# Dr. R James Duckworth

**Professor Emeritus**
Department of Electrical and Computer Engineering
Worcester Polytechnic Institute, 100 Institute Road,
Worcester MA 01609

## *Education*

University of Nottingham, England.
Ph.D. in the Department of Electrical and Electronic Engineering (1984). Thesis title: "Parallel Computation on a Multi-Stream Data Flow Machine".
University of Bradford, England.
Four year thin sandwich degree course in Electrical and Electronic Engineering. Obtained 2:1 Hons BEng (1981).

## *Employment*

**Professor Emeritus,** Electrical and Computer Engineering Department, Worcester Polytechnic Institute, July 2021- present
**Associate Professor**, Electrical and Computer Engineering Department, Worcester Polytechnic Institute, July 1991 – June 2021
**Assistant Professor**, Electrical Engineering Department, Worcester Polytechnic Institute, January 1987.
**Lecturer**, Computer Science Department, University of Nottingham, September 1984 to December 1986.
**Engineer**, Plessey Office Systems Ltd, Nottingham, August 1974 to August 1984.

Holds secret clearance

## *Teaching Experience*

Prior to joining WPI in 1987 Dr. Duckworth was a lecturer in the Computer Science Department at the University of Nottingham in England. He developed and taught courses and laboratories in the areas of Digital Logic, Microprocessor Systems, and Computer Networks.

At WPI he has taught undergraduate and graduate courses in the electrical and computer engineering area. He has developed new course and laboratory material for many courses including:

- Advanced Logic Circuits
- Introduction to VLSI
- Microprocessor System Design
- Modeling and synthesis of digital system using Verilog and VHDL
- VHDL for Modeling and Synthesis



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- Computer System Design
- Multi-processor and Distributed Systems
- Advanced Computer System Design
- Advanced Digital System Design using FPGAs

He also developed a textbook called "Workview Office Student Edition - schematic entry and digital analysis" which is published by Prentice Hall. This book has been used by many schools in their digital logic and circuit classes.

Dr. Duckworth has developed a short course titled "VHDL for Digital Design Synthesis". He has taught this course many times to engineers at companies in Massachusetts.
He also developed and taught a new short course: "Practical Debugging of Systems under Test".

### *Funded Grants and Awards Received*

1. "Sensor fusion of inertial tracking with vision sensing", Bosch Corporation, $62,085, December 2016
2. "Three-Dimensional Modeling to Support Indoor Location – Real-Time Image Capture Systems – Phase 3", Astrium Services, $110,000, October 2014 (with Cyganski).
3. "Three-Dimensional Modeling to Support Indoor Location – Real-Time Image Capture Systems – Phase 2", Astrium Services, $105,9121, September 2012 (with Cyganski).
4. "Precision Indoor Personnel Location and Tracking for Emergency Responders", DHS S&T, $20,000, September 2012 (with Cyganski).
5. "Improving Firefighter Health and Safety with Uninterrupted Real-Time Personal Sensors", FEMA AFG FP&S, $998,124, August 2012 (with Cyganski and Notarianni).
6. "Development and Support of WPI August 2012 Workshop", UCLA, $50,000, July 2012 (with Cyganski).
7. "Three-Dimensional Modeling to Support Indoor Location – Real-Time Image Capture Systems, Astrium Services, $109,410, August 2011 (with Cyganski).
8. "Development and Support of August 2011 Workshop- "Precision Indoor Personnel Location and Tracking for Emergency Responders", CSE, $50,000, September 2010 (with Cyganski)
9. Search and Rescue Prototype Systems (Mantenna), Honeywell, $118,081, September 2010 (with Cyganski)
10. Integration of WPI PPL and Honeywell Navigator Architecture: Phase I - Concept development and capability demonstration, Honeywell, $50,000, May 2010 (with Cyganski)
11. "Independent Analysis of Location Tracking Systems for First Responders via Focused Groups and Communities of Practice", CSE, $135,000, January 2010 (with Cyganski).
12. "Fire-Ground Environment Sensor Monitoring", FEMA AFG FP&S, $1,000,000, August 2009 (with Cyganski and Notarianni).



