We tragically lost our close friend and colleague
Gary Varner at age 56 to an aggressive cancer
on July 14th, 2023.

Today, we will remember and celebrate him:
Both *his scientific achievements* and his ***personal qualities***.

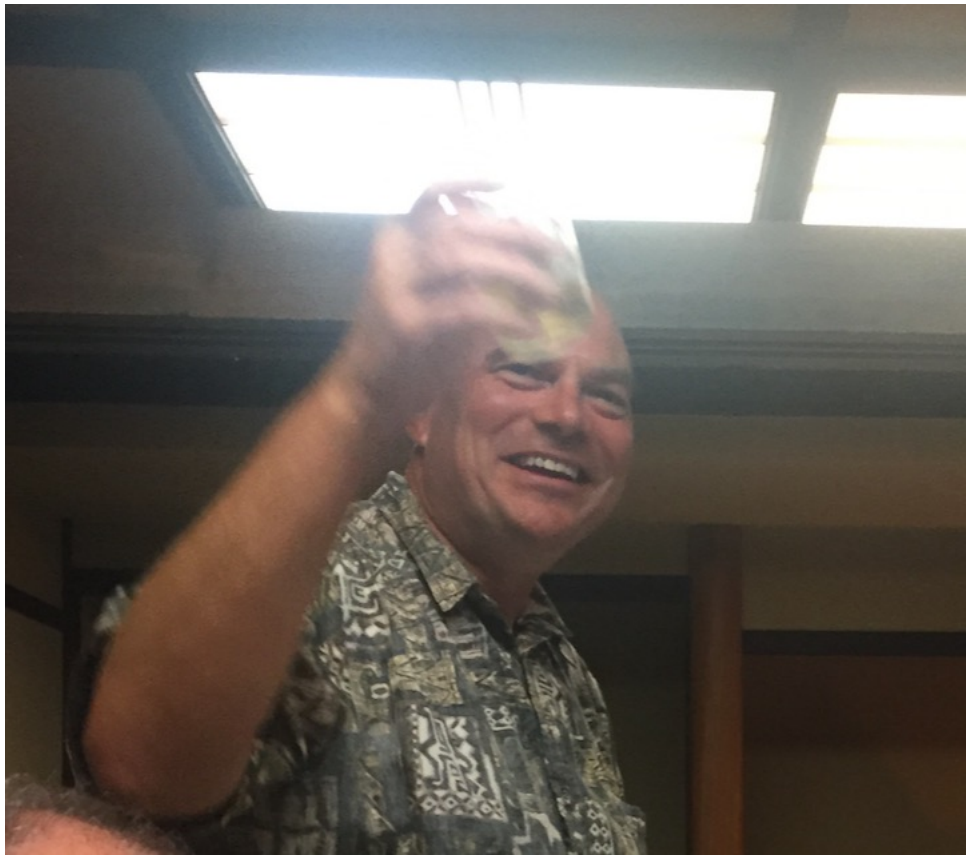
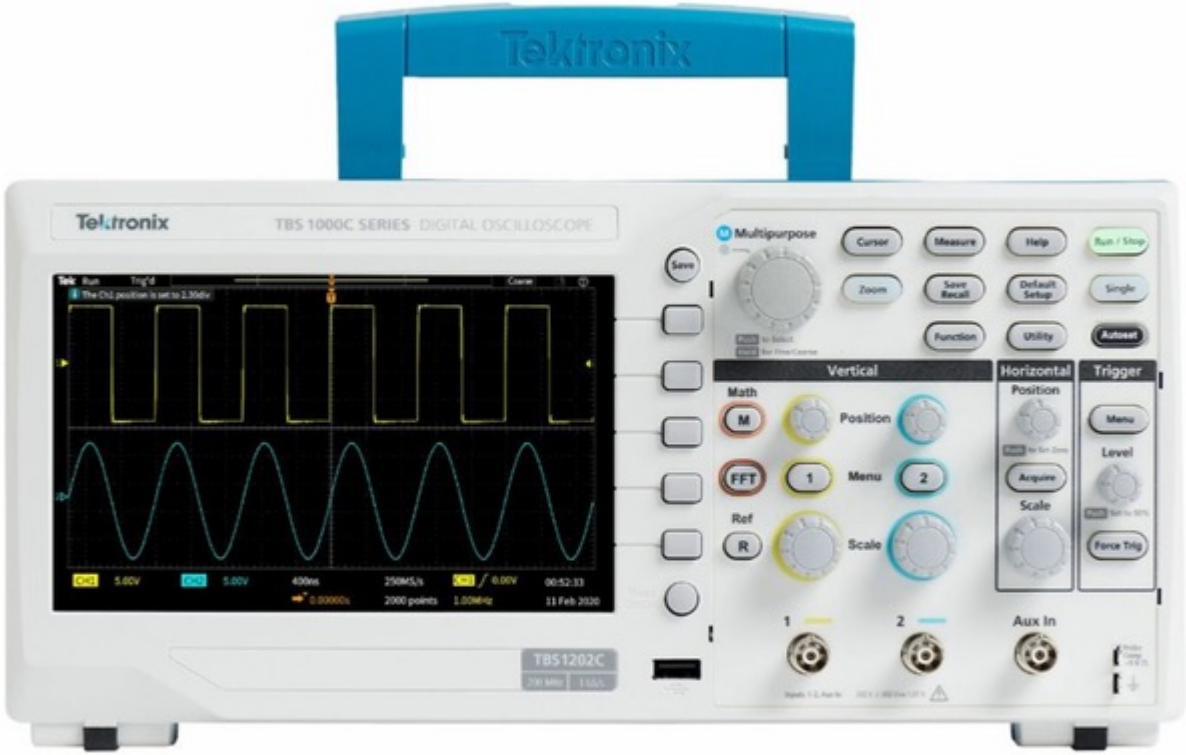


