

Profiles in Leadership #1

Maria M. Klawe: Welcoming the Excluded

Battling early ostracism and prejudice against women becoming mathematicians or computer engineers, Maria M. Klawe, Ph.D., California Omega '73, achieved both—and now heads a college dedicated to nurturing all undergraduates to fulfill their potential

by Trudy E. Bell

“I WAS MY FATHER’S SON,” declared Maria Klawe, president of Harvey Mudd College, a small private undergraduate college of engineering, science, and mathematics in Claremont, California, 35 miles due east of Los Angeles. Born in 1951 in Toronto, Canada, the second daughter of four girls, she recalls “society in the 1950s was so highly gendered that I was convinced I’d grown up in the wrong body. I used to go to sleep every night praying to wake up the next morning as a boy.”

“Both my parents thought I was extraordinarily gifted, which was hard on my sisters,” Klawe continued. She loved the arts—a safe choice for girls in the 1950s and early 1960s—and began painting in oils and acrylics and later watercolors, a lifelong avocation. But she also loved the sciences, and mathematics came with ease. The dark side of her talents and self-image conflicting

with stereotyped gender roles, however, was that she felt lonely and isolated from both boys and girls.

By the late 1960s, when Klawe entered the University of Alberta, the hippie movement was in full swing, with its emphasis on social relevance and political action. “I couldn’t figure out how math could make the world a better place,” Klawe recalled. So Christmas 1970, halfway through her third year toward an honors degree, she dropped out of the university and went to live with a Yale dropout. In summer 1971, the pair headed overseas, hitchhiking from Scotland to Venice, taking trains and buses through Turkey and Iran, lingering a month in Afghanistan, and bumping along in a donkey cart from Pakistan to India. There they got married and settled for six

months. “We lived on 25 cents per day, experimenting with different cultures,” Klawe recounted.

In India, Klawe found herself craving mathematics—

What does it mean to be a leader? A successful leader sees what needs to be done and is willing to make tough decisions. Anyone can sail in calm seas and fair weather. It is one who can navigate through storms with crew and cargo safe that people recognize as a true captain. In this new series, *Profiles in Leadership*, Tau Beta Pi is exploring the essence of leadership through the lives of eminent engineers who have attained leadership positions in their respective fields. Each has journeyed to insight through a unique series of challenges, opportunities, accidents, serendipity, stumbles, and personal gifts—which also shaped their drive to help and guide others. This series of profiles highlights the individual backstories of acknowledged leaders, distilling their discoveries and convictions.

Klawe interviews Microsoft founder Bill Gates during his visit to Harvey Mudd and Pomona College in southern California in March 2011. Klawe has served on the board of Microsoft since 2009.



Klawe speaks in her office in front of one of her own paintings, showing daughter Sasha with a friend's baby. Photo: Trudy E. Bell

playing chess daily and buying recreational math books. Realizing finally that she was unwilling to give up math, she returned to the University of Alberta in fall 1972. After finishing her bachelor's degree in May 1973, she went straight on to grad school at Alberta, earning her Ph.D. in mathematics in 1977, and getting divorced in 1978. Hearing of booming job opportunities in theoretical computer science, she enrolled at the University of Toronto, one of the three best programs in the world (along with Stanford University and the Massachusetts Institute of Technology). By summer 1979, she was named assistant professor at Toronto.

That fall, a young hotshot theoretical computer scientist named Nick Pippenger from IBM Research in Yorktown Heights, New York, flew to Toronto to give a colloquium at the university. "He was extraordinarily shy, extraordinarily bright, and extraordinarily nice," she recalled. The two young mathematicians rapidly developed a long-distance romance, flying between Toronto and New York every week or two. When they announced their engagement, "IBM Research was so afraid of losing Nick that they made me an offer to join either Yorktown Heights or a new theory group in San Jose." Klawe and Pippenger married in May 1980 and moved to California in July.

Relations Had Deteriorated

"At first, I did not realize how little value my manager put on me as a woman," Klawe reflected. "I could have been anyone, and he would have hired me to keep Nick." By 1984, relations with her manager had deteriorated so bitterly that Klawe started her own research group in discrete mathematics. In 1985, she was promoted to head all mathematical research within the computer science division at what became the IBM Almaden Research Center—leading what was regarded as one of the three best theoretical computer science research groups in the world and becoming manager of her former manager.

