Curriculum Vitae

PIERRICK M. HANLET

Citizenship: U.S. citizen

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EDUCATION

Aug. 1987 — May 1995	Ph.D. Physics	University of Virginia Charlottesville, Virginia
Sep. 1980 — Dec. 1984	B.S. Physics	S.U.N.Y. @ Stony Brook Stony Brook, New York

PROFESSIONAL EMPLOYMENT

Jun. 2002 — present	Senior Research Associate	Illinois Institute of Technology
Jun. 2001 — May 2002	Research Associate	University of Texas at Arlington
Dec. 1999 — Feb. 2001	Member of Technical Staff	Lucent Technologies, Inc.
Jun. 1996 — Dec. 1999	Research Associate	Northeastern University
May 1995 — Jun. 1996	Research Consultant	University of Virginia
Jun. 1986 — Aug. 1987	Physics Associate IV	Brookhaven National Laboratory
Oct. 1984 — Jun. 1986	Laboratory Technician	Yale University
Jun. 1984 — Aug. 1984	Laboratory Consultant	Alpha Omega Development Inc.
Jan. 1984 — Jun. 1984	Laboratory Assistant	S.U.N.Y. @ Stony Brook

HARDWARE SKILL SUMMARY

- Lead design of analogue printed circuit board
- Assisted in setting up a network for testing a packet data protocol standard using wireless devices
- Managed, designed, built, and implemented several CAMAC based test stands
- Managed, designed, prototyped, built, published muon scintillator LED pulser calibration system
- Debugged fast analogue and digital electronics for high rate electromagnetic calorimeter
- Assisted in building Silicon Microvertex Detector for Fermilab E771
- Built flip coil to measure field components of modified accelerator sextupole magnet
- Assisted in construction, testing, and mapping of dipole septum magnets
- Built phoswhich neutron detector
- Assisted in construction of an Ultra-high vacuum beamline

COMPUTER SKILL SUMMARY

• **Platforms:**	Unix (SGI, Sun, Linux, IBM AIX, Ultrix), DEC (VMS and AXP), PC (DOS, Windows, Windows 95/98/2000/ME/XP, Windows NT), VME (VXWorks), Apple
• **Administration:**	Linux, DEC, DOS, Windows 95/ME
• **Languages:**	C++, Fortran, C, Perl, HTML, Cobol, Python, ASN.1, shell scripting
• **Applications:**	LaTex, Microsoft Office Suite, MrProject/MSProject, PAW, Mathematica, GEANT, Pythia various X applications, some CAD programs, various internet protocols
• **Databases:**	mSQL, Oracle
• **Protocols:**	TCP/IP and SS7

RESEARCH ACTIVITIES

Fermilab Experiments 907/875/789 (2001-present)
Since the beginning of the commissioning phase of E907, or *MIPP*, I have served as co-Run Coordinator for the experiment. My responsibilities include planning and implementing a direction for the most expedient and systematic turning on of all sub-detector systems. This is accomplished by coordinating efforts of both local and remote collaborator schedules, experiment priorities, and accelerator schedule, effectively directing both senior and junior collaborators.

I have also played a principle roll in resurrecting a recycled drift chamber system. I designed, built, implemented a teststand to test all of the chamber electronics. I wrote a comprehensive safety document and oversaw safety modifications added to all of the discriminator boards. The chambers were one of the first sub-systems installed and ready for commissioning.

In addition, I have worked with the trigger group to develop and implement experiment triggers, worked with the DAQ group to serve as an on-call expert. Furthermore, I have developed data unpacking and reconstruction software.

For E875, or *MINOS*, I developed offline analysis package used to debug MINOS near detector electronics, and I took shifts at CALDet.

In parallel, I have been working on an analysis project for E789 in which I am developing a purely data driven multivariate approach to reconstruct charged K–mesons in a RICH detector. The approach is to use the reconstructed protons and pions to refine the detector calibration of multiple dependent variables.

