

# **Carl Elks, Ph.D.**

**Assistant Professor, Department of Electrical and Computer Engineering at VCU College of Engineering**  
Engineering West Hall, Room 222, Richmond, VA, US

Carl Elks' career has been focused on maturing and advancing the state of the art in the areas of safety assessment and fault tolerance

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## **Biography**

Dr. Elks' professional experience and interests over the past 20 years are in the analysis, design and assessment of dependable embedded systems which are typically found in critical infrastructure such as nuclear power, rail systems, flight control systems, electric power grid management and SCADA systems. As such, his career has been focused on maturing and advancing the state of the art in the areas of safety assessment, cyber-security, and fault tolerance/resilience through education, innovation and technology demonstration projects. He is recognized as a national level expert in the area of digital I&C, fault injection methods, and safety assessment methods for highly critical systems. While at NASA, he was significantly involved in the initial development of full-authority digital flight control technology for civil air transports that are used in today's fly-by-wire airliners. His recent projects have significantly contributed to the improvement of safety and security assessment methods required for licensing digital safety systems used in Nuclear Power Plants. He is past chair of the IEEE International Symposium on Network Cloud Computing and Applications, and is one of the co-founders of the Center for Safe and Secure Nuclear Energy located at the Center for Advanced Engineering Research in Lynchburg Virginia. He is past recipient of the national technology transfer award from the Federal Laboratory Consortium.

His recent research and teaching interests include resilient Cyber Physical Systems, light weight formal verification, methods and tools for fault injection, cyber threat and vulnerability analysis, Human Systems Interactions in complex systems, Unmanned Autonomous Vehicles, Renewable Energy Systems, and modernization strategies for energy and utility infrastructures.

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## **Areas of Expertise**

Assessment Methods for Dependable and High Integrity Systems, Digital Instrumentation and Control SCADA systems, Embedded Systems Design and Analysis, Dependability Analysis of Safety Critical Systems, Cyber Physical Systems, Emerging Approaches for Ensuring Safety and Security in Cyber Physical Systems, Model Based Methods for Identifying and Characterizing Cyber Vulnerabilities, Sustainable Energy Systems and Energy Economics, Human System Interactions in Autonomous Systems

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## **Education**

**University of Virginia**  
Ph.D. Electrical Engineering

**University of Virginia**  
M.E. Electrical Engineering

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