THE FERMILAB WILSON FELLOWSHIP PROGRAM

by Rolland P. Johnson

Over the last 12 years, the Wilson Fellowship has attracted some of the best young researchers in high energy and accelerator physics to Fermilab. The award was created by Leon Lederman to honor Fermilab's first director, Robert R. Wilson and it is typically awarded to one or two individuals per year. The award is for three years, extendable for another two, and has a stipend that is meant to be competitive with the best university assistant professorship pay scales. Additional funds are available for travel, publications, and computing.

In the spirit of providing the most desirable position available, there are no constraints on the research that a Wilson Fellow may pursue. Fellows are encouraged to spend all of their time on their research and there are no required laboratory duties to distract from this effort. Fellows in experimental high-energy physics generally have been required to have substantial postdoctoral experience before consideration as a Wilson Fellow candidate. As a recognition of Robert Wilson's contributions to particle accelerators and as an inducement for people to enter the field, Wilson Fellow candidates for accelerator physics research may have less postdoctoral experience.

Selection of the Fellows is made by the Laboratory Director, based on the advice of the Wilson Fellows Committee. The present Committee is composed of Gene Fisk, Irwin Gaines, Dan Green, Rol Johnson (Chair), Drasko Jovanovic, Paul Mantsch, and John Marriner.

There are presently 11 Wilson Fellows. They are listed below with the date of their appointment:

Bob Hsiung (Wilson Fellow, May 1989) received his Ph.D. from Columbia based on Fermilab Experiment 605. As a Fermilab research associate he worked on E-731, a measurement of CP violation parameters ε'/ε in neutral kaon decays. As a Wilson Fellow, Bob is involved in E-773, an extension of E-731, to test CPT invariance in the neutral kaon system by measuring the phase difference between the CP-violating decay parameters η_{+-} and η_{00}. He is also involved in a search for the direct CP-violating rare decay of $KL \rightarrow \pi^0 e^+ e^-$ and in E-789.

Jay Hauser (January 1989) received his Ph.D. from Cal Tech on weak decays of D mesons using the Mark III detector at SLAC. As an Enrico Fermi Fellow at the

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University of Chicago he participated in the Collider Detector at Fermilab (CDF) experiment where he was heavily involved in the development of the trigger processor. As a Wilson Fellow, Jay has continued with CDF, where, among other things, he has been analyzing the asymmetry of W boson decays.

Gerry Jackson, (October 1988), did his Ph.D. work at Cornell where he worked improving the luminosity of the CESR e^+e^- collider. Before becoming a Wilson Fellow, he worked at Fermilab as a research associate on the Main Ring and Tevatron, and, in particular, on the rf manipulations needed for collider operation. Concurrent with his Wilson Fellowship, Gerry is the Associate Head of the Injector Department for Instrumentation. His research as a Wilson Fellow is the design and installation of a bunched beam stochastic cooling system in the Tevatron. He also is supervising two Ph.D. students on beam instabilities in the Antiproton Accumulator, Main Ring, and Tevatron, and preparing an accelerator-physics course at Northwestern with Jamie Rosenzweig.

Heidi Schellman (June 1988) did her Ph.D. at the University of California, Berkeley, working on the Mark II (PEP) detector at SLAC. Following that she worked for the University of Chicago on Fermilab Experiment 744/770, a neutrino scattering experiment to measure proton structure functions and their variation with Q^2. As a Wilson Fellow she is working on Fermilab Experiment 665, again a measurement of structure functions, but using the Tevatron muon beam instead of neutrinos. She is working primarily on hardware for the next run, including a vertex "jet" tracking chamber.

Jamie Rosenzweig (June 1988) did his Ph.D. at the University of Wisconsin on experimental and theoretical investigations in plasma wake-field acceleration. He has used the Argonne Advanced Accelerator Test Facility to first demonstrate plasma wake-field acceleration and then to study the dynamics of intense beams in more detail. He also investigated the optics of plasma lenses and their uses in the final focus of linear colliders. As a Wilson Fellow, Jamie has continued working on these subjects as well as space charge effects on proton beams, ion trapping by antiproton beams, longitudinal beam dynamics, and stochastic cooling.