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13. “Precision Personnel Location (PPL)”, CSE, $50,000, January 2009 (with Cyganski).
14. “Micro-Beacon Tracking of Autonomous Systems (MTAS)”, Honeywell, $401,984 (with Cyganski), October 2008.
15. “Testing and Evaluation of First Responder Indoor Location Technology”, NSRDEC, $433,879 (with Cyganski), September 2008.
16. “Microlight Indoor Positioning Performance Evaluation”, Raytheon, $100,000 (with Cyganski), June 2008.
17. “Real-Time Troop Physiological Status Monitoring Systems Using a Common Wireless Network”, USAMRMC, $1,007,985 (with Pedersen, Michalson, Mendelson & McGimpsey), April and June 2008.
18. “Integrated Firefighter Locator and Physiological Monitoring”, DHS FEMA, $999,303 (with Cyganski and Makarov), August 2007.
19. “Real-Time Troop Physiological Status Monitoring Systems Using a Common Wireless Network”, USAMRMC, $875,000 (with Pedersen, Michalson, Mendelson & McGimpsey), August 2007.
20. “Real-Time Troop Physiological Status Monitoring Systems Using a Common Wireless Network”, USAMRMC, $3,225,000 (with Pedersen, Michalson, Mendelson & McGimpsey), December 2005.
21. "Precision Indoor/Outdoor Personnel Location System III," from the Department of Justice, for $1,973,286 (with Orr, Makarov, Cyganski, and Michalson) October 2005.
22. "Development and Testing of Wireless Wearable Ultrasound Scanner," USAMRMC, $178,957. (with Pedersen) October 2005.
23. “Real-Time Troop Physiological Status Monitoring Systems Using a Common Wireless Network”, USAMRMC, $1,245,000 (with Pedersen, Michalson, Mendelson & McGimpsey), January 2005.
24. Donation of FPGA development boards and software from Xilinx, $20,000, various dates
25. “Industrial Wireless Sensors”, *Adaptive Instruments*, $20,000, September 2002.
26. Sponsored MQP, *Adaptive Instruments*, $5,000, May 2003.
27. Donation of Xilinx XACT software and FPGA development systems, $150,000, September 1996.
28. "Laboratory Equipment for Microkernel based Embedded Systems”, *NSF Instrumentation and Laboratory Improvement Grant*, $23,055 (with Michalson), March 1995.
29. “Microcontroller Based Tripping System”, Satin American Corp. and Protective Technologies, $45,000, November 1994
30. Donation of Viewlogic EDA software tools, *Viewlogic Systems, Inc*., $4.9 million, (with Michalson), 1993.
31. Donation of Altera EPLD development systems, *Altera Corp*, $170,000, January 1993.
32. "Developing New ECE Freshman Courses", *Educational Development Council*, $14,591 (with Eggimann), April 1992.
33. "Improving Autonomous Fault Detection and Isolation Using Neural Networks" *Federal Aviation Administration*, $45,211 (with Enge and Michalson)

34. "Introducing Parallel Processing Concepts using Transputer Systems*", NSF Instrumentation and Laboratory Improvement Grant*, $74,746 (with Rotithor), March 1992.
35. "Shell for Knowledge Representations into Ada with Maintenance", *Real Time Intelligent Systems Company*, $18,000, September 1991.
36. Donation of Stratus Fault Tolerant System 30 and associated software, *Stratus Corporation*, $103,000 (with John Orr), October 1991.
37. "Knowledge Representation into Ada Methodology with Validation and Verification [KRAM 2-2]", *NASA and Air Force*, $143,400 (with Becker), Jan 1991.
38. "Design of a 16-bit ISA Bus Interface Card", *Robec Distributors*, $26,066, June 1990.
39. "Knowledge Representation into Ada Methodology with Validation and Verification [KRAM 2-1]", *NASA and Air Force*, $96,000 (with Becker), April 1990.
40. "Review and Design of the Bus Interface Card", *Robec Distributors*, $24,906, October 1989.
41. "Satin Distinguished Fellow Award", $18,000, April 1989.
42. "Review and Design of the Bus Interface Card", *Robec Distributors*, $18,000, January 1989.
43. "Validation and Verification of Expert Systems", *NASA and Air Force*, $171,000 (with Becker and Green), January 1989.
44. "Transputer Development System", *Inmos Corporation*, $11,000, donation of equipment and software, August 1988.
45. Donation from the *Raytheon Company* for $21,000 to support MQPs and research in the Intelligent Machines Laboratory (with Peter Green), January 1988.
46. "Evidence Based Scheduling for Real-Time Distributed Computer Systems", (with Green), *National Science Foundation*, $30,000, November 1, 1987.
47. "Developing an Activation Framework for a Parallel Computer". *Research Development Council*, Worcester Polytechnic Institute, $4,437, November 1987.

