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MARK S. ROSE, PH.D.

Innovation-Driven Technical Product Manager and Physicist with over thirteen years of full-cycle product development expertise in the design of radiation oncology quality assurance systems. Solid portfolio of product innovations including development of over ten integrated electrical, mechanical, and software systems designed to detect and measure radiation. Track record of designing systems currently used in 90% of US cancer treatment centers and in thousands of clinical sites worldwide.

Timeline

Sun Nuclear Corporation (SNC)	2005 - present
Senior Technical Product Manager and Research Physicist	
<ul style="list-style-type: none"> Responsible for overseeing the design and development of radiation therapy quality assurance systems. Brought more than ten integrated radiation detection and measurement systems to market. 	
Los Alamos National Laboratory (LANL)/University of California Riverside (UCR)	2004
Research Assistant	
<ul style="list-style-type: none"> Synthesized alloys designed to exhibit non-Fermi-liquid behavior. 	
University of California Riverside (UCR)	1998 – 2004
Ph.D. - Condensed Matter Physics / Research Assistant / Teaching Assistant	
<ul style="list-style-type: none"> Using muon spin resonance and a self-made, purpose-built, homodyne nuclear magnetic resonance spectrometer, probed the magnetic structure of non-Fermi liquid alloys to better understand atypical metallic characteristics. 	
Andrews University	1993 - 1998
Bachelor of Science – Physics / Teaching Assistant	
<ul style="list-style-type: none"> Physics Honors Society Member. 	
Florida Hospital - Marketing Department	1991 – 1995
Data Analyst	
<ul style="list-style-type: none"> Designed electronic key performance indicators (KPI) reporting system for executive management. Analyzed population demographics, highlighting areas for marketing emphasis. Generated patient satisfaction reports. 	

Professional Skills

Product Development Expert: Extensive background implementing and managing every phase (conception to market availability) of the product development life-cycle including market research, collecting and documenting product requirements, guiding design specifications, verification / validation activities, overseeing regulatory compliance, overseeing risk management and managing change request activities.

Project/Program Management: Solid project/program management experience leading the development of multiple radiation oncology quality assurance systems. Experience leading teams in the development of complex integrated system involving algorithm development, software, firmware, mechanical, and electrical components. Skilled at utilizing various project management approaches including agile and waterfall.

Scientific Acumen: Skilled at applying advanced scientific knowledge towards the development of innovative solutions that improve outcomes within healthcare. Extensive background conducting scientific research within both academic and business settings.

Regulatory Compliance Expert: Solid regulatory compliance background including:

- FDA 510K: Determination of filing applicability and authored 510K submittals.
- IEC 60601-1(-2): Worked with TUV documenting compliance with IEC guidelines.
- IEC 60732: Led documentation for electrometer compliance with IEC standards.
- IEC 62336: Conducted usability studies and documented results.
- Clinical Evaluation Reports: Authoring clinical evaluation reports updating Risk Management.

Product Development Portfolio

Water Scanners

Led development of one and three-dimensional water scanning systems, controlling software, and accessories. Software was designed to control motorized drives which scan radiation detectors through a water bath. Deposited dose is mapped throughout the radiation field. Accessories developed to support scanner functionality include: a) TPR accessory, b) submersible linear detector array, c) portable 50-gallon water transfer system, and d) transportation cases.

LINAC Quality Assurance

Led development of ion chamber and diode-based detector arrays for LINAC QA along with controlling software and accessories. Accessories developed include a) LINAC mounting fixtures, b) mounting fixture adapter plates and c) specialized buildup plates to monitor energy changes of the LINAC.

Patient Treatment Quality Assurance

Contributed to the development of three evolutions of patient treatment quality assurance hardware packages authoring and verifying requirements.

