

## **SELECTED PUBLICATIONS AND PRESENTATIONS**

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### **Books and Book Chapters:**

**Darrah, M.** (2006). Book Chapter: Neural Network Visualization Techniques. *Methods and Procedures for the Verification and Validation of Artificial Neural Networks*. Brian J. Taylor (editor). Springer.

**Darrah, M.** and Taylor, B. (2006). Book Chapter: Rule Extraction as a Formal Method. *Methods and Procedures for the Verification and Validation of Artificial Neural Networks*. Brian J. Taylor (editor). Springer.

Pullum, L., Taylor, B. and **Darrah, M.** (2007). *Guidance for the Verification and Validation of Neural Networks*. Wiley.

**Darrah, M.**, Fuller, E. and Squire, D. (2009) *Introduction to Calculus Labs*. Kendall/Hunt. ISBN-978-1-4652-0447-9 (Calculus Lab Website)

**Darrah, M.** and Dowling, A. (2010) Chapter 5: Preparing the Next Generation of Innovators through Collaboration. *Collaborative Technologies and Applications for Interactive Information Design: Emerging Trends in User Experiences*. Ed. Scott Rumler and Kwong Bor Ng. IGI Publishing:Hershey NY, 2010. 67-81.

**Darrah, M.** and Taylor, Brian. (2011) Chapter 5: Rule Extraction to Understand Changes in an Adaptive System in *Adaptive Control Approach for Software Quality Improvement* (W. Eric Wong and Bojan Cukic editors) World Scientific. 115-144.

### **Peer Reviewed Journal Articles:**

**Darrah, M.**, Liu, Y.P, and Zhang, C.Q. (1997). Cycles of All Lengths in Arc-3-cyclic Semicomplete Digraphs. *Discrete Mathematics*, 173(1-3), 23-33.

Skias, S., **Darrah, M.** and Webb, M. (2002) Improvement of Hubble Space Telescope subsystem through data mining. *Data Mining III*. WIT Press, Southampton, Boston.

Parker, C., Stylinski, C., **Darrah M.**, McAuliffe, C., Gupta, P. and Akbayin, B. (2010). Innovative uses of IT applications in STEM classrooms: A preliminary review of ITEST teacher professional development. *Journal of Technology and Teacher Education*, 18(2), 203-230. Chesapeake, VA: AACE.

**Darrah, M.**, Fuller, E. and Miller, D. (2010). A Comparative Study of Partial Credit Assessment and Computer-Based Testing for Mathematics. *Journal of Computers in Mathematics and Science Teaching*, 29(4), 373-398. Chesapeake, VA: AACE.

**Darrah, M.** (2012). The Use of Touch Technology in Science to Provide Access for Students who are Visually Impaired. *Journal of Technology Integration*, 4(1), 45-50.

**Darrah, M.**, Fuller, E., Munasinghe, T., Duling, K., Gautam, M. and Wathen, M. (2013). Using Genetic Algorithms for Tasking Teams of Raven UAVs. *Journal of Intelligent & Robotic Systems*, 70(1-4), 361-371. *Online First*, 20 July 2012.

Finstein, J., **Darrah, M.** and Humbert, R. (2013). Do Students in General High School Physics Classes Learn as Much from Virtual Labs as from Hands-On Labs? *National Teacher Education Journal*, 6(3), 61-70.

**Darrah, M.** (2013). Computer Haptics, A New Way of Increasing Access and Understanding of Math and Science for Students Who are Blind and Visually Impaired. *Journal of Blindness Innovation and Research*, 3(2). DOI: <http://dx.doi.org/10.5241/3-47>

**Darrah, M.**, Houglund, J. and Prince, B. (2014). Salary, space, and satisfaction: an examination of gender differences in the sciences. *Research in Higher Education Journal*, (23), 4-37.

