KURT FRANCIS

E-Mail: kfrancis77@sbcglobal.net
Phone: 630-305-0093

RECENT RESEARCH EXPERIENCE

Northern Illinois University DeKalb, IL**,** 6/2013 to present
Research Scientist:

- Analysis of data for a Proton Computed Tomography device for use in medical physics
- Developing Scintillator and Multipixel Photon Counter (MPPC) based calorimeter prototype for High Energy Physics

Argonne National Laboratory Argonne, IL**,** 5/2013
As post-doctoral researcher:

- Actively developed Monte Carlo simulations with Geant4 in the Mokka framework for a resistive plate chamber (RPC) based digital hadronic calorimeter (DHCAL)
- Studied the charge response of RPCs by comparing Monte Carlo and beam data shower profiles of positron and pion events
- Built, assembled, tested and operated in the Fermilab test beam an RPC based digital hadronic calorimeter prototype with steel absorber
- Operated RPCs at CERN test beam with Tungsten absorber and extended simulations with Tungsten configuration

PROFESSIONAL EXPERIENCE

As graduate student and doctoral candidate with the **Northern Illinois Center for Accelerator and Detector Development (NICADD)** Dekalb, IL, 12/2002 to 1/2010:

- Collaborated in all aspects of the design, construction, calibration, data collection and analysis of a prototype muon tracking system
- Developed Root C/C++ software to analyze data from CALICE Tail Catcher/Muon Tracker to demonstrated the use of a tail catcher to improve the energy resolution of calorimeter systems
- Test beam experience at the European Organization for Nuclear Research (CERN) in France and Switzerland, the Fermi National Accelerator Laboratory in Batavia, IL, and the Deutsches Elektronon-Synchrotron (DESY) laboratory in Hamburg, Germany
- Developed LabView software to collect data from a cosmic ray detector
- Evaluated scintillating plastic modules using fiber optics, photomultiplier tubes and analog to digital data acquisition equipment

Panasonic/MIECOA Elmhurst, IL, 4/1995 to 7/2002

- Software engineering for embedded systems
- Developed firmware for data encryption security terminal
- Developed firmware for pager sized electronic radiation dosimeters
- Development and maintenance of Thermoluminescent Dosimetry applications

- Developed 8051 CPU firmware for Magnetic stripe card and Smart cards readers
- Developed BIOS for DOS/x86 based data entry terminal with touch screen

V-Real, Redwood City, CA / **Brian A. Rice Inc.** Hinsdale, IL, 9/1994 to 4/1995
- Developed video game software for the Atari Jaguar, Sega systems

Panasonic Technologies, Franklin Park, IL, 12/1990 to 9/1994
- Designed and developed a Visual BASIC Time and Attendance Applications
- Programming and technical support for point of sales systems, radiation measurement devices, bar code scanners and data entry systems

EDUCATION
PhD in Physics, May 2010
Northern Illinois University DeKalb, IL
M.S. Applied Physics, May 2004
Northern Illinois University DeKalb, IL

B.S. Electrical Engineering, December 1988
University of Illinois Urbana, IL

Areas of Expertise
- Monte Carlo simulations using Geant4 in Mokka framework
- Calibration and analysis of calorimeter systems with Silicon Photomultipliers/Multi-pixel Photon Counters

Technical Skills
- Programming languages: C, C++, Java, Python, Visual Basic.NET, LabView, Fortran
- Design of particle detectors using plastic scintillators and photo-multiplier tubes
- Embedded systems programming in C and assembly language (x86, 8051)
- Low voltage test bench experience using Tektronix and Agilent digital oscilloscopes evaluating and characterizing silicon photo multipliers (SiPMs) and Multi-pixel photon counters and debugging a LED driver calibration circuit (to monitor the time and temperature response of SiPMs)

Select Publications
K. Francis, for the CALICE Collaboration, "Construction of the DHCAL", Physics Procedia, PHPRO2387, 10.1016/j.phpro.2012.02.377, 2012.

G.C. Blazey et.al., for the CALICE Collaboration, "Construction and Performance of a Silicon Photomultiplier/Extruded Scintillator Tail-Catcher and Muon Tracker", JINST 7 P04015, 2012.

K. Francis, "Results of Beam Tests on the Prototype Calorimeter for a Linear Collider", PhD Dissertation, May 2010.

A. Dyshkant, et.al "Small scintillating cells as the active elements in a digital hadron calorimeter for the e+e- linear collider detector", INSTITUTE OF PHYSICS PUBLISHING JOURNAL OF PHYSICS G: NUCLEAR AND PARTICLE PHYSICS J. Phys. G: Nucl. Part. Phys. 30 (2004) N1–N16 PII: S0954-3899(04)76470-1 RESEARCH NOTES FROM COLLABORATIONS.

K. Francis, for the CALICE Collaboration, "TIPP 2011 Proceedings: Construction of the DHCAL", Physics Procedia, in preparation.

<u>Select Presentations</u>
American Linear Collider Program Group / Linear Collider Workshop, Albuquerque, NM, 2009
CALICE Tail-Catcher Muon-Tracker (TCMT) Preliminary Test Beam Results

Linear Collider Workshop, Grenada, Spain 2011
Construction of the Digital Hadron Calorimeter

Technology and Instrumentation in Particle Physics, Chicago, IL, 2011
Construction of the DHCAL