Ultimately the two became lifelong friends. At the time, however, the confrontation with gender discrimination left Klawe both angry and thoughtful—and led her to discover a major goal. "I began to wonder: How can we build institutions and groups to create a culture within science and engineering to nurture all people, beginning with undergraduates?" She began thinking about returning to academia.

Committing to Shared Values

By 1988, among the shower of offers that Klawe and Pippenger had received from IBM Almaden, DEC Research in Cambridge, Mass., the University of Texas in Austin, and the University of California at San Diego was one from the University of British Columbia in Vancouver, Canada. "Of all the options, UBC paid the least, and had only an annual budget of only \$4,000 for computers for the entire department," Klawe recounted. "Then Nick said, 'We claim to be idealistic. Maybe we should make the idealistic choice and do what nobody in their right mind would do.'"

So they went to UBC. Although Vancouver was a safe, child-centered city with great schools—"a fabulous place to



This Leader In Brief:

Full professional name: Maria Margaret Klawe

Current position: President, Harvey Mudd College

Birthplace: Toronto, Canada

Highest degree: Ph.D., University of Alberta, 1977, Mathematics

Major career highlights: Manager of Mathematically Related Computer Science, IBM Almaden Research Center, 1985; Head of Computer Science, University of British Columbia (UBC), 1988; Vice President, Student and Academic Services, UBC, 1995; Dean of Science, UBC, 1998; Dean of Engineering, Princeton University, 2002; President, Harvey Mudd College, 2006

Board memberships: Microsoft Corp. since March 2009; Broadcom Corp. since May 2011. "Serving on the boards of leading tech companies is extremely interesting, plus an excellent opportunity to increase the visibility of Harvey Mudd College."

Honors: Ten honorary doctorates; Fellow of American Association for the Advancement of Science (AAAS), Association for Computing Machinery (ACM), and the Canadian Information Processing Society; Awards include *Wired Woman Pioneer* (2007) and A. Nico Habermann (2004). Initiated into Tau Beta Pi as an Eminent Engineer (2007).

Greatest accomplishments: "Building the computer science department at UBC, creating strategic visions at Princeton and Harvey Mudd."

Family: Husband Nick Pippenger; son Janek Klawe; daughter Sasha Pippenger

Hobbies: watercolor painting, running, kayaking, hiking, reading, skateboarding, electric guitar

Favorite books: *Anthem* by Neal Stephenson; *The Black Prince* by Iris Murdoch; *The Blind Assassin* by Margaret Atwood

Personal motto: "If I'm not failing, I'm not aiming high enough."

If you could do one thing over again: "I wouldn't take the vice presidency at UBC because it absorbed too much of my attention and energy while Sasha was becoming a teenager."



Top: Klawe conversing with engineering and science undergraduates at Harvey Mudd.

Middle: Klawe with son Janek and daughter Sasha in Cape Town, South Africa, during Sasha's semester at the University of Cape Town.

Bottom: Klawe with her husband, fellow mathematician and computer scientist Nick Pippenger, while waiting for a ferry in British Columbia.



grow up” for their two children—at the university, “funding, salaries, and facilities were not competitive. If we were going to attract new faculty to build a great department, we would have to get creative.” Klawe and her colleagues committed themselves to four core values in recruiting faculty: to hire people who 1) were outstanding researchers, 2) cared deeply about teaching, 3) were excited to join a team building a world-class department, and 4) valued a workplace where all faculty, staff, and students were supported. With those four values front and center, Klawe figured potential faculty “will self-select.”

The approach was even more successful than anyone anticipated. “In five years, we hired 15 faculty, doubling the graduate program, tripling the research program, and getting a new building. When I left after six and a half years as department chair, we had 30 faculty. Now there are well over 50. Best of all,” Klawe added, “those same four values still drive the department today.” From that longevity, she reached two further discoveries about leadership: “You have to be very clear about your values. And for an institution to be self-sustaining, the values must be something communal that everyone shares.”

