, Vol. 22, Issue 6, December 2006. <https://doi.org/DOI:10.1109/TRO.2006.886270>

E. R. Bachmann, and X. Yun, "A Single Parameter Tunable Quaternion Based Attitude Estimation Filter," *Journal Navigation*, Vol. 53, Issue 2, Fall 2006.

<https://doi.org/10.1002/j.2161-4296.2006.tb00377.x>

D. Waller and E. R. Bachmann, "The Borderline of Science: On the Value of Factor Analysis for Understanding Presence," *Presence: Teleoperators and Virtual Environments*, Vol. 15, Issue 2, April 2006. <https://doi.org/10.1162/pres.2006.15.2.235>

X. Yun, E. R. Bachmann, **S. Arslan**, **K. Akyol**, and R. B. McGhee, "An Inertial Navigation System for Small Autonomous Underwater Vehicles," *Advanced Robotics, VSP and Robotics Society of Japan*, Vol. 15, No. 5, 2001, pp. 521-532.

<https://doi.org/10.1163/156855301317033540>

X. Yun, E. R. Bachmann, R. B. McGhee, R. H. Whalen, **R. L. Roberts**, **R. G. Knapp**, A. J. Healey, and M. J. Zyda, "Testing and Evaluation of an Integrated GPS/INS System for Small AUV Navigation," *IEEE Journal of Oceanic Engineering*, Vol. 24, No. 3, July 1999, pp. 396-404.

<https://doi.org/10.1109/48.775301>

Referred Conference Proceedings:

J. Messinger, E. Hodgson, and E. R. Bachmann, Effects of Tracking Area Shape and Size on Artificial Potential Field Redirected Walking, *2019 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, March 2019. <https://doi.org/10.1109/vr.2019.8797818>

E. R. Bachmann, M. A. Zmuda, J. Calusdian, X. Yun, E. Hodgson, and D. Waller, "Going Anywhere Anywhere: Creating a Low Cost Portable Immersive VE System," *17th International Conference on Computer Games (CGAMES)*, Louisville, KY, 2012.

<https://doi.org/10.1109/cgames.2012.6314560>

E. R. Bachmann, J. Calusdian, E. Hodgson, and X. Yun, "In-Situ Heading Drift Correction for Human Position Tracking Using Foot-Mounted Inertial/Magnetic Sensors," *Proceedings of the IEEE International Conference on Robotics and Automation, ICRA 2012*, St. Paul, Minnesota, USA, May 2012. <https://doi.org/10.1109/icra.2012.6225007>

X. Yun, J. Calusdian, and E. R. Bachmann, "Adaptive-Gain Complementary Filter of Inertial and Magnetic Data for Orientation Estimation," *Proceedings of the IEEE International Conference on Robotics and Automation, ICRA 2011*, Shanghai, China, May 2011.

<https://doi.org/10.1109/icra.2011.5979957>

X. Yun, E. R. Bachmann, H. Moore, and J. Calusdian, "Self-contained Position Tracking of Human Movement Using Small Inertial/Magnetic Sensor Modules," *Proceedings of the IEEE International Conference on Robotics and Automation, ICRA 2007*, Rome, Italy, April 2007.

<https://doi.org/10.1109/robot.2007.363845>

B. J. Snow, P. Maynard-Zhang, and E. R. Bachmann, "A WiFi Based Personal Place Awareness System using Bayesian Learning," *Proceedings of the Midwest Artificial Intelligence and Cognitive Science Conference (MAICS-05)*, Dayton, Ohio, April 2005.

X. Yun, **C. Aparicio**, E. R. Bachmann, R. B. McGhee, "Implementation and Experimental Results of a Quaternion-Based Kalman Filter for Human Body Motion Tracking," *Proceedings of the IEEE International Conference on Robotics and Automation, ICRA 2005*, Barcelona, Spain, April 2005. <https://doi.org/10.1109/robot.2005.1570138>

X. Yun, E. R. Bachmann, **A. Kavousanos-Kavousanakis**, **F. Yildiz**, McGhee, R. B., "Design and Implementation of the MARG Human Body Motion Tracking System," *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 04)*, Sendai, Japan, September - October 2004. <https://doi.org/10.1109/iros.2004.1389422>

E. R. Bachmann, X. Yun, and **C. W. Peterson**, "An Investigation of the Effects of Magnetic Variations on Inertial/Magnetic Orientation Sensors," *Proceedings of the IEEE International Conference on Robotics and Automation, ICRA 2004*, New Orleans, Louisiana, April - May 2004. <https://doi.org/10.1109/robot.2004.1307974>

