

Thomas L. Martin

<http://www.faculty.ece.vt.edu/tlmartin/>

Education:

- 8/1992-8/1999 **Carnegie Mellon University** **GPA: 4.0/4.0**
Carnegie Institute of Technology, Pittsburgh, Pennsylvania
M.S. in Electrical and Computer Engineering, December 1994.
Ph.D. in Electrical and Computer Engineering, August 1999.
Advisor: Dr. Daniel P. Siewiorek
Ph.D. dissertation title: *Balancing Batteries, Performance, and Power: System Issues in CPU Speed-Setting for Mobile Computing*
- 9/1987-6/1992 **University of Cincinnati** **GPA: 3.9/4.0**
College of Engineering, Cincinnati, Ohio
B. S. in Electrical Engineering, with optional minor in VLSI Systems Engineering, June 1992.

Employment:

- 2019-present Deputy Executive Director, Virginia Tech Institute for Creativity, Arts, and Technology
2018-present Courtesy faculty appointment, Department of Engineering Education, Virginia Tech
2015-2019 Associate Director, Virginia Tech Institute for Creativity, Arts, and Technology
2013-present Professor, Department of Electrical and Computer Engineering, Virginia Tech.
2013-2015 Senior Fellow, Virginia Tech Institute for Creativity, Arts, and Technology
2013-present Courtesy faculty appointment, Department of Computer Science, Virginia Tech
2012-present Courtesy faculty appointment, School of Architecture + Design, Virginia Tech.
2006-2013 Associate Professor, Department of Electrical and Computer Engineering, Virginia Tech.
2001-2006 Assistant Professor, Department of Electrical and Computer Engineering, Virginia Tech.
1999-2001 Assistant Professor, Department of Electrical and Computer Engineering, The University of Alabama in Huntsville.

Honors/Awards:

Virginia Tech:

- Virginia Tech Alumni Teaching Award, 2017.
- Virginia Tech College of Engineering Pete White Award for Innovation in Engineering Education, 2014.
- Virginia Tech XCaliber Award (team), 2014. This university award is for using technology in education; Professor Paola Zellner-Bassett and I were selected for collaborating in her Textile Space course.
- Best Paper Award for 2012, IEEE Transactions on Automation Science and Engineering, August 2013.
- First place (tie), Charles W. Steger Design Competition, May 2012, for an interactive architectural textile concept developed with Professor Paola Zellner-Bassett from the VT architecture program.
- Virginia Tech XCaliber Award (team), 2012. This university award is for using technology in education; the award was given to the faculty team from the interdisciplinary design course.
- Virginia Tech Diggs Teaching Scholar, February 2011. This award is a university teaching award for my work on an undergraduate interdisciplinary design course; I was one of two faculty selected in 2011.
- Selected for the National Academy of Engineering Frontiers of Engineering Education symposium to present our findings from the interdisciplinary design course, November 2011.
- A student team from my interdisciplinary product design course won the medical category of the Virginia Tech Entrepreneur Club's VT \$5K executive summary competition, December 2010.
- National Science Foundation Presidential Early Career Award for Scientists and Engineers (PECASE), 2006.
- College of Engineering Dean's Award for Excellence in Teaching Innovation, April 2004.
- College of Engineering Certificate of Teaching Excellence, April 2004.

Carnegie Mellon University:

- National Science Foundation Graduate Research Fellowship, 1993-1996.
- National Science Foundation Engineering Education Scholar, 1995.