In early 1995, Klawe became UBC’s first female vice president. She had two objectives: to make all students university-wide feel as valued as they did in the computer science department, and to network the entire campus so that everyone who needed access to a computer could get it. In fall 1998, she became dean of science, and set out to increase the number of female faculty members in the sciences, who then numbered under 10 percent (only 24 of 285). The rest of the university was fully behind the aim: indeed, UBC became a leader in finding ways to hire couples. By late 2002, the number of female science faculty had doubled to 48, including in traditionally male departments such as mathematics, physics, chemistry, and computer science.

Tactics for strategy

In January 2003, Klawe became dean of engineering at Princeton University, which had just named a new president committed to encouraging women in science and engineering. She was charged with creating a strategic plan for making Princeton’s engineering school one of the top in the world. Klawe felt “we needed to engage all faculty, staff, trustees, alumni, and students so the plan would be embraced by everyone.” Over 90 percent of Princeton’s faculty participated in one or more day-long workshops to chart the future of the school. All discussions were published on the web, as were the many drafts of the eventual plan, encouraging input from the entire community. The open approach was enthusiastically received: “the strategic plan ‘Engineering for a Better World: The Princeton Vision’ is still driving the school forward today.”

In 2005, Klawe was approached by a search firm seeking a new president for Harvey Mudd College. Having so recently arrived at Princeton, neither Klawe nor Pippenger wanted to leave. Eventually, the firm flew them to Claremont to meet Mudd students and faculty. “They were phenomenal—unlike any I’ve met anywhere else,” Klawe exclaimed. “Both are simultaneously very bright and very

humble—there is no arrogance. The faculty are committed to being the best science and engineering teachers on the face of the earth, and the students are committed to being the best learners on the face of the earth.” Those explicit commitments, the legacy of the school’s founding president, Joe Platt, “make the college an extraordinary learning community.”

After Klawe joined Mudd in 2006, the community developed a strategic vision using a process similar to the one at Princeton. One of the vision’s six themes is “Unsurpassed excellence and diversity at all levels.” In 2006, 30 percent of the students and faculty were female. Today (2012), 40 percent of the faculty and over 45 percent of the students are female. More impressively, 40 percent of the computer science majors are female, up from 10 percent in 2006.

Encouraging Students

Klawe is focusing now on encouraging students of color, especially African-American students. That is a challenge for all science and engineering colleges: even today, only a small percentage of African-American students nationwide graduate from high school with both an interest in science and engineering and a level of preparation that would allow them to succeed at a college such as Mudd. Thus, Klawe and Mudd actively participate in pre-college STEM preparation programs such as Math for America, the Claremont–Long Beach Math Collaborative, and Homework Hotline. She has recruited African-American leaders in science and engineering to advise the college, which has launched several new initiatives. They include Future Achievers in Science and Technology (a program for bringing high-achieving students from under-represented groups to Mudd for a weekend) and the President’s Scholars Program (which provides full tuition each year to several incoming students who both demonstrate exceptional leadership ability and increase the diversity of the student body).

“I want to change the culture of science and engineering to be supportive of all people” regardless of gender, ethnicity, or background, Klawe declared. Recalling her own early-career battles against gender discrimination, she affirms: “It doesn’t matter what you look like. What matters is what you have to contribute.”

Trudy E. Bell (t.e.bell@ieee.org, www.trudyebell.com) is a former editor for *Scientific American* and *IEEE Spectrum*, and earned an M.A. in the history of science and American intellectual history. The author of *Weather* (part of the Smithsonian Science 101 set, HarperCollins 2007), lead writer for the IEEE’s millennium book *Engineering Tomorrow: Today’s Technology Experts Envision the Twenty-First Century* (IEEE Press 2000), and author of 10 other books and 450 articles, she is senior writer for the University of California High-Performance AstroComputing Center.



Silent Kayaker

Art Was Kept ‘In The Closet’

“I took a number of fine arts courses while in university but was quite discouraged by the attitude of the faculty toward students majoring in science (they felt science students shouldn’t be allowed in courses for those majoring in fine arts). As I became a professional mathematician and then a computer scientist, it became clear that also being an artist would diminish my credibility (already in question because of being female), so I kept my painting secret. When I turned 40, I decided to come out of the closet, and I hung several of my paintings in my office as well as in my home.”



Play



Reassembly Required