Curriculum Vitae

Kelly L. Mahoney
757-810-3854 (Cell)
kmahoney101@gmail.com
Linked

SUMMARY OF QUALIFICATIONS

Engineering manager with over 35 years increasing responsibility for managing, consulting, design, operations, and R&D for complex high reliability systems. In this role, I have a proven record in leadership and mentoring technical staff from technician to PhD Physicists. I set both short and long term objectives and establish and maintain relevant performance metrics. I have been involved in the design of safety systems for most new DOE accelerator facilities since 1995 – either as an external reviewer or as a consultant. I have also consulted for and reviewed systems for the DOD as well as large laser and fusion research facilities. This allows for a broad perspective and respect for the similarities and unique challenges of research facilities from a small university lab to the Large Hadron Collider. Expertise in risk-based engineering for personnel and machine protection systems. Teaching experience includes system safety course for the USPAS, professional development programs for the Health Physics Society, and invited tutorials and lectures at several venues.

RELEVANT SKILLS

System Safety/Software System Safety * Safety Control Systems * Machine Protection Systems
Engineering process development
Systems Engineering and Systems Management * Functional Safety
Requirements analysis * Hazard/Risk assessment * Project management
Decision analysis and critical thinking * RF and microwave engineering
Reliability analysis * Standards and Code interpretation
Organization and facilitation * QA/Assurance processes
IEC 61508 * IEC 61511 * IEC 62061/ISO 13849 * IEEE/ISO 15288/12207

RECENT ACHIEVEMENTS (2013-2020)

- Member SLAC LCLS-II Readiness Review Committee (2021)
- Member of ALS-U Protection System review panel (2020)
- Member of SLAC Accelerator Laboratory Personnel Protection Systems advisory committee (2020)
- Managed conversion of accelerator safety system segment to safety PLC based technology
- Created overall architecture for beam power measurement and interlock system (2019)
- Manage systems engineering for accelerator Integrated Control Systems (ICS) WBS for proposed second target facility for the U.S. Spallation Neutron Source (2018-present).
- Manage a series of engineering projects to improve the proton accelerator safety systems. (2014-present)
- Expert reviewer for the Stanford SLAC Accelerator Laboratory beam containment systems. (2016-Present)
- Led effort to completely revise and re-align team business practices. (2014-2015)
- Control Systems expert reviewer as part of the US DOE total project review committee for the Stanford/SLAC $1bb LCLS-II project. (2015-2016)
- Member of European Spallation Source (Lund, Sweden) EH&S Advisory committee. (2014-2017)
- Member of ORNL/SNS Engineering Policy Committee. (2015 – Present)

- Led effort to deliver TJNAF 12GeV Safety Systems on time and within budget. (2006-2014)
- Two separate external review panels described my TJNAF group as the "best in the country" "against which other programs are measured."[1]
- Successfully facilitated multiple stakeholder decision process for the ORNL/SNS PPS corrective action team. (September, 2013)
- Safety Systems Expert – ORNL/SNS Triennial Radiation Review Committee. (June 2013)
- Chair - MSU FRIB Protection Systems review committee. (July 2013)

OTHER ACHIEVEMENTS (2008-2012)

