Robert Lorence

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SUMMARY

Results-driven engineer and researcher with a strong background in electrical engineering, robotics, and enterprise systems integration. Passionate about hardware development, embedded systems, and autonomous technologies, with hands-on experience in sensor integration, signal processing, and robotics research. Proven ability to lead data-driven solutions, system optimizations, and large-scale technology implementations, particularly in healthcare, government, and enterprise infrastructure. Experienced in conducting field research, developing innovative engineering solutions, and applying data analytics to enhance system performance. Seeking opportunities to contribute to cutting-edge engineering projects and research initiatives that push the boundaries of automation, AI, and embedded technologies.

EDUCATION

Master of Science: Electrical Engineering
Virginia Polytechnic Institute and State University • Blacksburg, VA • 2025

Master of Science: Business Administration - Business Analytics
Virginia Polytechnic Institute and State University • Blacksburg, VA • 2017

Bachelor of Arts: Economics
Virginia Polytechnic Institute and State University • Blacksburg, VA • 2017

EXPERIENCE

Graduate Researcher
Monash University - PEARL Lab **May 2025 - Present, Melbourne, Vic**

- Integrated REGATRON amplifier with RTDS using custom-labeled analog I/O cable; validated signal flow via continuity testing and datasheet mapping.
- Developed and validated a polynomial scaling function (R^2 = 0.999999) to ensure accurate analog voltage matching between RTDS and REGATRON.
- Enabled synchronized HIL simulation by matching RTDS input with REGATRON analog output using oscilloscope-based verification.
- Contributed to system setup and firmware configuration for RTDS; supported lab efforts to establish a scalable inverter testbed using PSCAD/RSCAD.

Graduate Researcher
Virginia Tech - Naughton Lab **February 2025 - May 2025, Blacksburg, VA**

- Designed and analyzed the movement mechanics of soft robots actuated by pressurized air tubes with a cross-mesh structure.
- Integrated bend and pressure sensor systems to measure deformation and improve control strategies, including real-time sensor analysis using Raspberry Pi and Arduino platforms.
- Developed and mounted soft robotic “muscles” onto 3D-printed parts, optimizing mechanical and electrical integration for efficient performance.
- Created circuit designs to interface sensors with control systems and improve data acquisition accuracy.
- Explored system redesigns and developed simulation models to enhance mobility, mechanical responsiveness, and energy efficiency.

Managing Consultant
IBM **June 2018 - May 2025, Chantilly, Virginia**

- Led end-to-end data migration for TennCare’s Medicare implementation, successfully importing over 1 billion rows of client data into Snowflake, developing reusable ETL pipelines in Microsoft Azure Data Factory, and optimizing data validation, auditing, and system performance, while mentoring and onboarding new team members to ensure project success.
- Contributed to IBM’s successful $248M NAVSUP Navy BSC ERP (NEP) proposal, managing solution development, implementation strategies, and timeline creation under a tight two-week deadline, while reviewing and refining proposal materials to align with client needs and secure a major strategic contract.
- Led functional testing automation for the County of San Diego’s ConnectWellSD program, developing and implementing automated testing strategies across Cúram, Jira, and Jenkins, collaborating with cross-functional teams to optimize business requirements and testing procedures, and driving a 32% increase in regression test suite efficiency within three months through strategic roadmap development and cost analysis.
- Led QA testing and functional automation for the South Carolina Department of Health and Human Services (SC DHHS) MMRP project, ensuring the successful modernization of the state’s Medicaid Eligibility Determination System (MEDS) by implementing quality procedures, mentoring new QA resources, and developing job aids, which streamlined onboarding and improved project efficiency.
- Developed and implemented Power BI reporting solutions for functional and automated testing at Gwinnett County Public Schools (GCPS), collaborating with client executives to streamline testing processes, enhance documentation using TestRail and Jira, and expand IBM’s functional testing capabilities, contributing to the establishment of the IBM Center of Excellence and improving client deliverables.