Photo from
Roberto Mussa

In Memoriam Gary Varner web page:
(includes the program for this event, Zoom link)
https://www.phys.hawaii.edu/gary-varner/

Gary had a brilliant idea and a vision (one of several)

An Oscilloscope with good timing (only 2 channels). You may have seen one of these with your cable tv repairperson or in your physics lab.



Need to reduce by a few orders of magnitude in size and increase the channel count.

But suppose a state-of-the-art high energy physics experiment needs 10,000 or more channels with exquisite timing resolution (~20 picoseconds) ?

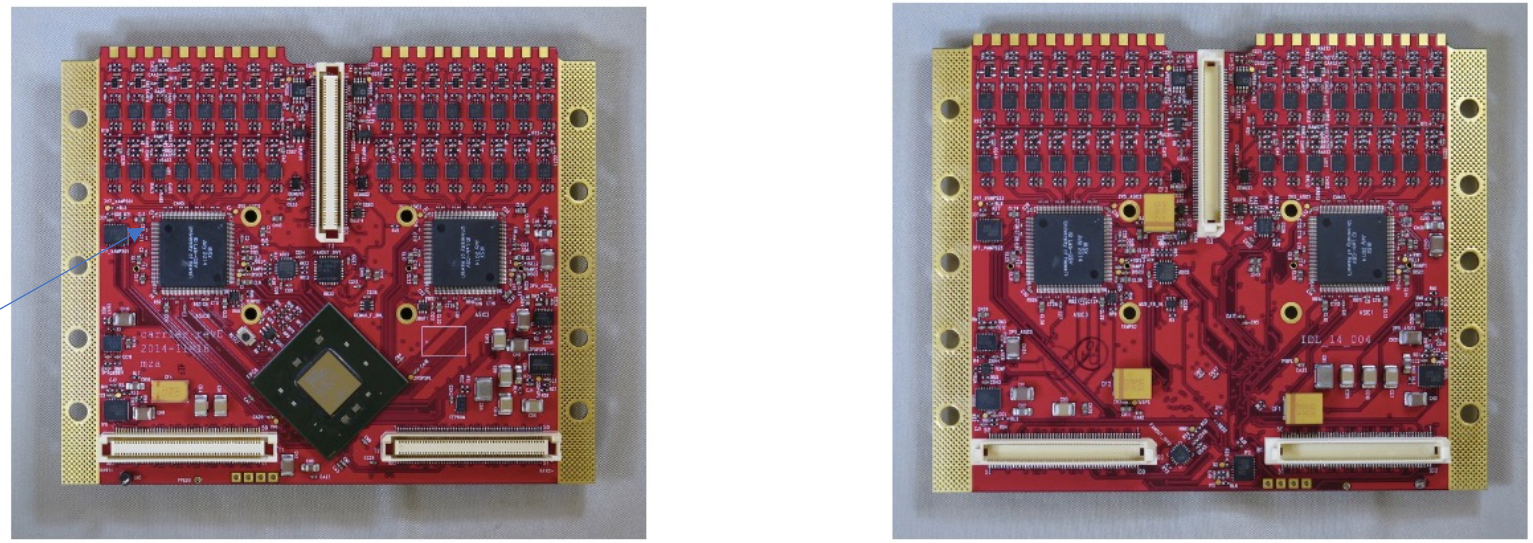
Gary had a vision: learn to make his own microscopic (tiny) integrated circuits, based on switched capacitor arrays.