- Safety System Consultant, US DOD Research Facility. (2012)
- Experiment operator for JLab Polarized Electrons for Polarized Positrons (PEPPo) experiment. (June-July 2012)
- Member of cross-DOE complex team to revise the Accelerator Safety Order and Guidance. (2008-Present)
- Chair of the 2010 DOE Accelerator Safety Workshop breakout session on Software QA.
- Member of cross-DOE complex team to create a standard for non-Nuclear Facility Safety Instrumented Systems.
- Consultant, safety systems architect, and programmer for the Stanford/SLAC Protection System upgrade. (2010-2011)
- Safety Systems Expert - NIF Operational Readiness Review Committee.
- TJNAF Cross Divisional Team Leader – Software risk assessment methodology; software assurance policy. (Led team with members from Nuclear Physics, High Performance Computing, Accelerator Physics, IT, Cyber Security, Controls, and Business Services.)
- Created new software risk assessment method that allows meaningful comparison of risks among the above disciplines. Now also applied to physical systems and cyber security.
- TJNAF Cross Divisional Team Leader – US National Archives compliant electronic access control log Records Management Application. First of its kind in accelerators.
- Consulting engineer for Canada's TRIUMF high current electron linac project safety systems.
- Engineering Team Leader - IEC standards compliant programmable safety system design. (2006 – Present)
- JLab Best Management Practice Recognition: *Use of Kepner-Tregoe Decision Analysis (KTA)*
- Developed project ranking and decision analysis tool adopted by executive staff. (2009)
- Created facility hazard assessment method recognized as an example of 'good practice' in DOE tutorial at BNL. (2009)
- Lead organizer and host of 2008 DOE Accelerator Safety Workshop; sat on organizing committee for 2009 and 2010 workshops.
- Co-Chair of Accelerator Interlock session; Course Developer and Instructor – "*Lifecycle Management of Accelerator Safety Interlock Systems."* Jan. 2008 Health Physics Society annual meeting.

Chair or contributor to numerous research laboratory external review panels. Includes facilities at: ANL, BNL, FNAL, LANL, LLNL, MSU, ORNL, SLAC, ESS (Lund, SE). (1995-Present.)

Speaker at national/international conferences and workshops. Most recently:

- 2017, 2019, 2020 Accelerator Safety Workshop
- 2012 M.I.T. First Annual STAMP/STPA Workshop (Expert Panel Member)
- 2012 CERN Workshop on Machine Protection, Focusing on Linear Accelerator Complexes (Invited)

[1] June 2013 TJNAF Director's 12GeV Readiness Review; August 2013 TJNAF 12GeV Accelerator Readiness Review (ARR).

- 2012 Siemens Automation Summit (Invited)
- 2011 FRIB/MSU Tutorial on Personnel Safety Systems (Invited)
- 2009 ICALEPCS conference paper on IEC compliant safety system, Kobe, Japan (Invited)
- 2009 TRIUMF, Vancouver, BC tutorial on PSS/MPS systems (Invited)
- 2008 Health Physics Society Winter Meeting Professional Enrichment Program (Instructor).

CERTIFICATIONS/AFFILIATIONS

- Certified Functional Safety Engineer, TÜV #0066/05 (Currently Lapsed)
- Senior Member IEEE
  - Reliability Society
  - Nuclear and Plasma Sciences Society
- International Society of Automation (ISA)
  - ISA S84 (Programmable Safety Systems) Standards Committee
  - ISA S99 (Cyber Security) Standards Committee
- International Council on Systems Engineering (INCOSE)
- Health Physics Society (HPS)

PATENTS AND AWARDS

- 2019 Accelerator Safety Workshop career recognition for outstanding contributions to accelerator safety
- 2012-2013 Averett University Wall Street Journal Best Paper Award: *The U.S. Economic Impact of Intellectual Property Cyber Crime.*
- Patent: [GPS] Spread Spectrum Long Loop Receiver, #4918706, April 1990, Phillips, F.; Mahoney K.; Zavada, E.

CURRENT POSITIONS

Oak Ridge National Laboratory/Spallation Neutron Source, Oak Ridge, TN

June 2014 – Present: Controls Group Leader for Protection Systems. Lead a group of engineering and technical staff in all aspects of the lifecycle management of personnel protection systems for a large research facility. Manage multiple support and improvement projects. Lead system architecture design for upgrades and new designs.

Establish vision, goals, and objectives for long-term viability and growth of the technical program and the group members. Identify and co-ordinate resources, schedule work; identify, document, integrate, and implement engineering and business standards and practices. Oversee internship of graduate and undergraduate students. The 2018 summer intern won lab-wide 'best poster award' for their work.

Current R&D includes systems engineering for accelerators, integrating system/software/cyber risk management methodologies, architectures for maximizing machine availability, and software and cyber security for high consequence control systems.

