JAMES M. POTTER, Ph.D.

HIGHLIGHTS OF QUALIFICATIONS

Experience

Linear accelerator design and rf measurements, 55 years.
Computer control and data acquisition, 45 years.
High power rf system design and testing, 34 years.
Design of high voltage, high current ac and dc power systems, 33 years.

Additional Capabilities

Practical analog, digital and interface electronic circuit design.
Prevention and correction of grounding and shielding problems.
Analysis and interpretation of coordinate measuring machine data.
Troubleshooting from system level to component level.
Programming: multiple languages, low level to high level.
Implementation of PC-based data acquisition and analysis systems.
Innovative solutions to accelerator engineering problems.
Unique combination of analytic and experimental ability.
Broad technical background for versatile approach to new problems.

Communications

Highly effective in communicating physics requirements to engineers and technicians.
Excellent teaching skills: novice through expert level, one-on-one or large groups.
Excellent technical writing skills: experienced in report and proposal writing.

PROFESSIONAL EXPERIENCE

Linear Accelerator Development

Contributed to the development of the resonantly coupled linac (CCL) at LAMPF.
Co-invented post-coupled drift tube linac (DTL).
Played leading role in US development of Radio Frequency Quadrupole (RFQ) linac.
Co-invented and developed resonantly coupled bridge coupler for joining sections of CCL.
Contributed to development of coupled circuit analysis of CCL.
Developed circuit analysis for RFQ based on multiport transmission lines and lumped elements.
Developing multiport network model for DTL analysis.
Developed principles and procedures for tuning CCLs and bridge coupled CCLs to achieve stable, uniform field distribution.
Invented tilt-sensitivity method for tuning post-coupled DTLs to achieve design field distribution with high stability.
Developed principles and procedures for tuning RFQ linacs for uniform, symmetric field distribution.
Invented manifold-coupled RFQ to provide distributed coupling of rf power without perturbing field distribution.
Developed tuning procedures and supervised tuning of LAMPF CCL, 1970-1972.
Determined problem with LAMPF DTL tuning, developed correction method and directed retuning effort (1975).

Co-invented adjustable energy DTL.
Invented wide range variable energy RFQ for ion implantation.
Invented special two beam buncher cavity for accelerator beam funneling.
Developed practical rf deflector for beam funneling.
Invented "Uni-vane" method of RFQ construction, using an aluminum extrusion to form the base for all four RFQ segments.
Co-invented "twin-beam" DTL design used for 2.5-70 MeV portion of Superconducting Super Collider linac system.
Developed fabrication procedure for S-band electron linac structures that eliminates post-braze tuning.
Built variable energy, 0.5 MeV to 4 MeV, S-band electron linac for research applications.
Built high power on-axis coupled S-band linacs for Homeland Security and Food Processing applications.
Invented resonant coupling scheme for superconducting accelerators.
Invented continuously variable energy electron accelerator.
Co-invented the Klynac, a coupled cavity linear accelerator with an integral resonantly coupled klystron rf power source.

RF Power

Developed efficient high peak power UHF rf amplifier cavity, using 12 planar triodes in a grounded grid circuit, capable of up to 360 kW output at 425 MHz with 1.5% duty factor.
Developed four-tube parallel planar triode cavity amplifier capable of 50 kW output at 850 MHz.
Developed rf power system for high Q resonant cavity loads with feedback control of cavity phase, amplitude and frequency.
Developed compact 40 kW, 2 MHz "class D" rf power system for driving H- ion source plasma.
Developed 200 MHz, 50 kW CW, 200 kW pulsed rf power system using 24 planar triodes in a push-pull-parallel configuration.
Developed amplifier output coupling scheme that allows wide variation of load impedance with fixed output connection.
Developed versatile DDS-based low level rf system for phase locking rf to accelerator structure at any phase angle with no phase shifters required.
Developed 180 KW, 200 MHz CW rf power amplifier using 6 UHF tetrodes in parallel.
Developed rf power system with multiple vacuum tubes directly coupled to an accelerator structure.

