Ali Manzak

DEGREES

Ph.D. in Electrical Engineering – **2001**
Arizona State University, Tempe, AZ
Dissertation Title: *"Voltage Scaling for Low Power / Energy"*

M.Sc. in Electrical Engineering – **1996**
University of Colorado, Boulder, CO
Specialty in Control Systems

B.Sc. in Electronics and Communication Engineering – **1991**
Istanbul Technical University, Istanbul,
Diploma Thesis Title: *"Low Sensitive Active R-Filter Design"*

TEACHING EXPERIENCE

UNIVERSITY OF DETROIT MERCY, Detroit, MI, U.S.A. (2018–)
Cohort Instructor, Department of Electrical and Computer Engineering

- Developed Hardware Description Languages course and laboratories. FPGA implementation of machine learning algorithms introduced as a course project.
- Updated Principle of Electrical Engineering and Logic Circuits Laboratory manuals, set up robot competition for the final design project
- Introduced ARM assembly language for both Microcontroller and Microprocessor courses.
- Represented department on high school visit day
- Prepared the students for FE exam, which is the first step toward professional engineering licensure
- Taught two courses and laboratories at BUCT, Beijing, China for the summer semester

GANNON UNIVERSITY, Erie, PA, U.S.A. (2016–2018)
Visiting Professor, Department of Electrical and Computer Engineering

- Revised Electronics II and Control Systems laboratory manuals, updated several lab experiments and final design projects.
- Updated course syllabi and necessary documents for the upcoming ABET visit for extension of accreditation process

AMERICAN UNIVERSITY of the MIDDLE EAST, (In affiliation with **PURDUE University**), Egaila, Kuwait (2013–2015)
Assistant Professor, Department of Electrical Engineering

- Developed various lab experiments to program Siemens S7-300 PLC using TIA PORTAL V12 for PLC laboratory.

LAKEHEAD UNIVERSITY, Thunder Bay, ON, Canada (2007–2013)
Assistant Professor, Department of Electrical Engineering

- Supervised undergraduate and graduate student degree projects, received university research grant
- Developed graduate level Digital ASIC Design course

SDU, Isparta, Turkey (2002–2006)
Assistant Professor, Department of Electronics and Communication Engineering

- Established/developed microcontroller course and lab involving PIC microcontrollers

- Introduced new graduate courses
- Developed the course curriculums and prepared all necessary documents to fulfill accreditation requirement of the new Computer Engineering Department.

ARIZONA STATE UNIVERSITY, Tempe, AZ, U.S.A. (1997–2001)
Teaching Assistant, Department of Electrical Engineering
Laboratories Supervised

- Feedback Systems (1997–1998)
  - Taught MATLAB and Simulink as analysis and design tools for Feedback Systems course. Introduced servo system control hardware.
- VLSI Design **(Graduate Level)** (1998–2001)
  - Taught Mentor Graphics tools for various steps in the VLSI design process. This included simulation, timing and delay analysis, auto layout, custom layout, and HSPICE extraction.

INDUSTRY EXPERIENCE

LATTICE SEMICONDUCTOR CORP., San Jose, California, U.S.A. (05/2001–08/2002)
Digital IC Design Engineer,

- Performed state-of-the-art IC design and verification for full-custom 130nm CMOS FPGA (LAVA2).
- Implemented the logic blocks in the memory section with Cadence Schematic Composer simulated with HSpice and tested with VERILOG.
- Simulated SRAM cells in the process corners. Checked the set-up and hold time violations of D-type registers.
- Supervised layouts to achieve minimum die area and integrated the building block into the overall chip schematics and layout. Developed test vectors and characterization vectors.
- Created optimization software to achieve minimum speed, area and sufficient noise-margin with PERL.

RESEARCH INTERESTS

Current Research:	Low power hardware and software design, battery-aware, thermal-aware design, hardware implementation of machine learning algorithms
General Interests:	Low power analog and digital design, mixed-signal IC design, FPGA design, embedded systems design, computer architecture and machine learning

COURSES TAUGHT

- Hardware Description Languages (Verilog/VHDL) (2017, 2019)
- Microcontrollers/Microprocessors (2002-2006, 2007-2013, 2019)
- Digital Logic Circuits (2002-2006, 2019)
- Computer Architecture (2019-2020)
- Professional World of Work III (2019-2020)
- Principles of Electrical Engineering (2008–2012, 2018-2019)
- Engineering Project and Managements (2016-2018)
- Advanced Engineering Analysis (2016-2018)
- Electronics II (2002–2006, 2016-2017)
- Circuits I (2015, 2017)
- Semiconductor Devices (2013-2015)
- Data Communications and Networking (2013-2015)
- Computer Programming for Engineering (C language) (2013-2015)
- Analog CMOS Integrated Circuits (2010–2013)
- Control Systems (2007–2013)