Fermilab Experiment 823 (2001-2002)
With the Forward Proton Detector, or *FPD*, group on experiment E823, or DØ, I am leading an effort to integrate the detectors into the standard DØ electronics for both readout and triggering. The detectors are Roman Pots which reside in the Tevatron ring, inside the vacuum pipe. These detectors can be moved very near to the stored proton and anti-proton beams to measure protons(anti-protons) which partake in an elastic or diffractive collision in the DØ interaction region. The cross section for these events is $\sim 40\%$ of the total cross section.

Signals from the new detectors are amplified by recycled Run I electronics in the tunnel near the detectors, and the output signals are transported to the DØ platform, where standard Run II electronics will be used to form triggers and to read out the data. A Transition Patch Panel, or *TPP*, which I lead in the design is used to: 1) make the transition from our cables to DØ flex circuits, 2) separate the tunnel ground from the DØ platform ground, 3) reshape the signals to mimic the output of the VLPC's, and 4) discard excess charge so that the signals lie within the dynamic range of the readout electronics.

Until the FPD is fully integrated into the standard DØ trigger and readout chains, I have taken the responsibility for the NIM based trigger logic of our stand-alone DAQ. Here, I design and implement triggers.

In addition to my hardware responsibilities, I have lead an effort in data selection for track reconstruction. These tracks will subsequently be used to generate our first physics distributions.

Lucent Technologies, Inc. (1999-2001)
For Lucent Technologies, I worked with a team of software testers which integrated several network elements of a packet data protocol standard. My responsibilities included developing a detailed understanding of the G_{R} interface, developing test procedures to test both the working scenarios and error legs, documenting a test plan for formal review, writing detailed test cases in TMS (Test Management System), setting up the lab, running the tests, and documenting the results in TMS.
Running the tests required using two independent simulators for cross checking results. In order to generate error conditions, I wrote filters to intercept and modify the simulator messages.
In addition, I wrote scripts to simplify adding numerous scripts simultaneously into TMS.

Fermilab Experiment 740/823 (1996-1999)
My work with Fermilab's experiment 740, or DØ, had been in three main areas: Muon Detector Upgrade, Direct Photon analysis of Run I data, and DØ Speakers' Bureau.

For the DØ muon detector upgrade, I have led two projects: 1) an LED based pulser system for monitoring muon scintillation counters, and 2) a CAMAC based cosmic ray test stand for commissioning muon scintillation counters.

I designed, prototyped, tested, and implemented an LED pulser system which monitors the gains of ~6000 photomultiplier tubes (*PMTs*) to within a few percent. Knowledge of the PMT gains are crucial to the proper functioning of the Level 1 muon trigger, as it helps to ensure proper timing of the signals and therefore proper rejection of out–of–time muons. To complete this project I was responsible for the R&D, procurement of parts, scheduling, interfacing with electrical engineers and draftsmen, and supervision of graduate, co–op, and summer students. I wrote the 68k code (on the VxWorks platform) to interface with the electronic pulser, and began interfacing the control with the online group. I led our team in the installation of the devices throughout the muon system. An accompanying project was the writing of a stand–alone Monte Carlo ray tracing simulation to aid in the design. The project was documented completely in DØNote 3563; at present, I am working on publishing our design and test results in NIM. The system came in under budget, and tests have demonstrated a high degree of short and long term stability and a resolution of $\mathcal{O}(0.2)\%$; a three month test of a prototype has tracked a 4% drift in gain of a counter PMT.

The excellent performance of the LED Pulser System had attracted interest outside of the muon group, and is being used as the calibration device by the Inter Cryostat Detector (*ICD*) group.

Also for the muon upgrade effort, I designed, built, wrote software, and implemented a CAMAC based data acquisition system for a muon test stand. This stand was used to commission the muon scintillation counters in the central region of the detector $|\eta| \leq 1$. To complete the project, I supervised a student, interfaced with technicians, and procured electronics from PREP.