External Sponsored Research

1. T. Martin (PI), "STTR Phase II-E: Integrated Sensors for the Evaluation of Structural Integrity of Inflatable Habitats," subcontract from NanoSonic for NASA STTR Topic T12.03. Award Date: 12/20/2019. Duration: 2 years. \$180K.
2. T. Martin (PI) and M. Jones, "SCH: INT: Collaborative Research: Smart Wearable Systems to Support and Measure Movement in Children With and Without Mobility Impairments," National Science Foundation. Award date: 10/1/2017. Duration: 4 years. Amount: \$395,356. (Collaborative grant with Lucy Dunne at U. of Minnesota and Michele Lobo at U. of Delaware. Total amount: \$1.5M.)
3. T. Martin (PI) and M. Jones, "STTR Phase II: Integrated Sensors for the Evaluation of Structural Integrity of Inflatable Habitats," subcontract to NanoSonic, Inc. for NASA STTR Topic T12.03, Award Date: 9/25/2017: Duration: 2 years. Amount: \$180K.
4. T. Martin (PI), Ideation Session with Steelcase, Award date: 5/2017. Duration: 1 month. Amount: \$16,965,
5. T. Martin (PI), Ideation Session with Cambrian Design and Development for DuPont. Award date: 10/17/2017. Duration: 1 month. Amount: \$4,568.
6. C. Williams (PI) and T. Martin (co-PI), Ideation Session with Anonymous Corp., Award date: 2/1/2017. Duration: 6 months. Amount: \$11,715.
7. L. Lester (PI), B. Knapp, L. McNair, T. Martin, and M. Wisnioski, "IUSE/PFE: RED: Radically Expanding Pathways in the Professional Formation of Engineers," National Science Foundation. Award Date: 7/15/2016. Duration: 5 years. Amount: \$2M.
8. T. Martin (PI) and M. Jones, "STTR Phase I: Integrated Sensors for the Evaluation of Structural Integrity of Inflatable Habitats," subcontract to NanoSonic, Inc. for NASA STTR Topic T12.03, Award Date: 6/9/2016: Duration: 1 year. Amount: \$35K.
9. J. Provo (PI), B. Knapp, D. Maggard, T. Martin, and E. Tranter, "CatalyzeVT," U.S. Economic Development Administration. Award Date: 2/1/2016. Duration: 3 years. Amount: \$500K.
10. T. Martin, "I-Corps Storycoding Team," National Science Foundation. Award Date: 4/1/2015. Duration: 15 months. Amount: \$50K.
11. T. Martin (PI), L. McNair, M. Paretti, "A Longitudinal Study of the Dimensions of Disciplinary Culture to Enhance Innovation and Retention among Engineering Students," National Science Foundation. Award date: 9/1/2013. Duration: 4 years. Amount: \$436K.
12. Darrell Bowman (PI), T. Martin, "An Innovative "Intelligent" Awareness System for Work Zone Workers Using Dedicated Short-Range Communications," Connected Vehicle/Infrastructure University Transportation Center. Award date: 9/3/2012. Duration: 2 years. Amount: \$150K.
13. T. Martin (PI), M. Jones, L. Dunne (U. of Minnesota), "SHB: Small: Collaborative: Electronic Textiles for Ambulatory Health Monitoring," National Science Foundation. Award date: 9/15/2011. Duration: 4 years. Amount: \$498K (VT portion: \$306K).
14. F. Quek (PI), T. Martin, C. North, T. Smith-Jackson, D. Bowman, D. Gracanin, and M. Evans, "II-EN: Device and Display Ecologies," National Science Foundation. Award date: 2/1/2011. Duration: 3 years. Amount: \$600K.
15. L. McNair (PI), E. Coupey, E. Dorsa, R. Kemnitzer, T. Martin, M. Paretti, D. Young-Corbett. "Building New Engineering Education Theory and Practice for Interdisciplinary Pervasive Computing Design," National Science Foundation. Award date: 9/1/2009. Duration: 4 years. Amount: \$396K.
16. M. Jones (PI) and T. Martin, "RECE", DARPA (subcontract from BBN). Awarded: 5/2009. Duration: 6 months. Amount: \$30K.
17. M. Jones (PI) and T. Martin, "Investigating a Novel Embedded Processor Architecture for Electronic Textiles in Wearable and Pervasive Computing," National Science Foundation. Award date: 9/1/2008. Duration: 3 years. Amount: \$220K.
 - a. A Research Experience for Undergraduates supplement of \$16K was awarded to this project in 6/2009.
 - b. A Research Experience for Undergraduates supplement of \$16K was awarded to this project in 6/2010.
18. T. Martin, P. Athanas, and M. Jones, "SBIR Phase I: Wearable Computer for Enhanced Situational Awareness," subcontract from Luna Innovations. Sponsor: U.S. Air Force. Award date: 6/15/2006. Duration: 7 months. Amount: \$30K.
19. T. Martin (PI) and M. Jones, "CRI: Electronic Textiles for Wearable and Pervasive Computing," National Science Foundation Computing Research Infrastructure program, grant number CNS-0454195. Award date: 7/15/2005. Duration: 2 years. Amount: \$85K. (Acceptance rate: 12-15%)

