# Visions of discovery David B. Cline Memorial Symposium

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# **Coming to UCLA**



- In 1987 I was scheduled to take a sabbatical from LLNL where I had just launched the Beam Research Division
  - We already had a collaboration with SLAC & LBNL on RFtechnology to power a linear collider many years in the future
- My goal was forming a new collaboration to build a new accelerator for discovery physics in the much nearer future
  - I had heard Pier Oddone's talk about intriguing idea of of an asymmetric collider to study CP violation in the B-meson system
- Shortly afterwards, I first met Dave Cline at a workshop devoted to the idea of building B-factory
  - Dave suggested that I spend my sabbatical at UCLA & begin offering courses in accelerator physics







## Window on discovering a new world

- Dave explained that his charge was rebuilding UCLA presence in HEP
  - Accelerator science was an essential component of his ideas for UCLA physics
    - Accelerators are engines of discovery for advances in physics
  - Fewer & fewer campuses had modern accelerator facilities
    - UCLA needed its own machine
- Dave asked me, "Why not a UCLA-led Bfactory in Southern California?"
- ✤ That was a crazy enough idea to appeal to me







### UCLA aims at leadership in US accelerator science



- UCLA already had a solid foundation on which to build
  - John Dawson and his younger colleagues in plasma physics
  - Chan Joshi's group in Electrical Engineering
- In 1988 Provost Ray Orbach made available 1 FTE for a junior faculty position in accelerator physics
- Fortunately Claudio Pellegrini expressed his interest in coming to UCLA
  UCLA won the competition with UC Berkeley for Claudio
- Dave was never shy; he told me that he would go back to the Provost "You promised us a junior faculty position"
  - Dave was persuasive; Ray agreed !!
- The result was a new posting & the hiring of Jamie Rosenzweig





## Hiring new faculty was only the beginning



- ✤ Dave & I established the accelerator seminar course in 1988 1992
  - I edit each quarter, every quarter except summers
    - Two notable students were David Robin (LBNL) & Jeff Corbett (SLAC)
- Dave typically sent his students to national labs for their thesis research
  - Dave's group made critical contribution to the success of BNL ATF
    - Research covered electron sources, linac feedback control, IFEL micro-bunching, laser acceleration & Compton Scattering and laser vacuum acceleration!
- One of his students at BNL was Xijie Wang (now at SLAC)
  - ➢ He provided me a remembrance to show you





## **Dave as Teacher and Counselor**



In 1997 Prof. San Lan Wu asked Dave, "Well, Dave, what do you want me to work on? Dave replied, "You are your own boss. Do whatever you like."

Dave forgot to tell me I was my own boss, but he did tell me I should do what I like, and he would help (*pay for it*).

So I did. I tried many topics for thesis research. I traveled around in US and Europe: electron cooling *at Wisconsin*; APS lattice design *at Argonne*;

Spin Splitter *at CERN*; **compact anti-proton storage ring for space travel** *at UCLA*; free electron laser & Smith-Purcell radiation *at BNL*.

Finally I settled down on high-brightness electron beam generation @ BNL - ATF!

PERSPECTIVES FOR POLARIZED ANTIPROTONS AT LEAR: THE SPIN SPLITTER

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representing the SPLIT Collaboration:

D. Cline, M. Conte, M. Gazzaly, R. Giacomich, M. Giorgi, J. Hall, J. Kewish, H. Kreiser, K. Kuroda, T. Niinikoski, Y. Onel, G. Pauletta, A. Penzo, A. Pisent, M. Pusterla, P. Riley, R. Rossmanith, N.M. Stewart and X.J. Wang

Abstract: Many of the physics problems addressed at LEAR, and which concern the NN interaction mechanisms and the new spectroscopy, might benefit from polarized beams of antiprotons. The perspectives for polarized  $\bar{p}$  in LEAR are briefly reviewed, and a recently proposed method for obtaining a separation of opposite-spin states in a storage ring is discussed in more detail.

Key Words: Antiproton, polarization, Stern-Gerlach, storage rings.

Dave asked me to make coffee for an anti-proton, compact ring, miniworkshop in 1988. I put one bag (1 lb) of coffee in a 12cup coffee pot. Dave never gave me another chance to make coffee!

Xijie Wang, SLAC



## Meanwhile...



- Claudio and Jamie focused their students on research conducted at UCLA with additional experiments at labs
- Claudio and Jamie established regular course offerings in accelerator physics
- Free electron lasers and plasma accelerators became dominant themes
- Thus the UCLA-school of accelerator physics was established





### We all continued to have a vision of a machine on the UCLA campus



- We considered several types of design
  - Linac colliders, linac-on-ring colliders, and storage rings
- The B-factory was too ambitious an idea
  - Besides, Burt Richter had given permission for the SLAC study of using the PEP infrastructure
  - Dave suggested that a phi-factory would be ideal for developing the west campus of UCLA
    - It embodied exciting fundamental physics & accelerator technology





#### A vision for the west campus (1990): UCLA Particle Beam Physics & $\varphi$ Factory Conceptual Design





The only thing HEPAP could agree on (1992) was killing the idea of a phi factory in the US





## Dave's next vision was a muon collider



- Dave gave many seminars promoting the physics case
  - Discovery opportunities as a Higgs factory, a neutrino factory, and a multi-TeV lepton collider
- With Sessler I worked on electro-production of muons
  - ➢ My seminar at SLAC got Bob Palmer hooked on the idea
    - He knew he could do better that I did producing copious muons
- Dave, Bob & their allies started the muon collaboration in ~1994
  - > This collaboration became a formal national program in OHEP
  - The idea persisted through Snowmass-on-the-Mississippi until HEPAP (P5) prematurely recommended terminating the Muon Program







- In 1993 I left to direct the LBNL accelerator division
  My work with Dave at UCLA was an important factor in my hire
- Dave & I remained in regular contact especially regarding the muon/neutrino program
- Through his own research and that of his students, Dave has made a strong mark on accelerator science

Dave played an important role in developing my career in accelerator physics & education *I will always be grateful to him* 