X. Yun, M. Lizarraga, E. R. Bachmann, and R. B. McGhee, "An Improved Quaternion-Based Kalman Filter for Real-Time Tracking of Rigid Body Orientation," *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 03)*, Las Vegas, Nevada, October 2003. <https://doi.org/10.1109/iros.2003.1248787>

E. R. Bachmann, X. Yun, and R. B. McGhee, "Sourceless Tracking of Human Posture Using Small Inertial/Magnetic Sensors," *Proceedings of the IEEE International Symposium on Computational Intelligence in Robotics & Automation (CIRA 03)*, Kobe, Japan, July 2003. <https://doi.org/10.1109/cira.2003.1222286>

E. R. Bachmann, , X. Yun, D. McKinney, R. B. McGhee and M. J. Zyda, "Design and Implementation of MARG Sensors for 3-DOF Orientation Measurement of Rigid Bodies," *Proceedings of the IEEE International Conference on Robotics and Automation, ICRA 2003*, Taipei, Taiwan, September 2003. <https://doi.org/10.1109/robot.2003.1241751>

E. R. Bachmann, R. B. McGhee, X. Yun and M. J. Zyda, "Inertial and Magnetic Posture Tracking for Inserting Humans into Networked Virtual Environments," *ACM Symposium on Virtual Reality Software and Technology, VRST 01*, Banff, Alberta, Canada, November 2001, pp. 9 – 16. <https://doi.org/10.1145/505009.505011>

J. L. Marins, X. Yun, E. R. Bachmann, R. B. McGhee, and M. J. Zyda, "An Extended Kalman Filter for Quaternion-Based Orientation Estimation Using MARG Sensors," *Proceedings of the 2001 IEEE/RSJ International Conference on Intelligent Robots and Systems(IROS 01)*, Maui, Hawaii, USA, Oct. 29 - Nov. 03, 2001, pp.2003-2011. <https://doi.org/DOI:10.1109/IROS.2001.976367>

X. Yun, E. R. Bachmann, and **S. Arslan**, "An Inertial Navigation System for Small Autonomous Underwater Vehicles," *Proceedings of 2000 IEEE International Conference on Robotics and Automation (ICRA 00)*, Vol. 24, April 2000, San Francisco, CA, pp. 1781 -1786. <https://doi.org/10.1109/robot.2000.844853>

E. R. Bachmann, **I. Duman**, **U. Usta**, R. B. McGhee, X. Yun, and M. J. Zyda, "Orientation tracking for Humans and Robots Using Inertial Sensors," *Proceeding of the IEEE International Symposium on Computational Intelligence in Robotics & Automation (CIRA 99)*, Monterey, CA, November 8-9 1999, pp.187-194. <https://doi.org/10.1109/cira.1999.810047>

X. Yun, **G. C. Hernandez**, E. R. Bachmann, R. B. McGhee, and A. J. Healey, "An Integrated GPS/INS Navigation System for Small AUVs Using an Asynchronous Kalman Filter,"

Proceedings of the 1998 Workshop on Autonomous Underwater Vehicles, August 20-21, 1998, Cambridge, MA, pp. 43-49. <https://doi.org/10.1109/auv.1998.744438>

X. Yun, E. R. Bachmann, R. B. McGhee, R. H. Whalen, **R. L. Roberts**, **R. G. Knapp**, A. J. Healey, and M. J. Zyda, "Testing and Evaluation of an Integrated GPS/INS System for Small AUV Navigation (SANS)," *Proceedings of the 10th International Symposium on Unmanned Untethered Submersible Technology (UUST)*, Durham, NH, September 1997, pp. 101-108.

E. R. Bachmann, R. B. McGhee, R. H. Whalen, **R. Steven**, **R. G. Walker**, J. R. Clynch, A. J. Healey, and X. Yun, "Evaluation of an Integrated GPS/INS System for Shallow-Water AUV Navigation (SANS)," *Proceedings of the 1996 IEEE Symposium on Autonomous Underwater Vehicle Technology, (AUV '96)*, Monterey, CA, June 3-6, 1996, pp. 268-275.
<https://doi.org/10.1109/auv.1996.532425>

R. B. McGhee, J. R. Clynch, A. J. Healey, S. H. Kwak, D. P. Brutzman, X. Yun, N. A. Norton, R. H. Whalen, E. R. Bachmann, D. L. Gay, and W. R. Schubert, "An Experimental Study of an Integrated GPS/INS System for Shallow-Water AUV Navigation (SANS)," *Proceedings of the 9th International Symposium on Unmanned Untethered Submersible Technology (UUST)*, Durham, NH, September 25-27, 1995, pp.153 - 167.

