**Expert Opinion Letter (Confidential)**

Analysis of Positional Requirements

Author: Prof. Dr. James Christopher (Chris) Foreman

Author Info: President/CEO, Chris Foreman Consulting

**Education**

* 2008 Ph.D. Computer Science and Engineering, University of Louisville

Use of expert systems and artificial neural networks in the optimization of process control systems. Specific applications in power generation such as combustion, hydropower optimization, and renewable energy integration. Dissertation: Architecture for Intelligent Power Systems Management, Optimization, and Storage.

* 1996 MENG in Electrical Engineering, University of Louisville

Advanced studies in optical computing, optical signal processing, artificial neural networks. Thesis: Development of Wavelength Division Multiplexed Fiber Optic Communication Link.

* 1990 B.S. in Electrical Engineering, University of Louisville.

**Professional Experience**

Present **Power and Controls Engineer**, *C&I Engineering*, Louisville, KY.

Power and control systems design and instrumentation specification for oil refinery processes. Creation of construction work packages for projects. Project management.

2021–Present **President/CEO**, *Self-employed*, Prospect, KY.

Financial data analysis of derivatives and futures using artificial intelligence, data mining, and other financial technology, e.g., fintech. Business plan development and grant writing for technology startups. *Part time.*

2022 **Principal Investigator**, *Covert Defenses, LLC*, West Lafayette, IN.

SBIR funded through DoE in the development of a cyber-security solution based on our patented mathematical approach.

2017–2021 **Assistant Professor**, *University of Louisville*, Louisville, KY.

Research in mathematics teaching, STEM engagement, artificial intelligence, and cyber-security. Teaching of calculus, linear algebra, numerical methods, and team-based industrial projects.

2013–2017 **Assistant Professor**, *Purdue University*, West Lafayette, IN.

Teaching and research in cyber-security for NSA-sponsored projects, power/energy conversion, microgrids, advanced metering infrastructure. Research Scientist with Center for Education and Research in Information Assurance and Security (CERIAS).

2008–2013 **Post-Doctoral Scholar**, *University of Louisville*, Louisville, KY.

Research and teaching in renewable power generation processes, smart grids and microgrids, cyber-security for critical infrastructure and industrial control systems.

2007–2008 **Graduate Student Assistant**, *University of Louisville*, Louisville, KY.

Management of student tutors, deployment of new computer and media centers.

2006–2007 **Project Engineer/Manager**, *Alcoa Inc.*, Louisville, KY.

Process control systems support, design, and optimization, electrical safety training.

2004–2006 **Control Systems Engineer**, *Self-Employed*, Louisville, KY.

Various projects in industrial control systems, PLC/SCADA, cyber-security.

1999–2004 **Plant Electrical Engineer**, *Cinergy Inc., now Duke Energy*, New Albany, IN.

Advanced control strategies for optimization in coal-fired and hydropower units, ANN optimization for reduced emissions of coal unit; data archiving and analysis.

1996–1999 **Research Engineer**, *University of Louisville*, Louisville, KY.

Research and lab instruction in MEMS, microfabrication, and cleanroom technologies.

1993–1996 **Control Systems Engineer**, *Westinghouse PCD, now Emerson Controls*, Chicago, IL. Design, implementation, and start-up of WDPF DCS process control systems for utility-scale power generation and other large industrial processes.

**Funded Research**

$300k co-Principal Investigator, *Measuring Student Engagement in Freshman Engineering STEM Classes,* NSF IUSE, 2019–2022.

$140k Principal Investigator, external corporate project for a defense contractor, *Survey of Countermeasures in Mission Critical Systems,* 2016–2017.

$843k co-Principal Investigator, NSF MRI *Development: Heterogeneous, Autonomic Wireless Control Networks for Scalable Cyber-Physical Systems,* 2014–2016.

$150k Principal, facilitating the donation by Sensus of a new Advanced Metering Infrastructure laboratory, 2016–2017.

$25k Principal Investigator, *Cyber-security in Industrial Control Systems,* Intel Corporation Gift, 2014.

$250k Research Associate, *Cyber-security in the Dams and Hydropower Sector,* DHS/NIHS, 2012–2013.

$600k Research Associate, *Cyber-security Risk Analysis of Telehealth and Telemedicine,*

DHS/NIHS, 2012–2013.

$30k Co-Principal Investigator, power line predictive maintenance study for Louisville Gas and Electric, AY 2012–2013.

$400k Research Associate, *Cyber-security in the Water Sector,* DHS/NIHS contract, 2010–2012.

$5k Principal Investigator, evaluation of pedometers for Humana Inc., 2011–2012.

$25k Co-Principal Investigator. Analysis of new sorting machine control for Print Fulfillment Services, Louisville, KY, 2011.