Gary was relentless (and fully implemented this vision)

He not only developed a series of ASICs (Application Specific Integrated Circuit), the micro-chips. But he then designed and built the full readout systems for several major experiments (ANITA, for ultra-high energy neutrino detection in Antarctica) and then Belle II TOP (Time-of-Propagation) and KLM (Klong Muon) detectors at KEK in Tsukuba, Japan. ***All of these detectors were long and difficult struggles with small teams.*** *There were difficult firmware challenges.* ***There were many turns and twists in the road. But ultimately they were successful !***

Gary did *not fit* into a pigeonhole and took ideas from his Astro-particle work and applied them to e+e- collider experiments (and vice versa). He worked with physicists and electrical engineers (again ignoring boundaries).

"an oscilloscope on a chip"



(a) (b)

Figure 2.2: The ASIC carrier board. (a) top view and (b) bottom view of assembled module.

After the official recognition of the "Instrumentation Frontier" at the Snowmass Decadal Survey in 2013, a new award was created: the "The American Physical Society/Division of Particles and Fields" Instrumentation Award.

Gary was a recipient of the second award in 2016.

Gary: "I prefer Discovery Frontier rather than Instrumentation Frontier"

2016 Awards

Gary was *well-known* and recognized in the US *and abroad* for this and other achievements.

STEPHEN HOLLAND
LAWRENCE BERKELEY NATIONAL LABORATORY

GARY VARNER
UNIVERSITY OF HAWAII

"For the development of technologies for detection of signals in frontier experiments, especially the fully depleted charge coupled device and the 'oscilloscope on a chip' integrated circuit."

Gary was relentless and ambitious *but was also a kind and generous colleague.*

He had *incredible patience and endurance.*

We worked together closely on the design, funding and commissioning of two Belle II readout systems. He never got angry at me for not understanding important technical details.

We spent many hours together at beam tests at the KEK-PS in Tsukuba, at SPRING-8 in Harima Science City, and at Fermilab in Batavia, Illinois. *Even under pressure, during the most difficult times and at the point of physical and nervous collapse*, Gary was a wonderful colleague.

