

# Memorial at PLDI for Ken Kennedy

## Opening

Good evening. My name is Kathryn McKinley and I was Ken Kennedy's 20th PhD student.

Ken was a creative, influential, and prolific researcher.

Would you do me a favor?

Would you please stand up if you were his student, his grand student, or his great grand student?

Would you stand up if read one of Ken's papers? or Ken influenced your research?

If you are not standing up already, would you stand up if you received ITR funding?

Thank you. You may be seated.

## Overview

Ken loved his research and loved bringing people together.

He was a devoted friend and mentor.

He laughed really loudly, especially at his own jokes.

## Research

Ken's research focused on giving programmers the right abstractions to make their job easier by providing compilers and tools to do the heavy lifting.

He wanted programmers to be able to work at an appropriate level of abstraction.

His compilers made programs go faster.

Ken, his colleagues and students invented

1. register allocation algorithms that are still the standard today,
2. strength reduction and other scalar optimization,
3. software prefetching,
4. loop transformation algorithms for vector, parallel, and scalar architectures,
5. interprocedural analyses,
6. interactive parallel programming tools,
7. FortranD and High Performance Fortran
8. and telescoping languages.

If you have ever used a compiler, you have benefited from Ken's research legacy.

## Awards

He was very proud that five papers of his papers were in the Best of PLDI.

His favorite two awards were for his technical accomplishments:

- his election to the National Academy of Engineers, and
- his 1999 ACM SIGPLAN Programming Languages Achievement Award.

When he told his father that he had been elected to the National Academy of Engineering, Ken Kennedy Sr., a retired Brigadier General in the Army Corps of Engineers, a true engineer, replied "they must have gotten the wrong Ken Kennedy." A story Ken liked to tell.

## Institutions

Ken fit a lot into his 61 years, and his legacy also lives on in institutions he was instrumental in creating and leading.

If you have ever used a supercomputer or received ITR funding, you have benefited from Ken's leadership legacy. Ken

1. founded The Department of Computer Science at Rice, in 1985
2. directed CITI, a cross disciplinary center at Rice, in 1986
3. directed CRPC Center for Research on Parallel Computing that eventually included nine institutions
4. directed the Virtual Grid Application Development System (VGrADS) project;
5. directed HiPerSoft Center for High Performance Software with 30 faculty members
6. founded The Los Alamos Computer Science Institute (LACSI);
7. and co-chaired with Bill Joy, the President Information Technology Advisory Committee from 1997 to 1999, the first PITAC committee that initiated the NSF ITR program

These institutions flourished because of Ken.

- He couldn't bear to cut back on people or research, instead, he would raise more money. Consider Rice's Duncan Hall - it started out as a building for the CRPC center; it ended up holding about 8% of Rice's faculty and graduate students and 3.5 departments.

## Abstraction

Many people have remark on his talent for building consensus in all these large groups.

Most computer scientists delve into detail, Ken went the other way.

He applied abstraction to everything, research and leadership.

When faced with colleagues who disagreed on fundamental issues, Ken would raise the level of abstraction until he could get agreement, then work his way back down to the details, and differences would get resolved.

## Details

He then paid an extraordinary attention to a details.

He balanced his check book to the penny, forcing the bank to correct any errors in his favor or theirs, repeatedly.

## Best that you can be

Ken was driven to prove himself over and over again. For much of his life, he was rarely satisfied.

Ken was not perfect, but there is hope for all of us because he managed to succeed anyway. Perhaps in part due to some of his flaws, he accomplished an extraordinary amount.

## People

Ken loved his mentors and colleagues. He was particularly grateful to Jack Schwartz, John Cocke, and Fran Allen, his advisors and graduate school mentors.

He loved working with computer architects. He particularly enjoyed his work with Steve Wallach at Convex, George Paul at IBM, and Burton Smith at Tera.

He loved collaborating and felt honored to work with distinguished colleagues, such as

- Susan Graham, Richard Tapia, Mary Wheeler,
- Dan Reed, Jack Dongarra, Fran Berman, John Mellor-Crummey, Vikram Adve, Chuck Koebel, Rich Wolski, and Jack Dennis.

Whenever colleagues visited, he set up a meeting for his current graduate students. He wanted his students to understand that they, too, could achieve success.