- Led a 26-person team for the New York Department of Labor's COVID-19 unemployment claims processing, managing urgent staffing, training, and daily operations to process over 75,000 Unemployment Insurance (UI) and PUA claims, ranking as the second most productive team out of 50 within a 1,200-member IBM project, while developing fraud detection enhancements and reusable process documentation that saved an estimated 500 hours in future operations.
- Developed and launched an internal company website to centralize knowledge sharing, improving pain point identification, onboarding efficiency, and subject matter expertise access, while leading executive-level presentations and strategy discussions that drove practice-wide automation initiatives and multiple contract extensions.

Bio-Inspired Robotics Co-Investigator

Virginia Tech, National University of Singapore **May 2024 - November 2024, Brunei Darussalam**

- Pioneered field research in the Brunei rainforests, contributing to the creation of the first publicly available bat call database, enabling future ecological and robotics research.
- Developed and deployed a custom acoustic array to capture bat flight acoustics, echolocation patterns, and sonar mapping, significantly improving data resolution for bio-inspired robotics.
- Engineered a sonar-based autonomous robotic system, leveraging ultrasonic transducers and real-time signal processing to enhance environmental perception and navigation.
- Optimized target detection and localization by implementing adaptive chirp modulation, improving sonar-based tracking and mapping in complex environments.
- Designed and integrated multi-modal sensor systems (sonar, IMU, GPS) for autonomous UAV navigation in GPS-denied environments, improving flight path reconstruction.
- Collaborated with Virginia Tech, University of Brunei, National University of Singapore, and NSF, advancing research in bio-inspired robotics and autonomous mobility.

Database Application Administrator

Virginia Tech Business Enterprise Systems **January 2018 - May 2018, Blacksburg, VA**

- Designed and implemented a new ETL process for Enterprise Systems, enabling a seamless migration to the Talend platform deployed via Docker.
- Converted and optimized SQL code, migrating IBM Datastage workflows to Oracle SQL and developing Talend ETL jobs for efficient deployment.
- Provided critical database support, actively managing incident resolution to ensure system stability and operational continuity.

Data Support Analyst/Migration Specialist

VT Department of Scholarships and Financial Aid **September 2017 - December 2017, Blacksburg, VA**

- Developed and implemented data collection techniques to ensure accuracy, adequacy, and compliance with reporting standards.
- Led the migration of SQL reporting to MicroStrategy, utilizing EDP and informatics automation to streamline operations for managing over $109 million in financial aid and grants.
- Diagnosed and resolved data-related issues, coordinating system maintenance and modifications to enhance data integrity.
- Reviewed and selected optimal data acquisition methods and standards, improving efficiency and accuracy in financial reporting.

Data Analyst

VT Business Intelligence Service **May 2017 - September 2017, Blacksburg, VA**

- Leveraged MicroStrategy, SQL, and ETL processes to analyze large datasets, uncovering trends in university software usage, financial reporting, and key operational metrics to enhance data collection and user experience.
- Investigated and resolved data integrity issues, ensuring accurate and reliable database operations.
- Developed interactive data visualizations, transforming complex data into clear, actionable insights for key stakeholders.
- Defined and documented business rules and use cases, improving data governance and process efficiency.
- Synthesized advanced analytics into strategic recommendations, enabling data-driven decision-making for university leadership.

Student Capstone Consultant

Hewlett Packard Enterprises, DXC Technologies **October 2016 - June 2017, Blacksburg, VA**

- Identified and analyzed critical inefficiencies in federal funding allocation, providing data-driven recommendations for process improvement.
- Developed an innovative algorithm with the potential to influence federal policy, creating a standardized scoring system for HUD to optimize funding distribution and resource allocation.
- Presented and successfully pitched the solution to HUD and DXC Technology executives at HUD HQ in Washington, DC, resulting in new business opportunities valued at over $300,000.

Founder and CEO

Odd Men for Odd Jobs **January 2010 - August 2015, Great Falls, VA**

- Founded and operated a successful contracting business, connecting high school students with local residents, completing an average of 9 projects per week over 5 years.
- Conducted market analysis to determine optimal pricing strategies, maximizing revenue and capitalizing on emerging opportunities.
- Developed and streamlined business operations, defining company roles and responsibilities to improve efficiency and service delivery.
- Led and managed a team of 12 students, negotiating rates between clients and workers, achieving a post-expense profit margin of 81%.