### *Publications and Presentations*

1. "Detection and Resolution of Motion Conflict in Visual Inertial Odometry". ICRA 2018: (with Babu, Cyganski, Kim) 2018
2. "Transactional Array Reconciliation Tomography for Precision Indoor Location". IEEE Trans. Aerospace and Electronic Systems 50(1): 17-32 (2014) (with Amendolare, Cyganski) 2014
3. "Gyroscope assisted scalable visual simultaneous localization and mapping" In Proc. of UPINLBS 2014 (with Babu, Cyganski) 2014
4. "Transactional Array Reconciliation Tomography for Precision Indoor Location" IEEE Transactions on Aerospace and Electronic Systems (with Amendolare and Cyganski) – January 2014.
5. "Indoor navigation for first responders" by Duckworth and Cyganski, AccessScience, McGraw-Hill Education, LLC, 2013.
6. "Tutorial – Urban Indoor Navigation", Institute of Navigation, Joint Navigation Conference 2013, Colorado Springs, Colorado, June 2013.

7. "Precision Personnel Locator: Inverse Synthetic Aperture Array Reconciliation Tomography" by Cavanaugh, Lowe, Cyganski, and Duckworth, ION/IEEE Position Location and Navigation Symposium (PLANS) 2012, Myrtle Beach, SC, June 2012.
8. "Tutorial - Urban and Indoor Navigation", ION GNSS, Portland, Oregon, September 2011.
9. "Location and Tracking for First Responders", invited Plenary Session speaker, TCIP 2011 (Technologies for Critical Incident Preparedness) National Harbor, Maryland, August 2011.
10. "Integrated First Responder Location and Physiological Monitoring", invited speaker, Body Area Network Technology and Applications, Worcester, MA, June 2011
11. "Tutorial – Urban Indoor Navigation", Institute of Navigation, Joint Navigation Conference 2011, Colorado Springs, Colorado, June 2011.
12. "WPI Precision Personnel Locator System - Inertial Filtering for Improved Positioning Accuracy in Challenging RF Environments" by Lowe, Cavanaugh, Cyganski, Duckworth, Joint Navigation Conference 2011, Colorado Springs, Colorado, June 2011.
13. "A New Bidirectional Transaction Approach to Improve Precision Location in Indoor Environments", by Cavanaugh, Lowe, Cyganski, and Duckworth, *Institute of Navigation, International Technical Meeting*, San Diego, California, January 2011.
14. "Indoor Location and Tracking Systems for First Responders", Invited speaker at *Institute of Navigation, New England Section*, Boston, MA, October 2010
15. "Fireground Environment Sensor Monitor System", by Duckworth, Cyganski, Notarianni, *Annual AFG R&D Meeting*, Chicago, Illinois, August 2010
16. "PPL System", by Duckworth, Cyganski, *Interflam 2010*, Nottingham, England, July 2010
17. "Tutorial – Urban Indoor Navigation" by Duckworth. *Institute of Navigation, Joint Navigation Conference 2010*, Orlando, Florida, California, June 2010.
18. "WPI Precision Personnel Location System: New RF Location Algorithms for Improved Precision Location in High Multipath Indoor Environments" by Amendolare, Cyganski, Duckworth, *Joint Navigation Conference*, Orlando, Florida, June 2010.
19. "Location and Tracking for First Responders", invited Plenary Session speaker, *Institute of Navigation, International Technical Meeting*, San Diego, CA, January 2010.
20. "WPI Precision Personnel Locator System – Rapid Deployment Antenna System and Supporting Algorithms for 3D Precision Location", by Cavanaugh, Lowe, Cyganski, and Duckworth, *Institute of Navigation, International Technical Meeting*, San Diego California, January 2010.
21. "Micro-Beacon Tracking of Autonomous Systems (MTAS)" by Cyganski, Duckworth, Baughman. *Institute of Navigation, GNC Challenges for Miniature Autonomous Systems Workshop*, Fort Walton Beach, Florida, October 2009.
22. "Tutorial – Urban Indoor Navigation" by Duckworth. *Institute of Navigation, Joint Navigation Conference 2009*, Orlando, Florida, California, June 2009.
23. "WPI Precision Personnel Location System: Synchronization of Wireless Transceiver Units" by Amendolare, Cyganski, Duckworth, *Joint Navigation Conference*, Orlando, Florida, June 2009.