Measurement and Analysis

Developed phase-locked generator method of bead perturbation field measurement.
Contributed to hardware and software development of minicomputer based data acquisition and analysis system for CCL tuning.
Invented and developed non-intercepting, wide dynamic range beam position monitor system for LAMPF.
Developed a method for precise measurements and comparisons of surface conductivity of materials.
Developed parity violation detector with four orders of magnitude increased sensitivity over previous experiments.
Developed wideband feedback system for dynamically controlling beam position and angle.

Developed low level coherent detection scheme and analog signal processing for parity experiment.
Contributed to development of analog trigger system for 64 x 64 calorimetric detector array.
Developed microcomputer-based eight-screen graphics system for on-line display of experimental data.
Contributed to the development of hardware and software for MultiBus-based distributed microcomputer control system.
Contributed to development of PC-based linac control system using Fermilab rack monitor data acquisition electronics.
Contributed to development of sophisticated permanent magnet quadrupole (PMQ) field measuring system.
Developed a highly improved version of the taut-wire PMQ position measuring system for aligning transverse position of drift tubes in DTLs up to 6 m long to within 0.002".
Developed procedure for aligning longitudinal position of DTL drift tubes based on physics requirements for gap-to-gap and accumulated phase errors.
Developed computer program for least-squares fit of coordinate measuring machine (CMM) data to theoretical drift tube profile for drift tube inspection.
Developed program for transient analysis of CCL, including interaction with beam.
Developed tuning procedure for determining frequencies of individual accelerating and coupling cells in on-axis coupled accelerator structures.
Developed DDS-based specialized rf source for linear accelerator applications.
Developed DDS-based low level rf system with multiple synchronized sources for VHF, UHF, and Microwave.

Miscellaneous

Co-inventor of improved high power ultraviolet lamp.
Co-inventor of thin vacuum valve for particle accelerators.
Co-inventor of specialized non-uniform transmission line.
Invented spark monitor and kill circuit for automotive engine testing.
Co-inventor of end-fed resonant transmission line high voltage power generator
Co-inventor of “Superluminal Antenna”, a completely new type of antenna that produces tightly-focused packets of electromagnetic radiation fundamentally different from the emissions of conventional antennas.

Management

Supervised tuning of Los Alamos coupled-cavity linac, 1970-72, with staff of 10 technicians, retuning Los Alamos DTL, 1975.
Founder, President, JP Accelerator Works, Inc. Expanded company to total of 29 employees in Texas and New Mexico.
Project Manager, Upgrade of SSC injector linac system to 1 mA at 70 MeV for International Isotopes, Inc. Established task-oriented team structure, maintained aggressive schedule for project completion.
Cofounder, Sr. Research Scientist, Manager of Research and Development, AccSys Technology, Inc. Supervised product development, and prototype production.

Computer Programs

Proficient in use of SUPERFISH, HFSS, PARMELA, TStep, AutoCAD, SolidWorks, FlowWorks, COSMOS/Works, Ansys, Comsol, SPICE, Mathematica, MathCad, Visual Basic, LabVIEW

WORK HISTORY

2013-Present	Founder and Managing Partner, Presidio Machine & Engineering LLC
1994-Present	Founder, President & CEO, JP Accelerator Works, Inc.
1986-1994	Founder, Senior Research Scientist, AccSys Technology, Inc.
1978-1986	Staff Member, Los Alamos Nat'l Laboratory, Accelerator Technology Division
1970-1978	Staff Member, Los Alamos National Laboratory, Meson Physics Division
1968-1970	Graduate Student, Research Asst., University of Illinois, Urbana, IL
1964-1968	Staff Member, Los Alamos National Laboratory, Meson Physics Division
1959-1964	Transmitter Engineer, WILL-AM/FM/TV, Urbana, IL
1960-1964	Electronics Technician, Physics Department, University of Illinois, Urbana, IL

EDUCATION

Ph.D. , Physics, 1975 - University of Illinois, Urbana, IL

M.S. , Physics, 1970 - University of Illinois, Urbana, IL

B.S. , Engineering Physics, 1964 - University of Illinois, Urbana, IL

HONORS

Sigma Xi , Scientific Research Society, 1976