Zhao, P., **Darrah, M.**, Nolan, J. and Zhang, C.Q. (2014). Analyses of Crime Patterns in NIBRS Data Based on a Novel Graph Theory Clustering Method: Virginia as a Case Study. *The Scientific World Journal*, vol. 2014, Article ID 492461. doi:10.1155/2014/492461

**Darrah, M.**, Humbert R., Finstein, J., Simon, M., and Hopkins, J. (2014). Are Virtual Labs as Effective as Hands-on Labs for Undergraduate Physics? A Comparative Study at Two Major Universities. *Journal of Science Education and Technology*, 23(6), 803-814. doi: 10.1007/s10956-014-9513-9

**Darrah, M.**, Wilhelm, J., Munasinghe, T., Duling, K., Sorton, E., Yokum, S., Wathen, M. and Rojas J. (2015) A Flexible Genetic Algorithm System for Multi UAV Surveillance: Algorithm and Flight Testing. *Unmanned Systems*, (3)1, 1-14. doi: 10.1142/S2301385015500041

Murphy, K. and **Darrah, M.** (2015). Haptics-based Apps for Middle School Students with Visual Impairments. *IEEE Transactions on Haptics*, 8(3), 318-326. doi: 10.1109/TOH.2015.2401832

Hansen, E. G., Liu, L., Rogat, A., Hakkinen, M. T. and **Darrah, M.** (2016) Designing Innovative Science Assessments That Are Accessible for Students Who Are Blind. *Journal of Blindness Innovation and Research*, 6(1).

Akiyama Y., Nolan, J., **Darrah, M.**, Abdal Rahem, M., and Wang, L. (2016) A Method for Measuring Consensus Within Groups: An Index of Disagreement Via Conditional Probability. *Information Sciences*, 345, pp. 116-128.

Fuller, E., Deshler, J., and Darrah M. (2016). Effects of an External Mentoring Program in a Department of Mathematics. *International Journal of Gender, Science and Technology*, 8(2) pp. 300-309.

### **Editor Reviewed Articles**

Pullum, L., **Darrah, M.**, and Taylor, B. (2004). Independent Verification and Validation of Neural Networks – Developing Practitioner Assistance. *Software Tech Newsletter*. 2004.

**Darrah, M.** (2013). eTouchSciences Apps, A New Way to Interact with Math and Science Content. *Future Reflections*, 32(3).

### **Peer Reviewed Conference Proceedings:**

Van Scoy, F., Kawai, T., **Darrah, M.** and Rash, C. (2000). Haptics Display of Mathematical Functions for Teaching Mathematics to Students with Vision Disabilities: Design and Proof of Concept. In *Proceedings of Workshop on Haptic Human-Computer Interaction*.

Taylor, B. and **Darrah, M.** (2003). Verification and Validation of Neural Networks: A Sampling of Research in Progress. In *Proceedings of AeroSense*, Orlando, FL, April 2003.

Witt, K., Giorcelli, R., **Darrah, M.**, Ives, B. and Peak, R. (2004) DEVISE: A Collaborative Virtual Environment for Integrated Concurrent Engineering. In *Proceeding of the 2004 International Symposium on Collaborative Technologies and Systems*.

**Darrah, M.** and Taylor, B. Rule Extraction from Dynamic Cell Structure Neural Network used in a Safety Critical Application. In *Proceedings of Florida Artificial Intelligence Research Symposium*, Miami, FL, May 2004.

Taylor, B. and **Darrah, M.** (2003). Verification and Validation of Neural Networks: A Sampling of Research in Progress. In *Proceedings of AeroSense*, Orlando, FL, April, 2003.

**Darrah, M.**, Taylor, B. and Skias, S. (2004). Rule Extraction from Dynamic Cell Structure Neural Network used in a Safety Critical Application. In *Proceedings of Florida Artificial Intelligence Research Symposium*, Miami, FL, May, 2004.

Pullum, L., **Darrah, M.**, Skias, S., Tso, K.S. and Tai, A.T. (2004). Developing a Data Driven Prognostic System with Limited System Information. In *Proceedings of the Eighth IEEE International Symposium on High Assurance Systems Engineering (HASE)*, Tampa, FL, March 25-26, 2004.