- Digital ASIC Design (2008-2010)
- Computer Networks and Data Communications, (2005-2006)
- Digital Electronics (2002–2006)

LAB. COURSES TAUGHT

- Hardware Description Languages Laboratory (2019)
- Introduction to Microcontrollers Lab (2019)
- Digital Logic Circuits Lab (2019)
- Principles of Electrical Engineering Lab (2018)
- Electronic Systems Lab (2018)
- Automatic Control Lab (2017-2018)
- Circuits I Lab (2017-2018)
- Circuits II Lab (2017)
- Electronics I Lab (2017)
- Electronics II Lab (2016-2017)

SUPERVISION OF THESIS

- I. Alshareef (M.Eng.), “Determining attention improvement factors using machine learning,” 2018
- R. Samala (M.Eng.), “Parallel to serial communication in UART using VHDL”, 2016
- O. Sandeep (M.Eng.), “Single precision floating point numbers for division and square root”, 2016
- G. Toombs(M.Sc.),“A DVS-capable ultra-low-power sub-threshold CMOS temperature sensor,” 2010
- H. Goksu (Ph.D.), "Application of computational intelligence to electromagnetic problems”, 2006 (Co-advisor)
- K. Basaran (M.Sc.), “Transistor sizing of latches using fuzzy logic,” 2006
- T. Goksu (M.Sc.) “Low power CMOS adder and multiplier design with reduced switching activity”2006
- D. Pagacli (M.Sc.), “Optimization in CMOS buffer design,” 2006

SUPERVISION OF UNDERGRADUATE DEGREE PROJECTS

- C Wilkes, M. Patriquin, T. Almeida, “CNFET phase-locked loop design,” 2012–13
- R. Abbas, M. Johnston, E. Lee, “Forest smoke detection,” 2012–13
- R. Santiago, P. Guido, N. Hutchinson, “Smart lighting system,” 2011–12
- T. McMillan, V. Patel, “Solar array repositioning system,” 2011–12
- A. C. Pan, C. Kosonen, B. McGurn, “Eden green,” 2010–11
- C. Pickering, R. Hunt, W. Sagle, “Electronic drum kit,” 2010–11
- B. Ater, J. Stronks, D. Rao and E. Aldisi, “Light sensing helicopter,” 2009–10
- P. Teel, N. Mohan, Y. Bernard, E. Bossuyt, “Fire robot,” 2009–10
- K. Wall, A. Sawchuck and M. Pineu, Wireless heart rate and step rate monitor,” 2008–09
- M. Wal, Y. Cao and V. Desai, “Data acquisition system: Infra-red liquid level sensor,” 2008–09

SELECTED PUBLICATIONS

- D. Manzak and A. Manzak, ‘Analysis of Environmental, Economic, and Demographic Factors Affecting COVID-19 Transmission and Associated Deaths in the U.S.A.” (July 6, 2020). Available at SSRN: https://ssrn.com/abstract=3644677
- A. Manzak and S. E. Seker, "Low Power Design for DVFS Capable Software", The 10th IEEE Annual Ubiquitous Computing, Electronics & Mobile Communication Conference (IEEE UEMCON 2019), Columbia University, New York, USA, 10-12 November 2019.