24. "WPI Precision Personnel Locator System: Antenna Geometry Estimation Using a Robust Multilateralization Technique." by Woodacre, Cyganski, Duckworth. *Institute of Navigation, International Technical Meeting*, Anaheim, California, January 2009.
25. "WPI Precision Personnel Location System: Inertial Navigation Supplementation", by Amendolare, Cyganski, Duckworth, et al. *Position Location and Navigation Symposium (PLANS)* 2008, Monterey, California, May 2008.
26. Session Chair, *Position Location and Navigation Symposium (PLANS)* 2008, Monterey, California, May 2008.
27. "WPI Precision Personnel Locator System", by Duckworth, Cyganski, et al. *Joint Navigation Conference*, Las Vegas, Nevada, March 2008.
28. "FPGA-Based Co-Processor for Singular Value Array Reconciliation Tomography", by Coyne, Cyganski, Duckworth. *The 16th Annual IEEE Symposium on Field Programmable Custom Computing Machines*, Palo Alto, CA, April 2008.
29. "WPI Precision Personnel Locator System – Automatic Geometry Location Estimation", by Woodacre, Cyganski, Duckworth, et al. *ION National Technical Meeting, session on Indoor Navigation,* San Diego, January 2008.
30. "WPI Precision Personnel Locator System – evaluation by first responders", by Duckworth, Cyganski, et al. *The 20th International Technical Meeting of the Institute of Navigation Satellite Division*, Fort Worth, TX, September 2007.
31. "WPI Precision Personnel Locator System - Indoor Location Demonstrations and RF Design Improvements." by Cyganski, Duckworth, et al., *Institute of Navigation, 63rd Annual Meeting*, Cambridge, MA, April 2007.
32. "WPI Precision Personnel Locator System", by Duckworth, Cyganski, et al. *Joint Navigation Conference*, Orlando, Florida, April 2007.
33. "WPI Precision Personnel Locator System", by Duckworth, Cyganski, et al. *ION-NTM 2007*, San Diego, January 2007.
34. A Wearable Reflectance Pulse Oximeter for Remote Physiological Monitoring," by Mendelson, Duckworth, Comtois. *IEEE Engineering in Medicine and Biology Society, 28th Annual International Conference*, New York NY, Aug 2006.
35. "Clinical evaluation of wearable ultrasound imaging system", by Duckworth, Pedersen, *ATA 2006, Annual Conference*, San Diego, May 2006.
36. "Field Testing of a Wireless Wearable Reflectance Pulse Oximeter", by Duckworth, Mendelson, *ATA 2006, Annual Conference*, San Diego, May 2006.
37. "Tutorial Introduction to VHDL and FPGAs", by Duckworth, *Modern FPGAs: Technology, Tools and Applications*" Woburn, MA. November 2005.
38. "2D Radio Navigation System Using MC-UWB," by J. Coyne, R.J. Duckworth, W. R. Michalson and H.K.Parikh, *Proc. Royal Institute of Navigation NAV 2005*, Church House, London, Nov 1-3, 2005.
39. "MC-UWB Precise Positioning System - Field Tests, Results and Effect of Multipath," by H.K. Parikh, R.J. Duckworth and W. R. Michalson, *Proc. Institute of Navigation GNSS 2005*, Long Beach Convention Center, Long Beach, CA, September 13-16, 2005.
40. "Embedded System Design with FPGAs using HDLS", by Duckworth, *MSE 05*, Anaheim, June 2005.
41. "Display of Field Deployable Ultrasound Imaging System" by Duckworth, Poulsen, *ATA 2005, Tenth annual meeting and exposition*, Denver, April 2005.