Taylor, B., **Darrah, M.** and Skias, S. (2004). Weaving it All Together: A Methodology for the V&V of Adaptive Systems. In *Proceedings of NIPS Workshop on Verification, Validation, and Testing of Learning Systems*, Whistler, B.C., December 2004.

**Darrah, M.**, Taylor, B. and Livingston, R. (2005). A Geometric Rule Extraction Approach used for V&V of a Safety Critical Application.” In *Proceedings of Florida Artificial Intelligence Research Symposium*, Miami, FL, May, 2005.

**Darrah, M.**, Niland, W. and Stolarik, B. (2005). Multiple UAV Dynamic Task Allocation using Mixed Integer Linear Programming in a SEAD Mission. In *Proceedings of the AIAA Infotech@Aerospace Conference*, Alexandria, VA, AIAA 2005-7164, September 2005.

**Darrah, M.**, Niland, W., Stolarik, B. and Walp, L. (2006). UAV Cooperative Task Assignments for a SEAD Mission using Genetic Algorithms. In *Proceedings of Guidance, Navigation and Control Conference*, Keystone, CO, August 2006.

**Darrah, M.** and Humbert, R. (2007) Information Technology Diffusion and Career Awareness in Middle and High School Science and Mathematics Classrooms. In *Proceedings of Society for Information Technology Education Conference*, San Antonio, Texas, March 2007.

**Darrah, M.** and Niland, W. (2007). Increasing UAV Task Assignment Performance through Parallelized Genetic Algorithms. In *Proceedings of Infotech@Aerospace Conference, Rohnert Park, California*, May 2007.

**Darrah, M.**, Van Scoy, F. and Plunkett, P. (2007). Enabling Collaboration in High Performance Computing. In *Proceedings of ACM Special Interest Group for Information Technology Education*, Destin, FL, October 2007.

**Darrah, M.**, Giorcelli, R., Dodson, T. and Blake, A. (2007). A Comprehensive Program for Expanding Pathways to IT Careers. In *Proceedings of ACM Special Interest Group for Information Technology Education*, Destin, FL, October 2007.

**Darrah, M.** and Tisdal, C. (2008). Advancing Content Through Interactive Virtual Environments. In *proceeding of Society for Information Technology and Teacher Education Conference*, Las Vegas, Nevada, March 3-7 2008.

Parker, C., Styliniski, C., **Darrah, M.**, Gupta, P., Akbayin, B. and McAuliffe, C. (2008). Information Technology Experience for Students and Teachers: Professional Development Models and Teacher Change Processes. In *Proceedings of Society for Information Technology and Teacher Education Conference*, Las Vegas Nevada, March 3-7 2008.

**Darrah, M.** and Blake, A. (2009). Providing Real World Experiences for High School Teachers and Students. In *Proceedings of Society for Information Technology and Teacher Education Conference*, Charleston, SC, March 2-6, 2009.

**Darrah, M.**, Pullum, L., Beck Roth, S., Gilkerson, B. and Taipale, E. (2009). Using Genetic Algorithms for Robust Tasking of Multiple UAVs with Diverse Sensors. In *Proceedings of AIAA Infotech@Aerospace Conference*, Seattle, WA, April 6-9, 2009.

**Darrah, M.**, Fuller, E. and Squire D. (2010). Using Online Context-based Labs to Motivate Students in an Introduction to Calculus Course. In *Proceedings of EdMedia Conference*, June 28 - July 2, 2010, Toronto, CA.

**Darrah, M.**, Fuller, E. and Miller, D. (2010). A Comparative Study of Partial Credit Assessment and Computer-based Testing. In *Proceedings of EdMedia Conference*, June 28

- July 2, 2010, Toronto, CA.

Humbert, R., **Darrah, M.** and Finstein, J. (2010). Applying a Heuristic Approach to Developing a User Interface for College-Level Virtual Physics Labs. In *Proceedings of EdMedia Conference*, June 28 - July 2, 2010, Toronto, CA.