Instructor – United States Particle Accelerator School

2003 - 2014: Course developer and lead instructor "*Systems Safety and Safety Systems for Accelerators.*" First USPAS course on engineered personnel and equipment safety systems. The course applies to accelerators the system safety based approach used throughout high consequence industries such as aerospace, rail, nuclear power, and chemical processing. The course covers systems safety, regulation, lifecycle models, hazard and risk assessment, reliability assessment, safety technology, and software specific to research facilities.

Dates and Host University

January 2014: University of Tennessee - Knoxville
June 2007: Michigan State University
January 2006: Arizona State University
June 2004: University of Wisconsin, Madison
January 2003: Indiana University

PREVIOUS POSITIONS

Thomas Jefferson National Accelerator Facility (TJNAF), Newport News, VA

2007 - 2014: Engineering Manager for Safety Systems. Lead a group of engineers and technical staff in all aspects of the lifecycle management of personnel and equipment protection systems for a large accelerator facility. Manage multiple support and improvement projects. Lead the design of system architectures for new and improved systems.
Establish vision, goals, and objectives for long-term viability and growth of the technical program and the group members. Identify and co-ordinate resources, schedule work; identify, document, integrate, and implement engineering and business standards and practices. Support commissioning and operations of the CEBAF, JLab FEL, and smaller development and test facilities. Contribute to the Facility Safety Analysis Document (FSAD) and Accelerator Safety Envelope (ASE) development and approval. Design and manage credited engineering controls (CEC) for personnel protection systems. Consulting engineer and reviewer at other science laboratories. Formal training and practical experience using Siemens, Rockwell (Allen Bradley), Schneider (Modicon), and Pilz safety PLCs. Also familiar with ABB, GE, and OEM PLCs.

1995-2007 – Group Leader, Safety Systems: Accelerator Division

1993-1995 - Group Leader for Operations Electronics (Instrumentation and Control hardware)

1990-1993 – RF Control Systems Engineer

1991-1993 – CEBAF Commissioning Crew Chief (member of the first accelerator commissioning group appointed by the Accelerator Division Associate Director; based on knowledge of accelerator systems.)

Sperry Marine Systems, Charlottesville, VA

1980-1990 RF/Microwave Engineer; RF/Analog CAE Consultant. Systems level engineering, R&D, and design of high reliability DOD, commercial marine and airborne transceivers for radar and satellite communications; primarily in the 1 to 12 GHz range. Facilitated and performed EMI compliance testing for radar equipment. US and international accomplishments include first use of a PC for radar system modeling; First kilowatt class solid-state “hard tube” modulator design; spread spectrum radar transceiver design; receiver design for first commercial marine GPS receiver; Pilot operable (as opposed to navigator operated) aircraft radar controls. Early contributor to microwave CAE; developed linear and non-linear models used for in-house and commercial microwave CAE systems; Coordinated effort and alpha testing for first integration of microwave CAE software (EESOF) with a commercial CAE/CAD design package (ViewLogic) front-end.

EDUCATION

2017 Certificate in Architecture and Systems Engineering, MIT, Cambridge, MA

2012 BA Business, Averett University, Danville, VA

1980 AAS ET, J. Sargeant Reynolds CC, Richmond, VA

SELECTED PUBLICATIONS AND PAPERS

"Production of Highly Polarized Positrons Using Polarized Electrons at MeV Energies." D. Abbott et al. (PEPPo Collaboration). Physics Review Letters 116, 214801. 27 May 2016

"PEPPo: Using a Polarized Electron Beam to Produce Positrons. Adeleke Adeyemi et al. (PEPPo Collaboration). 6th International Particle Accelerator Conference (IPAC2015). 3-8 May 2015

"Jefferson Lab IEC 61508/61511 Safety PLC Based Safety System." K.L. Mahoney, H. Robertson. ICALEPCS 2009, Kobe (JP), Oct. 2009.