42. “Display of Wearable Ultrasound System”, by Duckworth and Pedersen, *World’s Best Technologies Showcase 2005*, Arlington, Texas, March 2005.
43. “Radio Design and Performance Analysis of Multi Carrier-Ultrawideband (MC-UWB) Positioning System” by Duckworth, Parikh, Michalson, *ION GNSS 2005*, California, January 2005.
44. “Performance Evaluation of the RF Receiver for Precision Positioning System” by Parikh, Michalson, Duckworth, *ION GNSS 2004*, California, September 2004.
45. Display of Field Deployable Ultrasound Imaging System, Duckworth, Looft, Poulsen, *Mid-Year Technology Demonstration and Focused Roundtable Panel Discussion*, Capitol Hill Steering Committee on Telehealth and Healthcare Informatics, Dirksen Office Building, June 2004.
46. “Field Deployable Ultrasound Imaging System” by Pedersen, Duckworth, Sebastian, Poulsen, *ATA 2004, Ninth annual meeting and exposition*, Florida, May 2004.
47. “Workview Office Student Edition - Schematic Entry and Digital Analysis” by R. James Duckworth, Prentice Hall, 1997.
48. “Determining update latency bounds in Galactica Net” by S. Clayton, R.J. Duckworth, W. Michalson and A. Wilson, *Concurrency: Practice and Experience*, Volume 6 Number 7, October 1994 pp. 595-611.
49. “Rapid prototyping in the curriculum” editorial by R. James Duckworth*, Engineering Science and Education Journal*, Volume 3, Number 5, October 1994.
50. "Introducing Parallel Processing Concepts Using the Maspar MP-1 Computer" by R James Duckworth, *SIGCSE '94 technical Symposium*, Phoenix, AZ, March 1994.
51. "Evaluation of the Microgravity Ignition Experiment prepared for the GASCAN II Project", by Duckworth, Motevalli, Smith, Johnson, and Parker, *NASA/USRA Conference*, Austin, TX, 1993.
52. "Introduction to VHDL" presented at a two-day course "An Introduction to VHDL" at IEE, London, August 1993.
53. "Determining Update Latency Bounds in Galactica Net" by Clayton, Duckworth, Michalson, and Wilson. *First International Symposium on High Performance Distributed Computing*, Syracuse, NY, September 1992.
54. "A New Basic Program in Electrical and Computer Engineering" by Nicoletti, Cyganski, Demetry, Duckworth, Eggimann, and Grogan. *The Freshman Year Experience, Science and Technological Education Conference*, Worcester, MA, June 1992.
55. A Software Tool for Developing Distributed Networked Real-Time Artificial Intelligence Applications" by Green, Becker, Duckworth. *1992 International Phoenix Conference on Computers and Communications*, pp 372-378, Scottsdale, AZ, March 1992.
56. "Content Addressable and Associative Memory" by Larry Chisvin and R James Duckworth, in *Advances in Computers* by Academic Press, edited by Marshall C. Yovits, Vol 34, 1992, pp 159-235.
57. "The Development of Intelligent Real-Time Systems Using Ada and the Activation Framework" by Duckworth, Lavallee, Michalson, Becker, and Green. *12th IEEE Real-Time System Symposium*, San Antonio, TX, December 1991.
58. "Performance Testing of Real-Time AI Systems Using the Activation Framework" by Becker, Duckworth, Laznovsky and Green. *Workshop on Methodologies, Tools and*

*Standards for Cost-Effective, Reliable Software Verification and Validation*, Chicago, IL, August 1991.
59. "Detecting and Locating Failures in Communication Networks" by Weigeng Shi and R James Duckworth. *Journal of Computer Science and Technology*, Vol 5, No 3, 1990, pp 275-288.
60. "The PAD (Pen and Display) - a Demonstrator for the Electronic Paper Project" by Colin Higgins and R James Duckworth, *Computer Processing of Handwriting by World Scientific Publishing*, edited by R. Plamondon and C. G. Leedham, 1990, pp 111-131.
61. "Content and Associative Memory: Alternatives to the Ubiquitous RAM" by Larry Chisvin and R James Duckworth. *IEEE Computer*, Vol 22, No 7, July 1989, pp 51-63.
62. "Evaluating the Transputer using the Jigsaw Puzzle" by R James Duckworth and Andrew R Michaud. *Second NATUG Conference*, Durham, NC, October 1989.
63. "An Interactive I/O Interface for the Electronic Paper Project" by R James Duckworth and Colin Higgins. *International Electronic Imaging Exposition and Conference*, Boston, MA, October 1989.
64. "Validation and Verification of Expert Systems Using Evidence Flow Graphs" by Becker, Green, Duckworth and Bhatnagar. *AIAA Computers in Aerospace VI Conference*, Monterey, CA, October 1989.
65. "The PAD (Pen and Display) - a Demonstrator for the Electronic Paper Project" by C A Higgins and R James Duckworth. *14th International Graphonomics Society Conference on Development of Graphic Skills*, Trondheim, Norway, July 1989.
66. "Evidence Flow Graphs for VV&T" by Becker, Green, Duckworth, Bhatnagar, Pease. *Workshop on Verification, Validation and Testing of Knowledge Based Systems*, June 1989.
67. "The Mobile Robot Project" by R James Duckworth. *ASEE 66th Annual Fall Conference*, University of Hartford, October 1988.
68. "A Knowledge Based Scheduling Mechanism" by Duckworth, Green and Michalson. *Fifth Workshop on Real-Time Software and Operating Systems*, May 1988.
69. "Using the Macintosh on a UNIX network" by H.T. Smith, W. Armitage and R.J. Duckworth. *BYTE*, July 1987 Vol 12 No 8, pp 159-166
70. "Integrating AppleTalk Workstations into a UNIX Network Environment" H.T. Smith, W. Armitage and R.J. Duckworth. *EUUG Conference Proceedings*, University of Manchester, UK, September 1986 pp 239-255.
71. "The MUSE Machine - an Architecture for Structured Data Flow Computation" by David Brailsford and R James Duckworth. *New Generation Computing*, Vol. 3 No 2 - May 1985 pp 181 - 195.