Referred Poster Papers:

E. R. Bachmann, **J. Holm**, M. A. Zmuda, and E. Hodgson Multi-User, "Collision Prediction and Prevention in a Simultaneous Two-User Immersive Virtual Environment," *IEEE Virtual Reality 2013*, Orlando, FL. March, 2013. <https://doi.org/10.1109/vr.2013.6549377>

M. A. Zmuda, E. R. Bachmann, E. Hodgson, and **J. Wonsler**, "Improved Resetting in Virtual Environments," *IEEE Virtual Reality 2013*, Orlando, FL. March, 2013.

E. Hodgson, E. R. Bachmann, D. Waller, **A. Bair**, and **A. Oberlin**, "Virtual Reality in the Wild: A Self-Contained and Wearable Simulation System," poster *IEEE Virtual Reality*, 2012, March, 2012. <https://doi.org/10.1109/vr.2012.6180929>

Invited Papers:

M. J. Zyda, D. P. Brutzman, R. Darken, R. B. McGhee, J. Falby, E. R. Bachmann, K. Watsen, B. Kavanaugh, and R. Storms, "NPSNET-Large-Scale Virtual Environment Technology Testbed," *Proceedings of the International Conference on Artificial Reality and Tele-Existence*, Tokyo, Japan, December 1997, pp. 18-26.

Patents

United States Patent: *Method and Apparatus for Motion Tracking of an Articulated Rigid Body*, Patent No.: US 7,089,148 B1, Date of Patent: August 8, 2006.

United States Patent: *Method and Apparatus for Motion Tracking of an Articulated Rigid Body*, Patent No.: US 6,820,025 B2 Date of Patent: November 16, 2004 (Licensed PNI 2011).

Selected Courses Taught

Miami University

CEC 101 *Computing, Engineering, and Society*
CSE 174 *Fundamentals of Programming and Problem Solving*
CSE 271 *Object-Oriented Programming*
CSE 251 *Introduction to Game Programming*

CSE 283 *Data Communications and Networks*
CSE 287 *Foundations of Computer Graphics*
CSE 386 *Introduction to Computer Graphics*
CSE 387 *Game Engine Design and Advanced Computer Graphics*
CSE 487 *Game Design and Implementation*
CSE 618 *Graphics for Simulation and Virtual Environments*
CSE 620V *Networked Virtual Environments*
KNH 150B *Beginning Backpacking*

Naval Postgraduate School

CS 2971 *Introduction to Programming with C++*
CS 3010 *Computer Systems Principles*
MV 3472 *Graphical Simulation of Physical Systems in Virtual Worlds*
CS 3650 *Design and Analysis of Algorithms*
CS 3773 *Java as a Second Language*
MV 4202 *Computer Graphics*
MV 4470 *Image Synthesis*

Thesis and Master's Research Projects Supervised

Miami University:

Justin F. Messinger, *Genetic Algorithm Optimization of Artificial Potential Field Redirected Walking*, Computer Science Master's Thesis, Miami University, Oxford, Ohio, August 2019.

Cole Hoffbauer, *Multi-User Redirected Walking And Resetting Utilizing Artificial Potential Fields*, Computer Science Master's Thesis, Miami University, Oxford, Ohio, August 2018.

Hawkar A. Oagaz, *An Investigation Of Measuring Energy And Power During Walking On Slopes Using Foot Mounted Inertial Magnetic Sensors*, Computer Science Master's Thesis, Miami University, Oxford, Ohio, August 2017.

Aaron J. Baker, *Immersive Virtual Environment Reorientation: Path Resetting Technique*, Computer Science Master's Research Project, Miami University, Oxford, Ohio, May 2016.

Tyler J. Hadidon, *An Optimized Algorithm for Prediction of Virtual Environment Motion Sickness Using Postural Sway*, Computer Science Master's Research Project, Miami University, Oxford, Ohio, May 2016.

Yan Yu, *Enhanced Immersive Virtual Environment Reorientation: Intelligent Imperceptible Alignment*, Computer Science Master's Research Project, Miami University, Oxford, Ohio, May, 2016.

Jeannette Holm, *Multi-user Redirected Walking Algorithms*, Computer Science Master's Thesis, Miami University, Oxford, Ohio, August 2012.