Within the photon group, I was involved in the study of photons produced in the hard scattering of two partons. Such measurements provide a direct probe of gluon distributions within the proton, as well as k_T effects and higher order QCD processes. My analysis projects have included re-analysis of Run IA data using Run IB techniques and Monte Carlo for the inclusive cross section measurements, and a measurement of the ratio of same side to opposite side $\gamma + jet$ events. For both of these projects, I streamed off non–zero suppressed zero–biased data for use in overlaying calorimeter noise on Monte Carlo simulation events. These data have been used in numerous DØ analyses.

Additionally, I have participated in an Editorial Board which reviewed QCD photon physics results for conference presentations and publication.

From December 1996 until May 1999, I served as Assistant to the Chair of the DØ Speakers' Bureau. This committee serves to interface with conference organizers in selecting talks for DØ, and to choose DØ personnel who would both best represent the experiment and best be served with the talk opportunity. My responsibilities included candidate selection, as well as designing and maintaining web pages. In addition, I designed and built an mSQL database for the Speakers' Bureau with C++ based user interface with a web interface to the database. When the experiment chose to use Oracle, I assisted in designing the new Oracle database for the Speaker's Bureau, and converting the data from the old to populate the new one.

Fermilab Experiment 771 (1989-1996)
The primary goal of E771 was the study of the production of mesons containing b quarks—paired with lighter (u, d) quarks—by an 800 GeV/c^2 proton beam on a fixed silicon target. Due to the expected low cross section for these events at this energy, the experiment was designed to trigger on events containing a high mass di–muon pair or a single high transverse momentum muon. Considering both the theoretical predictions for the cross section times branching ratio into these distinctive signatures, and the computed acceptance of such events into the experimental apparatus, only one in 10^{11} interactions were expected to be recorded in our final data sample. The experiment was therefore run at high rates of $\sim$2 MHz.

My contributions to E771 encompassed almost every aspect of the experiment. I was a central figure in the revitalization of each of the $\sim$1500 elements of the E705 electromagnetic calorimeter, its electronic readout, and in the setting of timings and gains for each channel. I developed, tested, and implemented an electronic correction for the front end of the glass ADCs and modified high impedance pickoff modules to reverse the input polarity and amplify the signal. In test stands which I set up, I wrote programs which interfaced with the hardware controllers and readout modules. I set up the readout logic for the glass ADCs and TDCs, table position monitor, and pulser system. I was also involved in building a silicon micro–vertex detector, setting up triggers, developing online monitoring code, and building and monitoring the experiment's fast data acquisition system. During the run, I was a contact person for the electromagnetic calorimeter and data acquisition system.

For offline data analysis, I contributed to almost each effort with contributions including: the development of primitive Fortran routines for I/O, reading and writing of experiment data parameters, and data decoding routines. My primary task dealt with the reconstruction of electromagnetic showers in the electromagnetic calorimeter. The detector had numerous components, including scintillating and lead glass blocks, sampling calorimeters, TDC channels on the main array blocks, a table position controller and monitor, calorimeter house temperature monitors, and an LED pulser and filterwheel system—totaling 1,600 channels. The data analysis involved an offline energy calibration of each element of the detector, a relative alignment of each component, an absolute alignment of the device relative to the spectrometer, a time calibration of 400 channels to remove the energy dependence, resurrection of old shower reconstruction code, and development of new reconstruction code. Here I single-handedly developed algorithms for the pattern recognition and charged track reconstruction; developed algorithms for pattern recognition and reconstruction of tube hodoscope shower energies and positions—including overlapping showers; developed new track–shower matching algorithms; and wrote a complete set of shower analysis routines for particle identification. I also participated in the computer simulation of the entire E771 detector, and was sole author of a detailed simulation of the E771 electromagnetic calorimeter—each within the framework of the GEANT Monte Carlo simulation package. Furthermore, I participated in the development of a GKS graphics event display package for the spectrometer tracking and developed a GKS graphics event display package for the electromagnetic calorimeter.

My earliest analysis included spectroscopy of rare $c\bar{c}$ states; namely the ${}^1\mathrm{P}_1$ state of charmonium. Later, my thesis analysis was to make a precision measurement of the branching ratio for the rare decay $\eta \to \mu^+\mu^-$. Here I used the calorimeter to measure the differential and total cross sections for η production at our beam energies by reconstructing events in the $\eta \to \gamma\gamma$ channel and π^0s for the $\eta \to \pi^+\pi^-\pi^0$ channel.