20. T. Martin, "CAREER: E-Textile-based Wearable Computing for Sensing User Motions," National Science Foundation, grant number CNS-0447741. Award date: 6/1/2005. Duration: 5 years. Amount: \$400K. (This project was selected for the Presidential Early Career Award for Scientists and Engineers.)
 - a. A Research Experience for Undergraduates supplement of \$12K was awarded to this project in 6/2006.
 - b. A Research Experience for Undergraduates supplement of \$12K was awarded to this project in 5/2007.
 - c. A Research Experience for Undergraduates supplement of \$16K was awarded to this project in 6/2009.
21. T. Lockhart (PI), T. Martin, and M. Jones, "SBIR Phase I: An Electronic Textile System for Gait Analysis," subcontract from Virginia Electronic Textile Systems, LLC. Sponsor: National Science Foundation. Award date: 1/1/2005. Duration: 6 months. Amount: \$33K.
22. T. Martin (PI) and M. Jones, "ITR: Tailor-Made: Design of e-Textile Architectures for Wearable Computing," National Science Foundation Information Technology Research program, grant number CCR-0219809. Award date: 9/1/2002. Duration: 3 years. Amount: \$399K. (*Acceptance rate: 15%*)
 - a. A Research Experience for Undergraduates supplement of \$10K was awarded to this project in 7/2003.
 - b. A Research Experience for Undergraduates supplement of \$6K was awarded to this project in 5/2004.
 - c. A Research Experience for Undergraduates supplement of \$12K was awarded to this project in 5/2005.
23. T. Martin (PI), D. Ha, and M. Hsiao, "ITR: Architecture for Surviving Denial-of-Service Attacks on Battery-Powered Mobile Computers," National Science Foundation Information Technology Research program, grant number ANI-0219801. Award date: 9/15/2002. Duration: 3 years. Amount: \$412K. (*Acceptance rate: 15%*)
 - a. A Research Experience for Undergraduates supplement of \$32K was awarded to this project in 6/2003.

Exhibitions:

1. Three pieces (e-textile jumpsuit, boot controller for space jetpack, and flexible space suit cuff checklist) were selected for the "Sense and Sensuality" exhibition on wearable technology at the Arts, Design, and Media (ADM) Gallery at Nanyang Technological University, Singapore, October 24-November 8, 2014, <https://blogs.ntu.edu.sg/wearables/ss/>.

Publications:

Books:

1. M. Morris Mano, Charles R. Kime, and Tom Martin, *Logic and Computer Design Fundamentals, Fifth Edition*, Pearson/Prentice Hall, Upper Saddle River, New Jersey, March 2015.

Book Chapters:

