## Benita Albert's Kai-Fu Lee Story - Part two

(As published in The Oak Ridger's Historically Speaking column on November 29, 2017)

This is the second in the series of three articles on the story of Kai-Fu Lee suggested by Roger Cloutier and written by Benita Albert. In her first article, Benita introduced us to Kai-Fu Lee and shared her interactions with him while he was in Oak Ridge High School. In this installment she begins with his life after high school.

Kai-Fu Lee graduated from Oak Ridge High School in June of 1979 subsequently entering his freshman year at Columbia University in September. His initial intent was to major in mathematics or pre-law. His yearly tuition of \$10,000 required that he take out a student loan and also work part-time in addition to his partial scholarship monies.

Unbeknownst to him, his work experience would help reset his academic goals. He worked both as a tutor and as a student aide in the computer center. Kai-Fu loved helping others and programming was easy for him. Thus, he quickly earned a reputation as an effective mentor for frustrated students in computer science classes.

In 1979, Columbia had two computing systems. One system was an IBM S/360 mainframe which required students to key punch (hopefully correctly) cards and then queue up with their cards for computer time. Many a prayer went up that their programs would run the first time, an almost-never occurrence.

The other computer, a DEC VAX 11/780, considered the university's "mini-computer," was the preferred choice of students. It did not require punch cards and featured multiple-user, time sharing technology via terminals.

Kai-Fu spent many all-night sessions on the DEC VAX, ultimately deciding that he would change his academic plans to the promising and rapidly developing frontier of computer science. He was a star in this field at Columbia earning the respect of professors with his stellar exam and project ideas.

It was at Columbia that Kai-Fu first pursued natural speech processing and also computer graphics. His graphics work and a team project on moving light displays was inspired by dissertation research conducted by Rick Rashad. Dr. Rashad would become an important part of Kai-Fu's next academic growth as his review and consultation with Kai-Fu's Columbia project work prompted Rashad to recommend him for graduate work at Carnegie Mellon. Kai-Fu graduated from Columbia as the number one ranked computer science student in his class.

Digressing to other facets of Kai-Fu's Columbia life, it is here that he became a card game fanatic, namely the game of bridge. Always eager for a new challenge, he set a personal goal of becoming a Life Master in the American Contract Bridge League.

He calculated this goal, per the point-system requirements, could be achieved after winning 1,000 League-approved games. His student partners and he participated in inter-collegiate competitions with schools such as Harvard and Yale, and they won the Ivy League championship.

Kai-Fu achieved the title of Life Master by the end of his junior year. Years later Kai-Fu gave credit to his bridge obsession. He claimed that, "Thanks to the game of bridge, I know how to read people's faces and predict their next moves. These skills are essential in business negotiations."

Kai-Fu stayed in New York City during his first two collegiate summers, picking up jobs to help finance his education.

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However, in the summer before his senior year, he went home to Taiwan to be with his parents and older sisters. His sisters saw this as a prime opportunity to "arrange dates" for girl-shy Kai-Fu. They successfully found the future Mrs. Lee, though it took a summer courtship plus many air-mailed letters from Columbia (there was no email yet).

As Kai-Fu Lee completed his senior year, he pursued another important goal, to convince Shin-Leng Hsieh to marry him. His nervous and heart-felt proposal was delivered via an international phone call. They were married in Taipei on August 6, 1983, just prior to the start of Kai-Fu's doctoral program at Carnegie Mellon.

Kai-Fu has beautifully written of this life decision, "My stable marriage has anchored my heart and enabled me to concentrate on scientific research." They were blessed by the birth of two daughters in the next decade.

Why Carnegie Mellon? Kai Fu valued the fact that it was the first collegiate computer science department in the U.S., formally established in 1965. And that it was ranked as one of the top computer science programs in America also helped.

He was lured by the vision and the people who created the program: Herbert Simon, a Nobel Prize winner, as well as Turing Award winners Alan Perlis and Alan Newell. Carnegie Mellon drew these founding experts from the Business School, the Mathematics Department and the Psychology Department respectively. Kai-Fu had the utmost respect for other experts in the Computer Science Department with famous credentials in the fields of algorithms, speech recognition, robotics, cryptology, graphics and computing theory.

His academic shopping cart for research possibilities overflowed. The department's unique design included a "marriage process" to match PhD candidates with professors.

In his autobiography, Kai-Fu described this as, "We would enjoy lectures from all of the professors for a month, as though the professors were 'courting the students'...students would submit their top three favorites. I chose to follow Professor Raj Reddy in speech recognition after going on 'blind dates' with numerous professors."

This 'professional marriage' led Kai-Fu to the 3-stage problem research of speaker-independent, large vocabulary, continuous speech recognition via the use of statistics and massive data bases.

Though Professor Reddy preferred an expert system approach to Kai Fu's research, he did not discourage his method. He said, "Because I believe in science, there is no absolute right or wrong, we are all equals." Kai-Fu was deeply humble and ever-appreciative of the support he received over the 4.5 years of work his research involved.

Kai-Fu's research would make his mentor proud and would earn Kai-Fu numerous honors. One example was his research being recognized by Business Magazine as the most important scientific invention of 1988. In 1988, at age 26, Kai-Fu received his PhD and accepted a tenure-track, assistant professorship at Carnegie Mellon. In addition to his university work, Kai-Fu augmented his income with high-tech, corporate consultations.

Adding PhD candidates to mentor as researchers in speech recognition at Carnegie Mellon, Kai-Fu maintained a project ranking of number one in the Department of Defense's annual evaluations. Kai-Fu's research and teacher-heart made him a much sought-after international speaker.

His professional life was a mixture of what he termed "Ivory tower papers" and teaching/mentoring plus the lure of real world problems and applications. This heavy, and at times conflicting, load would ultimately need resolution. What would he choose? To be continued...

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Wow, how about that? Don't you see something amazing is happening in this young man's life. Kai-Fu Lee sought to learn and apply his newfound knowledge into solving substantial problems. As you will find in the third installment, he did this with astounding accuracy and went on to do even greater things.



Kai-Fu demonstrating speech recognition Ph.D. thesis to his father and sister



Kai-Fu receiving his Ph.D. at Carnegie Mellon University