LEGS (1986-1989)
The "LEGS" beamline (**L**aser **E**lectron **G**amma Ray **S**ource) is a tagged photon beam created by Compton backscattering UV photons off of electrons in the National Synchrotron Light Source X-ray storage ring. The photon energies were tagged by measuring the recoiling electron momenta in an electron spectrometer. By polarizing the laser light, one could achieve >75% polarization of the gamma rays. For a 2.8 GeV store in the ring, maximum photon energies of 370 MeV could be achieved having a tagged photon rate of 10 MHz. My contributions to the group included building a flip coil probe and using it to measure the field components of a modified sextupole magnet used in the storage ring. I assisted in building, testing, and field mapping three dipole magnets, used in the electron spectrometer which was installed in the NSLS tunnel. The first two of these dipole magnets were septum magnets, made of Hyperco 50A, and were highly constrained to fit in the alloted space, have high fields—$\mathcal{O}$(16 kG)—to deflect the recoiling electrons, and have a small fringe field—$\mathcal{O}$(0.1 G)—so as not to impact the stored electron beam which was only 3 cm from the gap of our first dipole magnet. I was also responsible for the construction of a phoswhich detector, a sandwich of 1–2 mm of CaF_2 followed by 30–50 cm of plastic scintillator; this proton detector was used in the measurement of the ratio $E2/M1$ for the proton and subsequent experiments.

BNL (1985-1986)
At the Brookhaven's National Synchrotron Light Source, I assisted a solid state X-ray scattering group in building and testing an X-ray beamline. Here I developed expertise in ultra-high vacuum techniques, beamline surveying and alignment, as well as acquired experience in beam optics.

TEACHING EXPERIENCE

I am presently serving as a 2^{nd} grade catechist in a Religious Education program. During the academic years of 1999-2000 and 200-2001, I assisted as a catechist in a Catholic Religious Education programs for 3^{rd} and 2^{nd} grades, respectively. During the academic years of 1989-1990, 1990-1991, 1997-1998, and 1998-1999, I taught Catholic Religious Education to 8^{th} graders. In addition, I have logged numerous hours of private and professional tutoring, have directed junior graduate students and undergraduate students in research projects, and have lectured in local public schools both in Virginia and Illinois.

ORAL PRESENTATIONS

Photon and di-photon results from CDF and D0
13th Topical Conference on Hadron Collider Physics, Mumbai, India, 14-20 Jan 1999

QCD Processes
Fermilab Annual Users Meeting, Fermilab, Batavia, Illinois July 1998

Direct Photon Measurements at DØ
Pheno-CTEQ'98, Madison, Wisconsin, March 1998

Direct Photon Production at DØ
QCD 97, Montpellier, France, July 1997

Direct Photon Production at DØ
Phenomenology Workshop, Madison, Wisconsin, March 1997

Preliminary Results for η Production and the Branching Ratio $\mathcal{BR}(\eta \rightarrow \mu^+\mu^-)$
DPF'96: The Minneapolis Meeting, Minneapolis, Minnesota, August 1996

Preliminary Results from E771: The Search for B-Mesons
Third Annual SAHEP Gulf Shores Meeting, Gulf Shores, Alabama, January 1993

MEMBERSHIPS

The American Physical Society
The Division of Particles and Fields

PERSONAL INFORMATION

I am fluent in French.

In addition to physics, my interests have included co-founding a soccer club and later a rugby club. I've actively played rugby for 15 years and have served as president, captain, and assistant coach. I've also coached a women's college rugby club.

Of equal interest to me is music. I've sung as a church cantor since 1991, have sung semi-professional opera, and have appeared as soloist with choral groups both in the U.S. and in Europe. In addition to singing in church, I sing with a professional choir and under contract with an events coordinator.

I enjoy repairing and maintaining my own automobiles. I built my own Triumph Spitfire.