1. R. Younes, K. Hines, J. Forsyth, J. Dennis, T. Martin, and M. Jones, "The design of smart garments for motion capture and activity classification," Chapter 27 in *Smart Textiles and Their Applications*, V. Koncar (editor), Woodhead Publishing, Duxford, UK, 2016, pp. 627-655.
2. T. Smith-Jackson, W. Winchester, Al Lisle, W. Holbach, H. Brackett, and T. Martin, "Accessible Emergency Management: A Human Factors Engineering Approach," in *Handbook of Emergency Response: A Human Factors and Systems Engineering Approach*, A. Badiru, L. Racz (editors), CRC Press, Boca Raton, FL, 2013, pp. 251-273.
3. C. Bowen, I. Burbey, and T. Martin, "Protecting Privacy in Location-Based Applications," Chapter 9 in *Location Based Services Handbook: Applications, Technologies, and Security*, S. Ahson and M. Ilyas, eds., CRC Press, Boca Raton, FL, 2010, pp. 207-232.
4. M.T. Jones and T.L. Martin, "Hardware and Software Architectures for Electronic Textiles," Chapter 6 in *Smart Clothing: Technology and Applications*, G. Cho, ed., CRC Press, Boca Raton, FL, 2010, pp. 135-151.
5. T. Martin, D. Siewiorek, A. Smailagic, and J. Warren, "Power Management for Mobile Computers," Chapter 30, *Mobile Computing Handbook*, I. Mahgoub and M. Ilyas, eds., CRC Press, Boca Raton, FL, 2005, pp. 709-730.

Journal Publications:

1. R. Younes, M. Jones, T. Martin, "Classifier for Activities with Variations," *Sensors*, vol. 18, no. 10, 19 pages, <https://doi.org/10.3390/s18103529>, October 2018.
2. M. Blake, R. Younes, J. Dennis, T. Martin, M. Jones, "A User-independent and Sensor Tolerant Wearable Activity Classifier," *IEEE Computer*, vol. 48, no. 10, pp. 64-71, October 2015.

3. J. Forsyth, T. Martin, D. Young-Corbett, E. Dorsa, "Feasibility of Intelligent Monitoring of Construction Workers for Carbon Monoxide Poisoning, *IEEE Transactions on Automation Science and Engineering*, vol. 9, no. 3, pp. 505-515, July 2012. (Received the Best Paper Award for 2012)
4. T. Martin, K. Kim, J. Forsyth, L. McNair, E. Coupey, and E. Dorsa, "Discipline-based Instruction to Promote Interdisciplinary Design of Wearable and Pervasive Computing Products," *Personal and Ubiquitous Computing*, <http://dx.doi.org/10.1007/s00779-011-0492-z>, December 2011. Print version: Volume 17, Issue 3, pp. 465-478, 2013.
5. Z. Nakad, M. Jones, T. Martin, and W. Fawaz, "Networking in E-textiles," *Computer Communications*, vol. 33, issue 6, pp. 655-666, April 2010.
6. J. Liu, T. Lockhart, M. Jones, T. Martin, and C. Einsmann, "Local Dynamic Stability Assessment of Motion Impaired Elderly using Electronic Textile Pants," *IEEE Transactions on Automation Science and Engineering*, vol. 5, no. 4, pp. 696-702, October 2008.
7. Z. Nakad, M. Jones, T. Martin and R. Shenoy, "Using Electronic Textiles to Implement an Acoustic Beamforming Array: A Case Study," *Pervasive and Mobile Computing*, vol. 3, issue 5, pp. 581-606, October 2007.
8. M. Chandra, M. Jones, and T. Martin, "E-Textiles for Autonomous Location Awareness," *IEEE Transactions on Mobile Computing*, vol. 6, issue 4, pp. 367-380, April 2007.
9. D. Raskovic, T. Martin, and E. Jovanov, "Medical Monitoring Applications for Wearable Computing," *Computer Journal*, vol. 47, issue 4, pp. 495-504, July 2004.
10. D. Marculescu, R. Marculescu, N. Zamora, P. Stanley-Marbell, P. K. Khosla, S. Park, S. Jayaraman, S. Jung, C. Lauterbach, W. Weber, T. Kirstein, D. Cottet, J. Grzyb, G. Tröster, M. Jones, T. Martin, Z. Nakad, "Electronic Textiles: A Platform for Pervasive Computing," *Proceedings of the IEEE*, volume 91, number 12, pp. 1995-2018, December 2003.
11. T. Martin, D. Siewiorek, A. Smailagic, M. Bosworth, M. Ettus, and J. Warren, "A Case Study of a System Level Approach to Power-Aware Computing," *ACM Transactions on Embedded Computing Systems*, volume 2, issue 3, pp. 255-276, August 2003.
12. T. Martin and D. Siewiorek, "Non-ideal Battery Behavior and Its Impact on Software Design for Wearable Computers," *IEEE Transactions on Computers*, pp. 979-984, August 2003.
13. T. Martin and D. Siewiorek, "Non-ideal Battery and Main Memory Effects on CPU Speed-Setting for Low Power," *IEEE Transactions on Very Large Scale Integrated Systems*, vol. 9, no. 1, pp. 29-34, February 2001.

