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Personal History

1968	B.A., University of California, Berkeley
1974	Ph.D., University of California, Berkeley, with G.H. Trilling
1974	Adj. Asst. Professor, University of California, Los Angeles, non-tenure track
1982	Assistant Professor, Iowa State University and Ames Laboratory (US DoE)
1986	Associate Professor, Iowa State University
1990	Principal Investigator, Department of Energy
1995	Professor, Iowa State University
2005	Initiator and spokesperson, 4th Concept Detector
2011	CERN Team Leader, RD52 (DREAM)

Research Summary with Annotations

Accelerator Physics (Berkeley)

Bevatron Crew Operator.

Design of Quadrupole Magnets. Design of 8" and 12" Narrow Quads (8QN and 12QN).

Electron Ring Accelerator. I designed the roll-out and acceleration fields for this new accelerator.

Bubble chamber physics (Berkeley, SLAC)

25-inch $K^+p \rightarrow K^+p$ elastic scattering with $pp \rightarrow pp$ as a polarization analyzer.

82-inch $\Lambda p \rightarrow$ all final states, and $\Xi^0 p \rightarrow \Lambda, \Xi$ final states. Test of SU(3) symmetry; my thesis.

40-inch $\pi^- p \rightarrow n\pi^0, nX$ baryon exchange scattering.

High precision electromagnetic form factors (UCLA, Fermilab)

$\pi^- e^- \rightarrow \pi^- e^-$ elastic scattering in a LH_2 target; measure the electromagnetic form factor.

$K^- e^- \rightarrow K^- e^-$ elastic scattering in LH_2 target; same for the ($s\bar{u}$) state.

TPC: e^+e^- at $\sqrt{s} = 29$ GeV (Berkeley, SLAC, PEP4 TPC)

$e^+e^- \rightarrow c\bar{c} \rightarrow D^* \bar{D}^*$ cross sections, $D^0 \bar{D}^0$ mixing, fragmentation function, and $\sigma_{c\bar{c}}$.

$e^+e^- \rightarrow c \rightarrow D^*$ fragmentation of c to spin-1 D^* , Sung Park thesis.

Energy-energy correlations: Hsiao-Ying Chao thesis.

DUMAND "Deep Underwater Muon And Neutrino Detector" (event reco, supernova trigger)

D0: $p\bar{p}$ at $\sqrt{s} = 1.8$ TeV and at $\sqrt{s} = 1.96$ TeV (Fermilab)

Top quark discovery: Myungyun Pang measured the mass of the top quark.

Higgs search, $h \rightarrow \gamma\gamma$ Bryan Lauer thesis.

Hard diffraction: Kristal Mauritz thesis.

Quark Substructure: group work, Andy Green, whose thesis was a technicolor search.

Supersymmetry search (mSUGRA): John Zhou thesis.

New Higgs search: $Whh \rightarrow jj\gamma\gamma\gamma\gamma$: Oleksiy Atramentov thesis.

First test of CP violation in top quark production: Sehwook Lee

CMS, Large Hadron Collider (CERN)

Design and construction of high voltage distribution to HF calorimeters.
Simulation of quartz fiber calorimeters; beam tests of modules and HF wedges.

DREAM dual-readout calorimeters (CERN, RD52)

A unique and highly successful instrumentation project (led by R. Wigmans, TTU)

4th Concept detector (Ames, the world)

A highly creative detector design for a future lepton collider. Initiated and led by me (140 collaborators world-wide)

Teaching (in addition to normal courses) and Public Outreach Summary

New courses “Newspaper Physics” (for first-year non-science students) , “Physics and Design of Big Detectors in High Energy Physics” (graduate students), “Physics, Philosophy and the Scientific Method” (honors students), “Physics for physics majors,” 241X-242X (new course in the Department), “Physics for Elementary Ed teachers,” Physics 102L (new course this semester, Spring 2012).

Teaching-Research QuarkNet (with U. Iowa), my own quarknet, and research-teaching by involving ISU undergraduate students directly into actual experimental work at CERN

Public Discourse Many columns in the *Des Moines Register*, on physics, academic freedom, nuclear weapons, sabbaticals, technology, spin-offs, teaching, Iran, etc.

Book “Particle Physics Experiments at High Energy Colliders”, Wiley-Berlin (2011)

Papers and Talks (roughly 390 refereed papers and 125 talks.)

- John M. Hauptman, John A. Kadyk, and George H. Trilling, “Experimental Study of Λp and $\Xi^0 p$ Interactions from 1.0 to 10.0 GeV/c,” **Nucl. Phys. B125** (1977) 29
- “Observation of the Top Quark,” Abachi, S., *et al.*, *Phys. Rev. Letts.* **74** (1995) 2632.
- “Direct Measurement of the Top Quark Mass,” Abachi, S., *et al.*, *Phys. Rev. Letts.* **79** (1997) 1197; hep-ex/9703008.
- “Limits on Quark Compositeness from High Energy Jets in $p\bar{p}$ Collisions at $\sqrt{s} = 1.8$ TeV”, Abbott, B., *et al.*, *Phys. Rev. D Rapid Communications* **62** 031101 (2000); hep-ex/9912023.
- “Hadron and Jet Detection with a Dual-Readout Calorimeter”, N. Akchurin, *et al.*, *Nucl. Instr. Meths. A* **537** (2005) 537-561.
- “Neutron Signals for Dual-Readout Calorimetry”, *Nucl. Instr. Meth. A* **598** (2009) 422-431.
- “Polarization as a tool for dual-readout calorimetry,” N. Akchurin, *et al.*, *Nucl. Instr. Meth. A* **638** (2011) 47-54.