John Granholm

Controls, Automation, Robotics, Logic, Mechatronics, Instructor, and Data Scientist

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Professional Summary

- **High-Impact Instructor (7+ years):** Renowned in robotics, logic, and mechatronics education. Provided 600+ students with the education and opportunities necessary to earn industry-recognized certifications in Machine Learning, AC/DC Electricity, Electric Motor Control, Ladder Logic, Fluid Power, Electro-Fluid Logic, SQL, .NET, Azure Cloud, Python, C#, JavaScript, PLC Troubleshooting, Cyber Security, Networking, Mechanical Systems, and more.
- **Workforce Development:** Committed to producing top-tier technicians and engineers with rigorous, logic-driven curricula. Emphasizes efficiency, problem-solving, and safety as the keys to high-performing automated systems.
- **Automation & Robotics Expertise:** Extensive background designing and integrating cutting-edge automation solutions using PLCs, Fanuc Robots, Arduino, Raspberry Pi, and machine vision (OpenCV). Full integration and control of an array of Fanuc robots using a vision system running Python and OpenCV on a Raspberry Pi. I'm actually very proud of this one. Reach out, please, and I'll give you a demo.
- **Innovative Teaching & Mentorship:** Created immersive AR/VR simulation environments, advanced apprenticeships, and hands-on labs that foster deep technical proficiency and industry readiness.
- **Leadership & Collaboration:** Skilled in communicating complex technical concepts across teams. Aligns program goals with institutional objectives to ensure impactful, industry-aligned education.
- **LLM-Driven Assessment Development:** Designed and deployed a large-scale system using large language models (LLMs) to automatically generate extensive question banks. Produced over 5,000 questions, 5,000 correct answers, and 15,000 incorrect answers for enhanced assessment variety, thorough student evaluation, and mastery-based learning in robotics and mechatronics.

Professional Experience

Lead Instructor, Robotics/Mechatronics, Wake Technical Community College, Raleigh, NC (2020–2025)

- Instructed and certified over 600 students across multiple industrial disciplines, including AC/DC Electricity, Electric Motor Control, Ladder Logic, Fluid Controls, Electro-Fluid Logic, Troubleshooting PLCs, Robot Operation, Machine Learning, Vision, and Vision Controls.
- Designed immersive, logic-focused coursework emphasizing systematic problem-solving and troubleshooting to cul-tivate a highly efficient and safety-conscious workforce.
- Created AI-driven robotics control experiments (OpenCV, machine learning, custom camera setups) and maintained open-source Fanuc and Python libraries to drive engagement.

- Designed, published, and deployed an AR-based PLC ladder simulator in Unity/C#, significantly boosting student en-gagement and achieving a 90% first-attempt pass rate on practical exams and certifications.
- Navigated 20+ cohorts (approximately 15 students each) through a structured 12-week Mechatronics Apprenticeship, emphasizing troubleshooting, process optimization, and best practices for control system design.
- Collaborated with administration and industry stakeholders to ensure curriculum matched mod-ern workforce demands and institutional objectives.
- **LLM-Assisted Question Bank Creation:** Leveraged large language models (LLMs) to automatically generate exam and quiz materials—amassing over 5,000 unique questions and corresponding correct/incorrect answers. Improved the scope and rigor of assessments while significantly reducing test creation time.

Machine Programmer, Mertek Solutions, Inc., Sanford, NC (2018–2020)

- Engineered, assembled, and programmed automated assembly lines incorporating robotics, pneumatic systems, and PLC logic.
- Performed complex mechanical/electrical troubleshooting to meet high-volume production demands on schedule and within budget.
- Partnered with cross-functional teams to optimize operational efficiency, focusing on logic-driven design that saved time and resources.

IT Assistant, Research Triangle Foundation, Durham, NC (2017–2018)

- Supported the IT infrastructure for RTP headquarters and associated businesses, including fiber installation and network optimization.
- Deployed custom software environments (Windows, Linux, macOS) to empower diverse tenant and staff needs.
- Streamlined internal processes by applying logical troubleshooting methodologies and efficiency best practices.

Core Competencies

- **Instructional Design & Curriculum Development:** Created and delivered lab-based modules, simulations, and real-world projects for electronics, fluid power, and integrated robotics systems.
- **Programming & Automation:** Python, R, SQL, C++, C#, Unity (10+ years), PLCs, Fanuc Robots, Arduino, Raspberry Pi.
- **Machine Learning & Data Analysis:** PyTorch, TensorFlow, OpenCV, Tableau, Power BI, MATLAB, AWS, Azure, Apache Spark.

- **LLM & Automated Content Creation:** Large Language Model integration for question bank generation, automated assessment strategies, and advanced knowledge testing.
- **Cloud & Software Infrastructure:** Git, Docker, Kubernetes, .NET, React, Hadoop, DataMesh, NoSQL, Flink.
- **Systems & Networking:** Windows, Linux, macOS, fiber networks, systems optimization.

Education

B.S. in Geology (Quantitative Geoscience), Appalachian State University, Boone, NC (2014–2017)
Minor: Mathematics (Computer Science, Data Science)

Certifications

- Fanuc Certified Operator and Tool Handling
- SACA C-101 Certified Industry 4.0 Associate I (Basic Operations)
- Industrial Electricity PMMI, Mechanical Components PMMI, PLC PMMI, Fluid Power PMMI

Awards & Publications

- **AGU Data Visualization Award** for published virtual reality applications
- Publications in the *Geological Society of America* and *American Geophysical Union (AGU)*

Selected Projects

- Integrated AI, machine learning, and computer vision (OpenCV) into custom hardware solutions.
- Maintained an open-source Fanuc robot coordination library, improving multi-robot precision and scalability.
- Developed an interactive augmented reality simulator in Unity/C#, elevating engagement and comprehension for industrial automation training.
- Achieved a 90% pass rate on first attempts through immersive, hands-on learning experiences.
- **LLM-Based Question Bank Generator:** Engineered a pipeline using large language models to automatically produce 5,000+ questions, 5,000 correct answers, and 15,000 incorrect answers, ensuring comprehensive coverage of course material and streamlined exam creation.
- 10+ years of Unity/C# experience in VR, mobile iOS apps, and interactive educational tools. Recognized by AGU for advanced data visualization and innovative learning experiences.

References available upon request.