- D. Manzak, G. Cetinel and A. Manzak, "Automated Classification of Alzheimer's Disease using Deep Neural Network (DNN) by Random Forest Feature Elimination", The 14th International Conference on Computer Science and Education (ICCSE 2019), Aug 2019, Toronto, Canada, pp. 1050-53.
- A. Saghir, E. Atoofian, and A. Manzak, "Reducing Power of Memory Hierarchy in General Purpose Graphics Processing Units", Journal of Low Power Electronics, Vol. 13, 1–17, 2017.
- K. Chen, E. Atoofian, and A. Manzak, "Improving Power of Cache and Register File through Critical Path Instructions" IEEE 17th Euromicro Conf. on Digital System Design (DSD 2014), pp. 349-55.
- E. Atoofian, and A. Manzak, "Power-Aware L1 and L2 Caches for GPGPUs" Euro-Par 2014 Parallel Processing. Lecture Notes in Computer Science, vol. 8632, pp. 354-36, 2014.
- O. Polat and A. Manzak, "Evaluation of Low Power Carbon Nanotube Field Effect Transistor (CNFET) Master-Slave Latches" Int. Conference on Solid-State and Integrated Circuit (ICSIC 2012), pp 142-46.
- C. Christoffersen, G. Toombs and A. Manzak, "An Ultra-Low Power CMOS PTAT Current Source", The Argentine School of Micro-Nanoelectronics, Technology and Applications Conf. (CAMTA), 2010.
- T. Goksu and A. Manzak, "Comparison of Voltage Scaling and Gate Sizing for Low-Power Custom IC Design" The IASTED International Conference on Circuits and Systems, (CS 2008), August, 2008.
- B. Yildirim and A. Manzak, "Low-Power Low-Noise RF Amplifier for RFID Applications" 1st Annual RFID Eurasia Conference & Exhibitions, September, Istanbul, Turkey (2007).
- A. Manzak, "Temperature Aware Datapath Scheduling" Lecture Notes in Computer Science. (LNCS 3728), PATMOS 2005, pp. 99-106.
- A. Manzak and H. Goksu, "Application of Very Fast Simulated Reannealing (VFSR) to Power Optimization" Lecture Notes in Computer Science. (LNCS 3553), SAMOS 2005, pp. 308-13.
- A. Manzak and C. Chakrabarti, "Optimum Buffer Size Selection for Dynamic Voltage Scheduling" Lecture Notes in Computer Science (LNCS 3254), PATMOS 2004, pp. 711-721.
- A. Manzak and C. Chakrabarti, "Variable Voltage Task Scheduling Algorithms for Minimizing Energy/Power" IEEE Transactions on VLSI Systems, April 2003, pp. 270-276.
- A. Manzak and C. Chakrabarti, "A Low Power Scheduling Scheme with Resources Operating at Multiple Voltages" IEEE Transactions on VLSI Systems, Feb. 2002, pp. 6-14.

GRANTS

- Principle Investigator, "Dynamic Thermal Management (DTM) Using Dynamic Voltage Scaling (DVS)," Senate Research Committee NSERC Research Development Fund, Lakehead University, 2009.
- Principle Investigator, "Ultra Low Power Design for Low Throughput Systems," Start-up Grant and NSERC Research Development Fund, Lakehead University, 2007.
- Principle Investigator, "Dynamic Voltage Scalable Low Power FPGA Design," Career Project, TUBITAK (The Scientific and Technological Research Council of Turkey, $100,000), 2004.

COMPUTER SKILLS

- Programming Languages C/C++, Python, R, Assembly Languages: ARM, Intel 80x86, PIC
- Engineering Software/Tool Cadence/Mentor Graphics Tools, VHDL, Verilog, Xilinx Vivado, HSPICE Keil uVision, HSPICE, MatLAB, Simulink, Labview, Arduino IDE, Siemens TIA portal v12,
- Application Software Latex, Perl

SERVICE

- **Committees:**
  - Program Committee Member, The 6th ACM SIGPLAN International Workshop on AI-Inspired and Empirical Methods for Software Engineering on Parallel Computing Systems (AI-SEPS 2019) Athens, Greece, October 20-25, 2019
  - Editor, Turkish Journal of Electrical Engineering & Computer Sciences, 2013

- Session Chair, Analog Circuits and System Session, IASTED International Conference on Circuits and Systems (CS 2008), Kailua-Kona, USA, August 2008
- Member of the Scientific Committee at the 11th International Research/Expert Conference, Trends in the Development of Machinery and Associated Tech. (TMT'07), Tunisia, September 2007

- **Professional Affiliations:**
  - Member of Institute of Electrical and Electronics Engineers (IEEE), 2002–Present

- **Reviewer:**
  - IEEE Transactions on VLSI Systems,
  - IEEE Transactions on Computer Aided Design of Integrated Circuits and Systems,
  - Integration the VLSI Journal,
  - Digital Signal Processing Journal,
  - ASPDAC,
  - Turkish Journal of Electrical Engineering & Computer Sciences,
  - AI-SEPS,
  - ICCSS

- **Community Service:**
  - Served as a judge at the Northwestern Ontario Regional Science Fair 2009.

- **Professional Development Activities:**
  - Online Learning: Pedagogy and Practice workshop, University of Detroit Mercy. Feb 13-March 27, 2019.