David Vincent, *Drift Reduction for Inertial/Magnetic Tracking Systems through the Use Of Range Aware Multidimensional Scaling*, Computer Science Master's Thesis, Miami University, Oxford, Ohio, May 2011.

Bradford J. Snow, *A Personal Place Awareness System*, Computer Science Master's Thesis, Miami University, Oxford, Ohio, May 2005.

Christopher Peterson, *An Investigation of the Effects of Magnetic Variations on Inertial/Magnetic Orientation Sensors*, Computer Science Master's Thesis, Miami University, Oxford, Ohio, December 2003.

Eric Montgomery, *Design and Implementation of Real-Time Software for Sourceless Full Body Tracking using Small Inertial/Magnetic Sensors*, Computer Science Master's Thesis, Miami University, Oxford, Ohio, May 2003.

Naval Postgraduate School:

Allen Dutton, *A Realistic Human Avatar for Inertial/Magnetic Body Tracking*, Master's in Modeling Virtual Environments and Simulation (MOVES), Naval Postgraduate School, Monterey, California, September 2001.

Pierre G. Hollis, *An Improved Magnetic, Angle Rate, Gravity, (MARG) Body Tracking System*, Thesis for Electrical Engineer's Degree, Naval Postgraduate School, Monterey, California, June 2000.

Joao L. Marins, *An Extended Kalman Filter for Quaternion-Based Attitude Estimation*, Thesis for Electrical Engineer's Degree, Naval Postgraduate School, Monterey, California, September 2000.

Suat Arslan, *Testing and Evaluation of the Small Autonomous Underwater Vehicle Navigation System (SANS)*, Electrical Engineering Master's Thesis, Naval Postgraduate School, Monterey, California, March 2000.

Ivan Chang Kok Ping, *High Level Architecture Performance Measurement*, Master's in Modeling Virtual Environments and Simulation (MOVES), Naval Postgraduate School, Monterey, California, March 2000.

George D. Greenway, *Design, Automated Communications Intercept Analysis, and Direction Finding System*, Computer Science Master's Thesis, Naval Postgraduate School, Monterey, California, September 1999.

Kadir Akyol, *Hardware Integration of the Small Autonomous Underwater Vehicle Navigation System (SANS) Using a PC/104 Computer*, Electrical Engineering Master's Thesis, Naval Postgraduate School, Monterey, California, March 1999.

Ildeniz Duman, *Design, Implementation, and Testing of a Real-Time Software System For a Quaternion Based Attitude Estimation Filter*, Master's Thesis, Computer Science Master's Thesis, Naval Postgraduate School, Monterey, California, March 1999.

Glenn C. Hernandez, *An Integrated INS/GPS Navigation System for Small AUVs Using an Asynchronous Kalman Filter*, Electrical Engineering Master's Thesis, Naval Postgraduate School, Monterey, California, June 1998.

Randall G. Knapp, *Calibration and Evaluation of Water Speed Indicator and Compass for the Small Autonomous Underwater Vehicle Navigation Filter*, Electrical Engineering Master's Thesis, Naval Postgraduate School, Monterey, California, December 1997.

Ricky L. Roberts, *Analysis, Experimental Evaluation, and Software Upgrade for Attitude Estimation by the Shallow-Water AUV Navigation System (SANS)*, Computer Science Master's Thesis, Naval Postgraduate School, Monterey, California, March 1997.

Rudiger Steven, *Simulation-Based Validation of Navigation Filter Software for a Shallow Water AUV Navigation System (SANS)*, Computer Science Master's Thesis, Naval Postgraduate School, Monterey, California, March 1996.

Awards

Nominated College of Engineering and Computing Teaching Excellence Award	2016
Behavior Research Methods Journal Article of the Year	2015

	E. R. Bachmann
Nominated Best Paper IEEE Virtual Reality	2013
School of Engineering and Applied Science Research Award	2009
Navy Achievement Medal	1997
Navy Achievement Medal	1992
Navy Achievement Medal	1989

Additional Activities

Ohio Certified Volunteer Naturalist	2024-present
Butler County Advocate for Sexual Assault Victims	2010 – 2012
Butler County Community Crisis Center Suicide Prevention Hotline	2010 – 2012
Auction volunteer, Three Valley Conservation Trust	2005 and 2006
WMUB Public Radio Pledge Drive Volunteer	Spring 2002
Citizens for Talawanda Schools Committee	Fall 2002