Giorcelli, R. , Lee, C.P and **Darrah, M.** (2010). Finding an Answer to the Enrollment Crisis in Computing: An ExpEDITE Project Case Study. In *Proceedings of Decision Science Institute 2010 Annual Meeting*, November 20-23, 2010, San Diego, CA.

**Darrah, M.**, Fuller, E., Munasinghe, T. Duling, K., Gautam, M. and Wathen, M. (2012). Using Genetic Algorithms for Tasking Teams of Raven UAVs. In *Proceedings of 2012 International Conference on Unmanned Aircraft Systems (ICUAS'12)*. June 12-15, Philadelphia, PA.

**Darrah, M.**, Murphy, K., Speranski, K. and DeRoos, B. (2014). Framework for K-12 Education Haptic Applications. In *Proceedings of IEEE Haptics Symposium 2014*. Houston, TX, February 23-26, 2014.

Fuller, E., Deshler, J. and **Darrah, M.** (2014). Mentoring Women Faculty in STEM Academic Departments. In *Proceedings of University of New Mexico 2014 Annual Mentoring Conference*, Albuquerque, NM, October 21- 24, 2014.

**Darrah, M.**, Aviles, W., Murphy, K., and Speransky, K. (2015) Computer Haptic Effects in Math and Science Lessons Support Student Learning. *Proceedings of International Conference on Education and Access for Persons with Visual Impairments*, Athens, Greece February 12-14, 2015.

Mera Trujillo, M., Duling, K., **Darrah, M.**, Fuller, E. and Wathen, M. (2015) Fitness Function Changes to Improve Performance in a GA Used for Multi-UAV Tasking. *Proceedings of Workshop on Research, Education and Development of Unmanned Aerial Systems*. Cancun, Mexico, November 23-25, 2015.

### **Posters and Presentations:**

**Darrah, M.**, Peduto, D. and Humbert, R. (2006). Using 21st Century Tools to Motivate Students to Study Math and Science and Enter IT Careers. Presented at the *West Virginia State Technology Conference*, Charleston, WV, August 2006.

**Darrah, M.**, Harris, P. and Roy, S. (2006). A Multi-Modal Learning Environment for the Study of Earth and Space Science for the Inclusion of All Students. Presented at *West Virginia State Technology Conference*, Charleston WV, August 2006.

**Darrah, M.**, Girocelli, R. and Chenoweth, T. (2006). Expanding Pathways to Careers in Information Technology: A Project Connecting Academia to Industry Needs. Presented at the *West Virginia State Technology Conference*, Charleston, WV, Aug. 2006.

**Darrah, M.,** Peduto, D., Blake, A. and Calloway, C. (2007). Using 3-D Graphics to Enhance Student Learning. Poster presentation at *National Education Computing Conference (NECC)*, Atlanta, GA, June 2007.

**Darrah, M.,** Peduto, D., Blake, A. and Calloway, C. (2007) Motivating K-12 Students towards Careers in Information Technology. Poster presentation at *National Education Computing Conference (NECC)*, Atlanta, GA, June 2007.

**Darrah, M.** Promising Teaching Practices for Working with Students with Disabilities. Invited Symposium. *Society for Information Technology and Teacher Education (SITE) Conference*. Las Vegas, Nevada, March 3-7, 2008.

**Darrah, M.** (2008). The ITEST Experience: Combining Cutting Edge Technology and Pedagogy for Teacher Professional Development. *Society for Information Technology and Teacher Education (SITE) Conference*. Las Vegas, Nevada, March 3-7, 2008.

**Darrah, M.** (2008). Emerging Technology as a Vehicle for Teacher Change. *NSF Information Technology Experiences for Student and Teachers Principal Investigators Summit*. Arlington, VA, Feb. 5-7, 2008.

Parker, C., Stylinski, C., **Darrah, M.,** Gupta, P., Akbayin, B. and McAuliffe, C. (2008). Emerging Technology as a Vehicle for Teacher Change: Frameworks and Assessment Strategies. *American Education Research Association (AERA) Conference*. New York, NY, March 24-28, 2008.