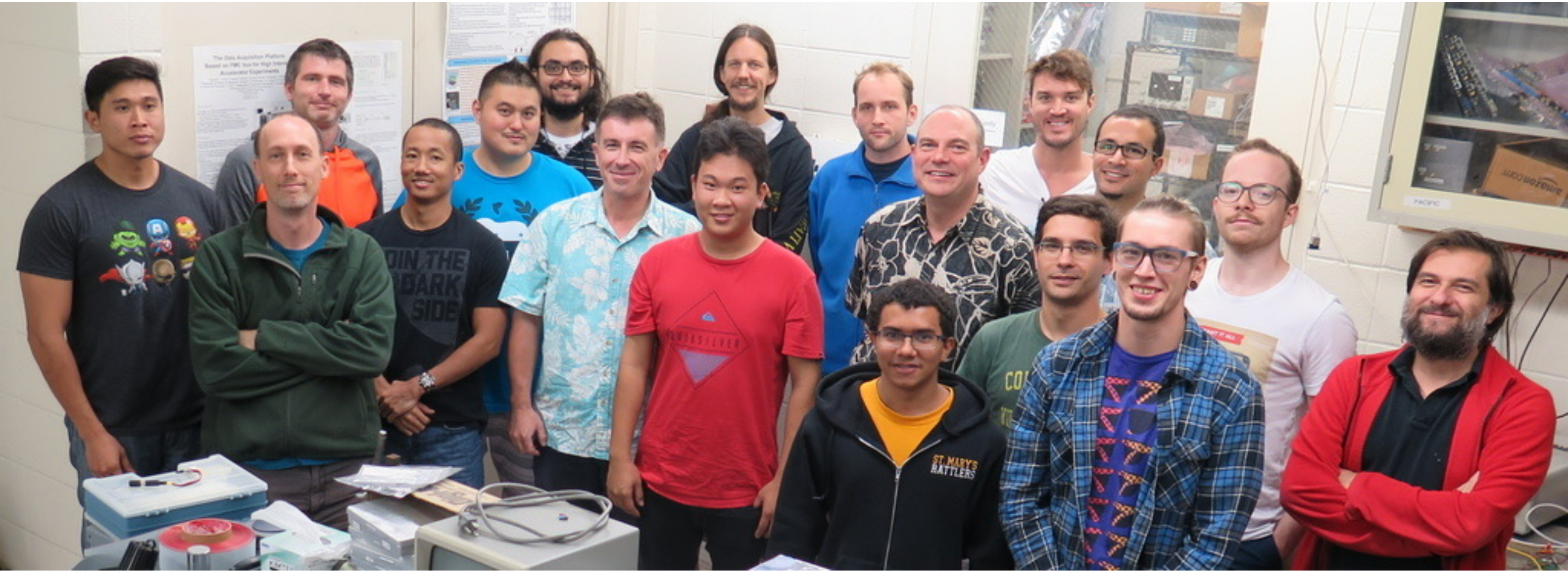
Interestingly, one of his hobbies was driving very long distances (10 hours or more) to visit special places but also for relaxation.

Gary was a wonderful and effective teacher and mentor.

(His patience and his openness were key ingredients).

In addition to his scientific accomplishments, Gary mentored and trained many undergraduate and graduate students, postdocs and engineers from Hawai‘i and around the world. ヴァーナー　ギャリー (素粒子物理学の教授)

Gary’s innovative ideas for readout, data acquisition and detector development in high energy physics live on in a generation of scientists that he trained, inspired and mentored.



For example, the team for one year (2016), at the IDL (soon to be renamed “Varnerlab”)

A few acknowledgements

Mahalo to all those who are attending in person today and to those who could not travel to Hawai'i on short notice but are connecting by Zoom from their time zones. We will learn much more from some of them about the themes that I outlined.

Thanks to the UH Foundation and UH Physics Dept. Chair Veronica Bindi for supporting this event. (She will speak next). Thanks to Vannida Phommachanh (HEPG admin) *and her UH team (Jacky Li, Roy Tom et al.) for local organization of the event.*

Thanks to Dr. Oskar Hartbrich and Dr. Andrej Seljak for organizing the "Story Book". Please contribute if you have not done so already.

Thanks to Jaimy (Zhibian) Varner for her help in organization of the event. Very much looking forward to her talk and memories.

Plan for today

Agenda for In Memoriam Gary Varner
(Saturday, August 19th)
Location: UH Watanabe Hall and the MSB courtyard

9:30-10:00	Coffee, tea, pastries
10:00-12:00	Talks and memories (Session I), Zoom connection
12:00-1:30	Buffet Lunch (Chinese food)
1:30-3:00	Talks and memories (Session II), Zoom connection
3:00- xx	Refreshments and pupu's

We do not want to cut off anyone's talk or memories. If we overrun the morning session, we will move some short talks to the afternoon and start the refreshments late.

Zoom etiquette for remote participants: Please stay muted unless you are giving a talk. If necessary, Jacky Li, our systems administrator will have to mute you. If you need help with your remote talk, contact zli@hawaii.edu ; phone (808) 382-6228