**Consulting**

Dr Duckworth has over forty years experience in the electrical and computer engineering profession working in academia and industry. During a leave of absence from WPI, he served as VP Engineering for two local companies, designing a new line of wireless based industrial sensors.

While at WPI, Dr. Duckworth has worked as a computer consultant for many companies. This consulting has ranged from designing, building, and programming a variety of computer-based equipment, serving as an expert witness on a number of cases involving copyright and patent infringement and software piracy, and teaching training courses.

He created a company in 2007 (with Professor Mendelson of the BME department of WPI) to design and manufacture battery powered, wireless pulse-ox devices, for military and first responder use.

Duckworth works as a consultant for a manufacturer of Satellite Navigation (GPS and other GNSS systems) simulators. He holds a secret clearance and works on FPGA designs for classified and non-classified GPS signals.

**Patents**

1. "Locating and ranging using coherent array reconciliation tomography" (with Koski, Cyganski) Patent #10,061,012 issued August 2018

2. "Gyroscope assisted scalable visual simultaneous localization and mapping" (with Babu, Cyganski) Patent #9,846,042 issued August 2017

3. "Precision location method and system" (with Amendolare, Cyganski) Patent #9,658,309 issued May 2017

4. "Search and rescue method and system" (with Cyganski) Patent #9,476,963 issued October 2016

5. "Enhanced RF location methods and systems" (with Cyganski) Patent #9,274,208 issued March 2016

6. "Reconfigurable Wireless Ultrasound Diagnostic System." (with Pedersen and Cordeiro). Patent #8,221,324 issued July 2012

7. "Methods and Apparatus for High Resolution Positioning" Patent #7292189 (with Cyganski, Orr, Michalson) issued November 2007

8. "Low power infrared communication system" Patent #6091530 issued July 2000.

**Memberships and Offices held in Professional Society**

- Senior member of the Institute of Electrical and Electronic Engineers (IEEE)
- Fellow and Chartered Member of the British Computer Society (BCS)
- Member of the Institute of Electrical Engineers (IEE)
- Member of the Institute of Navigation (ION).
- Chartered Engineer of the Engineering Council of England

**Editorial and Referee Services**

Dr. Duckworth has served as a reviewer for the following conferences, journals, and books:

- IEEE Transactions on Education
- IEEE Transactions on Computers
- International Conference on Parallel Processing
- IEEE Computer Journal.
- Frontiers of Massively Parallel Computation Symposium
- IEEE Transactions on Parallel and Distributed Systems
- IEEE Transactions on Communications

- DEC technical Journal
- IEE Engineering Science and Education Journal.
- IEEE Parallel and Distributed Technology
- *Computers as Components* by Wayne Wolf, Morgan Kaufmann Publishers
- *Wireless Positioning - Technologies and Applications* by Alan Bensky, Artech House (published 2008)
- *Wireless Distant Measurement and Location Technologies* by Alan Bensky, Artech House
- Served on FEMA review panel for Assistance to Firefighter Grants, January 2008, March 2009, December 2009, March 2011, and 2013

**Other**

- KEEN Fellow, August 2011
- Joseph Samuel Satin Distinguished Fellow 1990
- Our prototype location and tracking technology is featured in the Smithsonian Air and Space Museum "Time and Navigation" exhibit that opened in 2013
- Also in 2013 our work was described in a IEEE Spectrum article "How New Indoor Navigation Systems Will Protect Emergency Responders" by Mark Harris
- 2012 State Fire Marshal's Award for 'pioneering research and significant contributions made to the Fire Service' (with Cyganski, Notarianni and Orr)

- Duckworth was the main organizer for the 2nd, 3rd, 4th, 5th, 6th and 7th Annual Workshop "Precision Indoor Personnel Location and Tracking for Emergency Responders" August 2007, 2008, 2009, 2010, 2011, and 2012 at WPI.