Early Research

- University of California, Riverside (UCR): Study of Heavy-Fermion, non-Fermi-liquid alloys utilizing Nuclear Magnetic Resonance (NMR).
- Los Alamos National Laboratory (LANL): Los Alamos, New Mexico: Alloy creation and characterization.
- Paul Schreer Institute (PSI), Villigen, Switzerland: Disorder driven non-Fermi-liquid systems utilizing Muon Spin Rotation (μ SR).
- TRI-University Meson Facility (TRIUMF), Canada's National Laboratory for Particle and Nuclear Physics, Vancouver, Canada: Frustrated spins systems contribution to NFL behavior utilizing μ SR.
- Massachusetts Institute of Technology (MIT): United States Particle Accelerator School.
- University of Central Florida (UCF): Transient absorption studies of ligand binding to myoglobin at variable pressure.
- University of Florida (UF): Tested muon detectors to be installed in the Compact Muon Solenoid detector in Geneva, Switzerland.
- Andrews University (AU): Theoretical studies of K-shell photoionization of neon, argon and krypton.
- G.R.G. Vanderweil Engineers: Lighting system and power supplies for Universal Studios - Islands of Adventure.

Recognition

Patents

- MiniLift Table International, Patent# 13/691,663
- Cylindrical 3D SCANNER for Dose characterization, US 8321179 EP 2457237 A1

Awards

- Albert Staats Apparatus Award (UCR). Received for construction of NMR spectrometer electronics.
- Post-doctoral research position funded by a collaborative grant between LANL and University of California.

Memberships

- American Association of Physicists in Medicine (2006 - present)
- Sigma Pi Sigma - Physics Honor Society (1998)

Engineering Management Skills

Mechanical

- Encoded servo & stepper motors
- Watertight enclosures
- Product housing: plastics, aluminum, steel, molding
- Product finish: paint, etching, nickel plating, anodization, overlays
- Pendant
- Cabling
- Packaging

Software

- Algorithm development
- Measurement control
- Post-measurement analytics
- File import/export
- GUI design
- C-Sharp
- .Net
- Borland
- Sequel server databases

FPGA/Firmware

- Measurement control
- Data logging
- Error handling
- Cross product synchronization

Electrical

- Analog
- Digital

Software Proficiencies

- Microsoft Office (Word, Excel, PowerPoint, Access, Outlook)
- Salesforce
- Survey Monkey
- Windchill
- Team Foundation Server
- Test Track
- Trello
- Go-To-Meeting
- DropBox
- Solid Works - Reviewer
- Eagle - Reviewer
- One Note
- MATLAB
- Mathcad
- Mathematica
- Sigma Plot
- Origin
- Kaleidagraph
- Igor Pro
- National Instruments-Labview
- Penelope (Monte-carlo modeling software)

Laboratory and Machine Shop Proficiencies

- Linear accelerator operation
- Dilution refrigerator operation
- Cryogenic handling
- Helium leak detection using a mass spectrometer
- Lathe operation
- Drill press operation
- Band saw operation
- Milling machine operation
- High and low-pressure systems
- Radio frequency electronic circuitry
- YAG laser operation