$41k Principal, facilitated donation of PLC equipment from General Electric, 2013.

$450k Principal, facilitated donation of power systems software from ETAP, 2013.

**Professional and Community Activities**

* Advisor Solutions for cyber-security of the Natural Gas delivery sector with NYSEARCH and AGA affiliated partners, 2022.
* Vice Chair Louisville Section Institute of Electrical and Electronics Engineers, 2021–2022.
* Representative Faculty - KY Council on Post-Secondary Education, Faculty Advisory Network, 2019-2021
* Asst. Editor - ASEE Computers in Education Journal, 2019-2021
* Chair – Central Indiana Region IEEE Computer Society, 2017
* Invited Speaker – Citi Global Information Security Conference, Opportunities from Other Critical Infrastructure for the Financial Sector, Sep 22, 2016
* Chair – IEEE Central Indiana Region, EnCON conference planning committee, 2016, member 2017
* Invited Advisor – Sandia National Laboratory, University Days and TITAN programs, Summer 2016
* Invited Speaker - Panel When Cyber Meets Physical 17th Annual CERIAS Security Symposium at Purdue University, April 19, 2016
* Invited Speaker - Workshop on international collaborations in research and teaching at the University of Applied Sciences in Darmstadt Germany, Feb 2016
* Advisor - SCADA cyber range to be used in urban warfare training and research in critical infrastructure solutions for resilience at Muscatatuc Urban Training Center, 2015–2016
* Advisor - Catholic Relief Services for microgrids in Africa for energy, information, and communication solutions, Fall 2015
* Invited Speaker - Panel on high school, 2-year, and 4-year degree paths, 2+2+2+ Education Continuum in Photonics, NSF ATE Principal Investigators Conference, Washington, D.C., Oct 2015
* Advisor - Tau Alpha Pi Engineering Technology Honors Society, 2013–2017
* Member - University of Louisville Interdisciplinary Sustainability Scholars Roundtable, 2012–2013
* Member - Program committee for the IEEE Industrial and Commercial Power Systems Technical
* Conference hosted in Louisville, KY, 2012
* Chair - Louisville KY Section IEEE, 2012–2013
* Founding Chair - Louisville KY Chapter IEEE Power and Energy Society, 2010–2011
* Member - Advisory board for One World Clean Energy, an integrated bio-refinery concept, Louisville, KY, 2009–2013
* Member - Program committee for the 22nd ICSA Annual Conference on Parallel and Distributed Computing Systems in Louisville, KY, 2009

**Professional Memberships and Recent Awards**

* Senior Member Institute of Electrical and Electronics Engineers (IEEE)
* IEE Service Award, *service to the institute and the community*
* University of Louisville – Teaching Faculty Favorite, *nominated by students*

I am currently the President/CEO of my consulting firm, Chris Foreman Consulting in Prospect, KY. I handle financial data analysis of derivatives and futures using artificial intelligence, data mining and other financial technology, e.g., fintech. I also do business plan development and grant writing for technology startups. In addition to this, I am a power and controls engineer with a local engineering firm designing power, control and instrumentation systems for oil refinery processes, including project management of construction work packages for these designs.

My academic credentials include a Doctorate in Computer Science and Master of Engineering in Electrical Engineering, and a Bachelor of Science in Electrical Engineering from the University of Louisville.

During my 15 years in academia as a professor at both the University of Louisville and Purdue University, I taught and performed research in renewable energy processes, electrical systems, and cyber-security of industrial control systems and critical infrastructure. I taught courses in Calculus, Linear Algebra, Numerical Methods, Renewable Power Generation and Intelligent Power Grids, Computer-based Control Systems and Real-time Programming. During my 15 years in industry, I have worked at several large-scale industrial sites as a controls engineer for advanced processes in power generation, water treatment, manufacturing, and oil refining - including applications of artificial intelligence, data analysis, and data mining at these locations. I am a Senior Member of the Institute of Electrical and Electronic Engineers (IEEE). My professional opinions have been accepted in areas of Electrical Engineering, Engineering Physics, Industrial Engineering, Mathematical Simulation, and Computer Science. I have also been invited as an advisor and speaker to conferences, trainings, and programs and have published approximately 40 peer-reviewed journal articles, book chapters, etc.

As an evaluator, I am responsible for reviewing academic and experiential qualifications to form part of a candidate’s credential evaluation report, providing a detailed analysis of the academic background and occupational experience that a person has received outside the United States.

Sincerely,

A picture containing looking, sitting, small, young

Description automatically generated

Prof. Dr. Chris Foreman, PhD CSE, MENG EE

President/CEO, Chris Foreman Consulting