Ken loved his students, and he respected us. In class, we were Mr. Warren, his first Phd student 1, Mr. Allan number 8, Mr. Callahan number 13, Mr. Porterfield number 15, Ms. Hall number 19, Mr. Kremer number 27, Mr. Ding number 33, and Ms. McCosh to be number 40.

Ken never fired any student; a strength or a weakness? He took it as a personal failure when students dropped out of graduate school. There were students that took a long time to graduate.

However, I would not have gone to graduate school if it weren't Ken.

At crucial points, when some of his students wanted to quit, Ken convinced students to persevere. Ken was incredibly patient with us. He gave people time to mature technically and personally. His patience elicited the best from many of us.

Cheryl McCosh recalled that numerous times Ken asked her as they worked together on a problem if she was having fun. She was having fun. Ken was having fun.

For Ken's 60th birthday his students took him to an Astros game, where he high fived strangers on every Astros run. On a previous birthday, Keith Cooper, number nine, gave him a loaded squirt gun, having of course armed himself and all the students. Bedlam broke out.

In his last days he sent emails to his current Ph D students, he wrote "You are my highest priority."

He spent his last days giving his students guidance, For each one, he told Keith and Linda Torczon, number 11, the best way to advise each his current students.

His respect for and ability to work with anyone, regardless of their status, may be best revealed by examining Ken and Keith's collaboration. Their collaboration spanned a myriad of professional relationships. Ken first taught Keith as an undergraduate at Rice, then Ken became Keith's PhD advisor, his post-doc advisor, and his department chair. When Keith joined the faculty at Rice, they became colleagues. Finally, in 2002, Keith became the department chair; he was Ken's boss.

Ken's close technical and personal relationships with Keith and Linda spanned almost 30 years.

I would like to thank Keith, Linda, Cheryl McCosh, Rui Zhang, Yuan Zhao, Ben Chase, David Chase, Jack Dongarra, Mary Hall, Dan Reed, and Kenny Zadeck who helped me prepare this talk.

As we saw earlier, we would be here all night if I mentioned all of Ken's circle. My apologies if I left you out.

Ken's philosophy was to be nice to everyone, they could be your DARPA program manager one day.

## **Life**

Ken loved all things Apple. For example, he never threw out his Newton Messenger 130 – one of the least successful electronics products of all time.

Ken always dressed to stand out; if everyone was wearing jeans, he had on a suit, and often vice versa. Someone once asked me, "What's it like working with him? He looks like a movie star." I was speechless.

Ken wanted to be loved. He spent a lot of time searching for love, providing lots of fodder for generations of graduate student gossip.

Late in life, he found love and married the woman for him.

Carol Quillen, she is also an academic. Her research is on

- early modern European history,
- European intellectual history, and
- feminist theory.
- She is currently a Vice Provost at Rice.

And he got a two for one deal, with her daughter Caitlin. This was an enormous life transition point for him after. He took over chores Carol hated; and he truly enjoyed playing Barbie with Caitlin and serving as a daily fashion consultant on the perfect outfit.

His rich family life for the last twelve years gave him enormous happiness, support during his illness, and seemed to give him the freedom to enjoy his work and professional successes more fully than before.

## **One last story**

Ken left town mid-afternoon to give an invited lecture somewhere. He gave Keith his garage key so that Keith and Linda could get into his house and pick up a few forgotten items.

They arrived about 10:30PM and found the front door open. Within fifteen minutes, they had Houston Police Officers on the scene.

Ken woke up with five armed officers pointing guns at him asking “who are you?”

The cops came back outside and told Keith and Linda that the inhabitant of the house would like to speak with them. Ken was somewhat shaken; but he kept repeating “you did the right thing.”

For months afterward, he told friends that they should ask Keith and Linda for a “wakeup call.”

### **In Closing**

In the past three years, as he struggled with pancreas cancer, Ken actually seemed more peaceful and happy.

At one juncture, when I found out that the cancer had recurred, I asked him had he considered not working and looking back, did he have any thing he would have liked to do differently?

Ken replied: “Not working would kill me. I love my life. I love my work.”

His 61 years came to an end on February 7, 2007.

On that day, the world, the United States, Computer Science, and Rice University has lost a visionary leader that helped mold innovative technologies, institutions, and people.

In the words of Dan Reed and Jack Dongarra, “I miss my friend.”

“I miss my academic dad.”

Thank you.