ENTREPRENEURIAL PROJECTS

Founder & CEO
Guided LLC • September 2018 - Present
- Founded and developed a mobile travel app for iOS and Android, designed to enhance trip planning and navigation by integrating real-time recommendations, itinerary management, and location-based services for travelers.

CERTIFICATIONS

Grid Forming Inverters
Monash University • 2025

Microsoft Azure Fundamentals
Microsoft • 2023

AWS Migration Ambassador Foundations
AWS • 2023

AWS Partner: Sales Accreditation
AWS • 2023

AWS Certified Cloud Practitioner
AWS • 2021

ACCOMPLISHMENTS

Manager's Choice Award
For demonstrating the following IBM Practice - Listen for need, envision the future

Manager's Choice Award
For demonstrating the following IBM Practice - Dare to create original ideas

Member of Pi Lambda Phi Fraternity External Housing Chair, Tailgate Chair, New Member Education Committee
External Housing Chair, Co-Tailgate Chair, New Member Education Committee

Board of Directors East Heritage Oaks Homeowners Association
Secretary

National Society for Leadership and Success
Selected for membership based upon academic success and leadership potential

DESIGN TEAMS

Business Program Manager
Virginia Polytechnic Institute and State University • VT AstroBotics • October 2015 - April 2016
- Developed and managed the final build budget, conducting cost analysis for hardware and software components using cost modeling techniques to optimize resource allocation and project efficiency.
- Led cross-functional communication between engineering and finance teams to ensure alignment on cost-saving measures while maintaining technical feasibility.
- Conducted risk assessments and financial forecasting, identifying 15% potential cost overruns and implementing mitigation strategies to keep the project on track.

Electronics Team/Engineer
Florida Institute of Technology • Student Rocket Society, Hybrid Rocket Team ACE • August 2013 - December 2014
- Optimized altimeter placement using OpenRocket, ensuring balanced load distribution, weight efficiency, wiring integrity, and system reliability, while aligning with contingency and design specifications.
- Designed and tested electrical wiring configurations for avionics, improving signal integrity and ensuring proper interfacing between telemetry and propulsion systems.
- Assisted in payload integration, collaborating with mechanical and software teams to ensure seamless operation of onboard instrumentation.

Mechanical Design Team/Hardware Engineer
Auburn University • Auburn University Small Satellite Program (AUSSP) • August 2011 - May 2012

- Integrated MATLAB and Solid Edge to simulate hardware performance, supporting system requirement validation and risk analysis during the concept feasibility phase.
- Assessed material costs, tools, and construction elements, optimizing budget allocation by 10% while ensuring build feasibility.
- Designed and evaluated structural components for a small satellite, ensuring compliance with spaceflight constraints and thermal considerations.

SKILLS

Programming and Tools: Python, C++, MATLAB, SQL, JIRA, Git
Embedded Systems and Hardware: Microcontrollers and SBCs (NVIDIA Jetson, Raspberry Pi, Arduino), PCB Design and Fabrication (Fusion, Altium, Eagle), Soldering and Prototyping (Surface mount and through-hole soldering, circuit debugging), Sensors and Actuators (Ultrasonic Transducers and Motor Controllers), Power Electronics (Motor Drivers, DC-DC Converters, Power Supply Design)
Enterprise Systems Integration and Consulting: ETL and Data Engineering (Talend, IBM Datastage, Data Warehousing), Healthcare and Government Sector Solutions (Medicaid/Medicare Data Processing, TennCare Implementation, Compliance and Regulatory Frameworks), Cloud and Infrastructure (Cloud Architecture with AWS, Azure, GCP, Hybrid Cloud Solutions), Business Intelligence and Analytics (Power BI, Tableau, MicroStrategy, SQL Reporting)
Testing and Maintenance: Automated Testing (Selenium, Cypress), Functional and Regression Testing