Refereed Conference/Workshop Publications:

1. Reeping, D., Ozkan, D., McNair, L., Martin, T. (2020). Stirring up a Special Sauce: Marrying Electrical and Computer Engineering with Threshold Concepts for ECE 101. Proceedings of FIE (Frontiers in Education) Conference, 2020. Uppsala, Sweden. (virtual due to COVID)
2. Reeping, D., McNair, L., Martin, T., & Ozkan, D. (2020). A Case Study of Barriers to Curricular Change in Revolutionizing an Electrical and Computer Engineering Department. Conference on Academic Research in Education 2020, Las Vegas, NV (virtual due to COVID).
3. Reeping, D., Grote, D., McNair, L., & Martin, T. (2020). Curricular Complexity as a Metric to Forecast Issues with Transferring into a Redesigned Engineering Curriculum. In Proceedings of American Society for Engineering Education Annual Conference, 2020 (virtual due to COVID).
4. Reeping, D., McNair, L., Martin, T., & Ozkan, D. (2019). "Modeling the perception of rigor in large-scale curricular change." In Proceedings of FIE (Frontiers in Education) Conference, Cincinnati. Piscataway: IEEE.
5. Ozkan, D., Reeping, D., McNair, L., Martin, T., Harrison, S., Lester, L., & Baum, L. (2019). "Using personas as curricular design tools: Engaging the boundaries of Engineering culture." In Proceedings of FIE (Frontiers in Education) Conference, Cincinnati. Piscataway: IEEE.
6. S. Lord, W. Newstetter, J. Sweeney, N. Salzman, T. Martin, J. London, B. Sukumaran, T. Maciejewski, J. LeDoux, "WIP: Progress of the NSF RED Revolution", In Proceedings of the American Society for Engineering Education Annual Conference, Salt Lake City, Utah, June 2018.
7. A. Agrawal, C. Groen, A. Nave, L. McNair, M. Paretto, and T. Martin, "Overriding Tradition: Exploring the Intersection of Institutional and Disciplinary Cultures on Student Perceptions," In Proceedings of the American Society for Engineering Education Annual Conference, Salt Lake City, Utah, June 2018.