Miller, D., Fuller, E. and **Darrah, M.** (2009). Comparing Partial-credit Graded Examinations and the End of Semester Bonus Quiz for Computerized Examination. *Presentation at ICTCM 2009 International Conference on Technology in Collegiate Mathematics*, New Orleans, LA, March 12-15, 2009.

**Darrah, M.** and Humbert, R. (2010). Preparing Students for Algebra I: A Comprehensive Approach that is Paying High Dividends. *Presented at Math Science Partnership Regional Conference*, New Orleans, LA, March 29-31, 2010.

**Darrah, M.** (2012). Touch Technology for Exploring Science. Presentation at *27<sup>th</sup> Annual International Technology & Persons with Disabilities Conference*, San Diego, CA, Feb. 27 – Mar. 3, 2012.

**Darrah, M.,** Hougland, J. and Prince, B. (2013). Salary, Space, and Satisfaction: An Examination of Gender Differences in the Sciences. *Association for Applied and Clinical Sociology Conference 2013*, Portland, OR, October 3 – 5, 2013.

Latimer, M., Dilks, L., Jackson, K., **Darrah, M.** and Hougland, J. (2014). Small Steps toward Big Change: Strategies for Changing a University's Climate. *Association for Applied and Clinical Sociology Conference 2014*, Pittsburgh, PA, October 9 – 11, 2014.

**Darrah, M.** (2014) Using Technology to Give Students What They Need. Invited Kick-off Keynote presentation at the West Virginia Higher Education Technology Conference.

Conference Theme: Innovate to Educate. Morgantown, WV, October 27-28, 2014. (was a presenter)

**Darrah, M.** and Hougland J. (2014) Salary, Space and Satisfaction: An Examination of Gender Issues in STEM. Webinar Presentaion to the ADVANCE Implementation Mentors Network. September 9, 2014. (was a presenter)

**Darrah, M.** (2015) Overview of Competency Based Education. *West Virginia Higher Education Technology Conference, Morgantown, WV, October 26-27, 2015.* (was a Presenter)

Engelke, N., **Darrah, M.** and Murphy, K. (2016) A framework for examining the 2-D and 3-D spatial skills needed for calculus. *In Proceedings of Research in Undergraduate Mathematics Education.* Pittsburgh, PA, February 25-27, 2016.

Fuller, E., Deshler, J., **Darrah, M.**, Mera Trujillo, M., and Wu, X. Anxiety and Personality Factors Influencing the Completion Rates of Developmental Mathematics Students. *INDRUM 2016: First conference of the International Network for Didactic Research in University Mathematics.* March 31 – April 2, 2016, Montpillier, France.

#### **Technical Reports:**

“Toward Reliable Neural Network Software for the Development of Methodologies for Independent Verification and Validation of Neural Networks.” IVVNN-LITREV-F001-UNCLASS-111202. November 2002.

“Concept of Operations: Design Environment Using Virtual Interfaces for Smart Engineering (DEVISE) for the demonstration of Augmented Distributed Virtual Integrated Concurrent Engineering (ADVICE)” GISSTR-CONOPS-D001-UNCLASS-033103. 2003.

“Introduction to Development of Methodologies for Independent Verification and Validation of Neural Networks.” IVVNN-INT-F001-UNCLASS-021403. January 2003.

“Library and Architecture for Implementing Data Driven Prognostics: Phase I Final Report.” Kam S. Tso, Ann T. Tai, Laura Pullum, Marjorie Darrah, Spiro Skias. STTR Topic: MDA03T-001. Contract Number: N00174-03-C-0057. 2004.

“A Formal Method for Verification and Validation of Neural Network High Assurance Systems: Final Report.” Marjorie Darrah, Brian Taylor, Spiro Skias, Dan McCaugherty, Rhett Livingston. STTR: NASA Ames. Contract Number: NNA04AA20C. 2004.

“Robust Cooperative Control: Final Report.” Marjorie Darrah, Stephanie Beck Roth, Beau Gilkerson, Laura Pullum, and Eric Taipale. Lockheed Martin, December 15, 2008.