Publications

- M. S. Rose, L. Senadheera, "Measuring small fields with SRS MapCHECK™" Winter Institute of Medical Physics, Breckenridge, CO, (2018)
- C. S. Mayo et al., "American Association of Physicists in Medicine Task Group 263: Standardizing Nomenclatures in Radiation Oncology", International Journal of Radiation Oncology, 100-4, 1057–1066, (2018)
- S. Gao, P.A. Balter, B. Tran, M. S. Rose, and W. E. Simon, "Qualification of a 2D ionization chamber array for beam steering comparing with a water scanning system", JACMP, 2018-01019A
- S. Gao et al, "Measurement of changes in linear accelerator photon energy through flatness variation using an ion chamber array", Med. Phys. 40, (2013)
- M. Testa et al, "Proton radiography and proton computed tomography based on time-resolved dose measurements", Phys. Med. Biol. PMB/479221/PAP/3054, 54, (2013)
- A. Prabhu, B. Patadiya, D. Saini, M. Rose, S. Saini, "Implementation of Patient Specific QA in CyberKnife® using Mapcheck Software", 2009 CyberKnife® Users' Meeting, (2009)
- W. Simon et al, "LINAC Dosimetry: Benchmark Data Set Uncertainty", Med. Phys. 33, 2118 (2006)
- D. E. MacLaughlin et al., "Effect of annealing on glassy dynamics and non-Fermi liquid behavior in UCu4Pd", Physica B: Condensed Matter, 374-375, 177-179, (2006)
- D. E. MacLaughlin, M. S. Rose, O. O. Bernal, R. H. Heffner, G. J. Nieuwenhuys, R. Chau, and M. B. Maple, "Susceptibility inhomogeneity and non-Fermi liquid behavior in UCu5-xPt_x", Physica B: Physics of Condensed Matter 374-375, 174, (2006)
- D. E. MacLaughlin et al., "Critical slowing down in the geometrically frustrated pyrochlore antiferromagnet Gd₂Ti₂O₇", Physica B: Condensed Matter, (2005)
- M. S. Rose et al., "Impurity Satellite 27Al Nuclear Magnetic Resonance Studies of the f-site Diluted Non-Fermi-Liquid Alloys La_{1-x}U_xPd₂Al₃", Physical Review B, 72, 014423, (2005)
- K. Ishida et al., "Static and dynamical properties in the Pr-based filled skutterudite compound PrFe₄P₁₂ revealed by a 31P-NMR study", Phys. Rev. B 71, 024424, (2005)
- A. Bosse, F. J. Litterst, H. H. Klauss, M. S. Rose, L. Shu, D. E. MacLaughlin, "NMR study of the spin diffusion in the spin ladders of Sr₁₄Cu₂₄O₄₁", Verhandlungen der Deutschen Physikalischen Gesellschaft 40 (2), 572 (2005)
- M. S. Rose, "Nuclear Magnetic Resonance Studies of the Non-Fermi-Liquid Alloys La_{1-x}U_xPd₂Al₃", Ph.D. Dissertation, University of California, Riverside, (2004)
- B. L. Young et al., "29Si nuclear spin-lattice relaxation in CePtSi_{1-x}Gex near a magnetic instability", Phys. Rev. B 70, 174430, (2004)
- B. L. Young et al., "Disorder effects near a magnetic instability in CePtSi_{1-x}Gex (x=0, 0.1)", Phys. Rev. B 70, 024401, (2004)
- D.E. MacLaughlin et al., "μSR and NMR in f-electron Non-Fermi-Liquid materials", Physica B 326, 381–386, (2003)
- DE MacLaughlin et al., "μSR in Ce_{1-x}LaxAl₃: anisotropic Kondo effect?", Physica B, 326, 387-389, (2002)
- D. E. MacLaughlin et al., "Muon Spin Relaxation and Isotropic Pairing in Superconducting PrOs₄Sb₁₂", Phys. Rev. Lett. 89, 157001, (2002)
- B. L. Young et al., "Nuclear Magnetic Resonance Method for Determining the Magnetic Easy Direction in Anisotropic Paramagnetic Powders", Review of Scientific Instruments 73, 3038-3043, (2002)
- D. E. MacLaughlin, O. O. Bernal, R. H. Heffner, G. J. Nieuwenhuys, M. S. Rose, "Glassy Spin Dynamics in Non-Fermi-Liquid UCu_{5-x}Pd_x, x= 1.0 and 1.5.", Physical review letters 87 (6), 066402, (2001)
- M. S. Rose, BL Young, DE MacLaughlin, OO Bernal, HG Lukefahr, K Heuser, "Detection of Magnetic Easy Direction in Field-Aligned Anisotropic Paramagnetic Samples Using NMR", APS Meeting Abstracts
- M. S. Rose, D. E. MacLaughlin, B. Young, H. G. Lukefahr, M. B. Maple, "27Al NMR Studies of Non-Fermi-Liquid Behavior in Y_{0.8}U_{0.2}Pd₂Al₃", APS Meeting Abstracts
- M. Kutzner and M. Rose, "A theoretical investigation of K-shell photoionization of neon", Journal of Physics B: Atomic, Molecular and Optical Physics, 32, (1999)