"Jefferson Lab Personnel Safety Electronic Log RMA." K.L. Mahoney, I. Carlino, T. Larrieu, K. Kindrew, T. McGuckin, N. Okay. ICALEPCS 2009, Kobe (JP), Oct. 2009.

"New Beam Loss Monitor for the 12GeV Upgrade." Jianxun Yan, K.L. Mahoney. Proceedings of the 12th International Conference on Accelerator and Large Experimental Physics Control Systems (ICALEPCS) 2009, Kobe (JP), Oct. 2009.

"Contemporary Programmable Safety Control Systems and Design Methods." K.L. Mahoney. ICALEPCS 2003, Gyeongju (KR), Oct. 2003.

"Helium Sensitivity in Oxygen Deficiency Measurement Equipment." K. Mahoney, D. Arenius, D. Curry, A. Hutton, H. Robertson. Aug 2001. 3pp. In the Proceedings of IEEE Particle Accelerator Conference (PAC 2001), Chicago, Illinois, 18-22 Jun 2001, pp 636-638.

"Emerging Standards with Application to Accelerator Safety System Design." K.L. Mahoney, H. Robertson. May 1997. In the Proceedings of 17th IEEE Particle Accelerator Conference (PAC 97): Accelerator Science, Technology and Applications, Vancouver, British Columbia, Canada, 12-16 May 1997, pp 3684.

"Survey of Electronic Safety Systems in Accelerator Applications." K. Mahoney. May 1997. In the Proceedings of 17th IEEE Particle Accelerator Conference (PAC 97): Accelerator Science, Technology and Applications, Vancouver, British Columbia, Canada, 12-16 May 1997, pp 3565.

"Modular Reliability Modeling of the CEBAF Personnel Safety System." J. Cinnamon [Student Intern], K. Mahoney [Mentor]. May 1997. In the Proceedings of 17th IEEE Particle Accelerator Conference (PAC 97): Accelerator Science, Technology and Applications, Vancouver, British Columbia, Canada, 12-16 May 1997, pp 3678.

"Jefferson Lab Personnel Safety Fast Beam Kicker System." K. Mahoney, O. Garza, E. Stitts, H. Areti, M. O'Sullivan. Particle Accelerator Conference, 1997. Proceedings of the 1997 Particle Accelerator Conference, IEEE, 1997, pp. 3681-3683.

"Implementation of an EPICS IOC on an Embedded Soft Core Processor Using Field Programmable Gate Array." Douglas Curry, Alicia Hofler, Hai Dong, Trent Allison, Curt Hovater, Kelly Mahoney. Oct 2005. 4pp. Published in Conf. Proc.C051010:PO2.055-4, 2005. Also in *Geneva 2005, ICALEPCS* PO2.055-4

"Calibration and Operation Schemes for CEBAF RF Control"
S. Simrock, J. Hovater, I. Ashkenazi, G. Lahti, K. Mahoney, J. Fugitt. Proceedings of the 1990 Linear Accelerator Conference, IEEE/AIP, Albuquerque, NM, 1990 . pp 480.

Performance of the CEBAF Arc Beam Position Monitors
A. Hofler, B. Bowling, C. Higgins, P. Kloeppel, G. Krafft, K. Mahoney. Proceedings of the 1993 Particle Accelerator Conference. IEEE. pp. 2298-2300.

"The CEBAF Frequency Distribution System"

A. Krycuk, J. Fugitt, K. Mahoney, S. Simrock. Proceedings of the 1991 Particle Accelerator Conference.

"Beam Loading Studies at CEBAF"

G.A. Krafft, K.L. Mahoney, S.N. Simrock. Proceedings of the 1990 Linear Accelerator Conference, IEEE/AIP, Albuquerque, NM, 1990.

HOBBIES AND INTERSETS

Volunteer science demonstrations at local events and schools

Maker projects including Arduino and Raspberry Pi controllers (Stepson won 2011 N.Y. Maker Fair 'Make Magazine's Editor's Choice Award' for collaborative submission.)

Photography

Science based art