8. R. Younes, M. Jones, and T. L. Martin, "Toward practical activity recognition: Recognizing complex activities with wide variations," in CoMoRea'18 - 14th Workshop on Context and Activity Modeling and Recognition (CoMoRea'18), Athens, Greece, Mar. 2018.
9. D. P. Saha, T. L. Martin, and R. B. Knapp, "Towards Defining a Quality-Metric for Affective Feedback in an Intelligent Environment," in IEEE International Conference on Pervasive Computing and Communications Workshops, 2018. PerCom Workshops'18, Athens, Greece, 2018.
10. D. Reeping, L. McNair, S. Harrison, B. Knapp, L. Lester, T. Martin, A. Patrick, and M. Wisnioski, "How are Threshold Concepts Applied? A Review of the Literature," In Proceedings of the American Society for Engineering Education Annual Conference, Columbus, OH. June 25-28, 2017.
11. D. Reeping, L. McNair, M. Wisnioski, A. Patrick, T. Martin, L. Lester, B. Knapp, and S. Harrison, "Restructuring an Electrical and Computer Engineering Curriculum: Using Participatory Research to Prototype Curricula and Situate Threshold Concepts," In Proceedings of the Frontiers In Education Conference, Indianapolis, IN. October 18-21, 2017.
12. D. P. Saha, R. B. Knapp, and T. L. Martin, "Affective Feedback in a Virtual Reality Based Intelligent Supermarket," in Proceedings of the 2017 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2017 ACM International Symposium on Wearable Computers, New York, NY, USA, 2017, pp. 646–653.
13. D. Saha, B. Bortz, W. Huang, T. Martin, and B. Knapp, "Affect-aware Intelligent Environment Using Musical Cues as an Emotion Learning Framework," In 12th International Conference on Intelligent Environments IE 2016 London, England. pp. 178- 181 doi:[10.1109/IE.2016.39](https://doi.org/10.1109/IE.2016.39)
14. H. Murzi, T. Martin, L. McNair, and M. Paretti, "A Longitudinal Study of the Dimensions of Disciplinary Culture to Enhance Innovation and Retention among Engineering Students," American Society for Engineering Education Annual Conference, Seattle, Washington, June 2016.
15. P. Zellner, J. Knuteson, and T. Martin, "Forecasting Nets," ACSA 103: The Expanding Periphery and the Migrating Center, Proceedings for the 103th Annual Meeting of the Association of Collegiate Schools of Architecture (ACSA). ACSA Press, 2015, pp. 169-176.
16. Deba Pratim Saha, Thomas L Martin, R Benjamin Knapp, "Towards incorporating affective feedback into context-aware intelligent environments," 2015 International Conference on Affective Computing and Intelligent Interaction (ACII), September 2015, pp. 49-55. (50 of 176 regular paper submissions accepted for oral presentation, 28% acceptance rate)
17. R. Younes, T. Martin, and M. Jones, "Activity classification at a higher level: what to do after the classifier does its best?" Proceedings of the 2015 International Symposium on Wearable Computers, September 2015, pp. 83-86. (13 full papers and 16 notes out of 121 submissions accepted for oral presentation, 24% acceptance rate)
18. H. Murzi, H., T. Martin, L. McNair, and M. Paretti, "Comparative Dimensions of Disciplinary Culture," ASEE Annual Conference, Seattle, WA, June 2015.
19. Jason Forsyth, Tom Martin, Darrell Bowman, "Feasibility of GPS-based Warning System for Roadside Workers", IEEE International Conference on Connected Vehicles and Expo, Vienna, Austria, November 3-7, 2014 (33% acceptance rate)
20. P. Zellner and T. Martin, "Integrating Computing as a Material in Design Education," FabLearn 2014 Conference on Creativity and Fabrication in Education, Palo Alto, CA, October 25-26, 2014 (8 pages).
21. H. Murzi, T. Martin, L. McNair and M. Paretti, "A Pilot Study of the Dimensions of Disciplinary Culture among Engineering Students (Work in progress)," Frontiers in Education Conference, Madrid, Spain, October 2014 (4 pages).
22. J. Forsyth, T. Martin, "Extracting Behavioral Information from Electronic Storyboards," Proceedings of the 6th ACM SIGCHI Symposium on Engineering Interactive Computer Systems, Rome, June 2014 (10 pages, 18% acceptance rate).
23. J. Dennis, R. Lewis, T. Martin, M. Jones, K. Baumann, J. New, T. Pearman, "Garment for rapid prototyping of pose-based applications, International Symposium of Wearable Computers Design Exhibition, Zurich, Switzerland, September 2013 (4 pages).
24. L. McNair, K. Kim, J. Forsyth, E. Dorsa, T. Martin, and E. Coupey, "Interdisciplinary Pedagogy for Pervasive Computing Design Processes: An Evaluative Analysis," American Society of Engineering Education Annual Conference. San Antonio, TX: June 11, 2012 (16 pages).
25. B. Sawyer, F. Quek, W. Wong, M. Motani, S. Chu Yew Yee, M. Perez-Quinones, T. Martin, I. Burbey and L. McNair, "Information Re-finding Through Physical-Social Contexts," Personal Information Management (PIM)

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