Bruce Denby (June 1988) received his Ph.D. from the University of California, Santa Barabara, based on his work in experimental high-energy physics in charm photoproduction experiment E-516 at Fermilab. He subsequently worked on the UA1 experiment at the CERN SPS, and on Delphi at LEP. In 1987, while working at the Linear Accelerator Laboratory in Orsay, France, he became interested in neural networks, and became excited about the possibility of applying these techniques to triggering in a high-energy physics experiment. This excitement has carried through to his current position as a Wilson Fellow at Fermilab, where

he is currently investigating, among other neural net applications, two types of beauty triggers, one based on finding electrons within jets in a calorimeter, and the other based on the recognition of secondary vertices in a vertex detector.

Taku Yamanaka (January 1988) received his Ph.D at the University of Tokyo working on studies of charged kaon decays. As a Fermilab research associate, he has worked on Fermilab Experiment 731, a CP violation experiment, where he was especially interested in the data acquisition and trigger. As a Wilson Fellow, he has continued on the Monte Carlo simulation of E-731, a very crucial part of the analysis. Besides E-731, Taku and Wah from the University of Chicago proposed a new experiment for the group to measure the branching ratio of $K_L \rightarrow \pi^0 e^+e^-$ with a sensitivity of one part in 10^{11}. The experiment has been approved (E-799), and preparations for the upcoming run are being made.

John Huth (Nov 87) received his Ph.D. from the University of California, Berkeley, based on a search for free quarks with the PEP-4 TPC Collaboration at SLAC. He subsequently worked at LBL on the development of a novel concept, the radial drift chamber. John came to Fermilab as a research associate where he joined the CDF experiment. As a Wilson Fellow, he has continued work on CDF where his main interests have been jet studies and detector upgrades.

Bob Bernstein (April 1987) received his Ph.D. from the University of Chicago for work done at Fermilab (E-617), a study direct of CP violation through a precision measurement of η_{00}/η_{+-}. He then joined the CCFR neutrino program at Fermilab (E-744/770) as a research assistant at Columbia University. As a Wilson Fellow, Bob has continued to work on the analysis of the neutrino experiment as well as on the design of a tagged neutrino facility. P-788 uses neutrinos from K_L decay, where the neutrino species and momentum are determined event-by-event. Neutrino oscillation experiments and cross-section measurements would each improve by nearly an order-of-magnitude and $\sin^2 \theta_W$ could be determined in an entirely new way which would be nearly free of the systematic problems which have limited the old experiments, decreasing the error by a factor of three and making the errors on the radiative corrections competitive with future W and Z mass determinations from LEP.

Mike Crisler (April 1986) received his Ph.D. from Ohio State University for work on Fermilab Experiment 613, a measurement of the prompt neutrino flux produced by 400-GeV proton collisions in a beam dump. Mike then came to Fermilab as a research associate where he was involved in Experiment 711, a study of massive di-hadron production in proton-proton collisions. As a Wilson Fellow, Mike is presently Spokesperson for E-774, a beam-dump particle search.

Bill Foster (April 1984) earned his Ph.D. from Harvard University for work on the IMB underground search for proton decay. As a research associate at the

University of Michigan he was involved with hardware upgrades to the IMB detector. As a Wilson Fellow, he has worked on many aspects of the CDF experiment, including front-end electronics, VTPC, CTC, tracking processor for the trigger, event display, and top quark search in electromagnetic channels. Bill is presently Co-Leader of the CDF Data Acquisition Group.

Previous Wilson Fellows

There are nine Wilson Fellow alumni. They have all moved on to either university professorships or staff positions at a national laboratory. The previous fellows and their positions when last heard from are:

Name	Appointment	Present Activity
Milind Purohit	April '86	Asst. Prof., Princeton University, E-791
Kam Biu Luk	August '85	Asst. Prof., UC, Berkeley, E-789
David Christian	Jan. '84	Fermilab Assoc. Sci. detector VLSI, E-690
Chris Sliwa	August '83	Asst. Prof., Tufts, CDF
Petros Rapidis	June '82	Fermilab Sci. I, Pbar Source, E-760
Richard Kadel	June '82	LBL Research Staff, CDF
David Neuffer	Oct. '80	Los Alamos, Research Staff
Risto Orava	March '79	Assoc. Prof., U. of Helsinki
John Cumalat	Oct. '77	Assoc. Prof., U. of Colorado, E-791

Fermilab is quite proud to recognize the Wilson Fellows, present and past, as outstanding scientists, dedicated to learning nature's secrets. It is particularly satisfying to support these researchers at a time in their development when independence can be so important to creative endeavors.