

Alice Gast

of the
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Alice P. Gast wanted to be a scientist ever since she was a little girl visiting her father's biochemistry laboratory. She almost diverged to become an archeologist at one point, and at another time an aptitude test told her to become an auto mechanic, but she went on to find the right home for her talents in chemical engineering. A ChemE since her freshman year in college, Alice says she loves the field and the collegiality of the community. What she didn't foresee, however, was that she would eventually become an academic administrator—a job she now finds even more challenging and rewarding.

As Associate Provost and Vice President for Research at MIT, Alice holds one of the more interesting, important, and complex positions in American academic administration. The position reports to MIT's Provost, Robert A. Brown, and to President Susan Hockfield. It is Alice's responsibility to advise them on matters of research policy. Diverse policy issues in areas such as research integrity, intellectual property, international student visas, and the terms of research agreements are continuously evolving and require Alice's attention and influence. She also views her job as being a "champion of interdisciplinary research," and she can think of no better place to promote it than in the vibrant research environment of MIT. Reflecting on how she got this "dream job" she says that one thing simply led to another.

PERSONAL BACKGROUND

The seeds of scientific curiosity were planted early in Alice's life when she would go to her dad's lab and look at pictures from his electron microscope. Later, she found



that being in junior high school was made tolerable by a circle of studious and like-minded friends . . . as well as by joining a track team. She says that growing up in California made "beach runs" *de rigueur*, and that it was easier to be a serious student when one was a jock and a nerd at the same time. She remembers one time that she was embarrassed by her high school history teacher when a picture showing her executing a long-jump appeared in the local paper. He said "I could tell it was Alice because she is sitting down and her eyes are closed!" (Alice says she was simply honing that important academic talent of sleeping through lectures!)



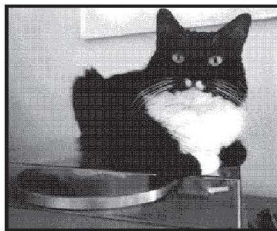
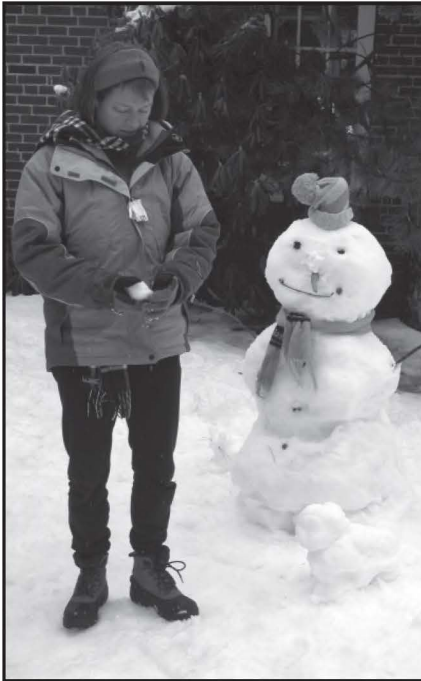
Top: Family visit to Paris for Stanford chemical engineering colleague Michel Boudart's 80th birthday.

Above: Alice and fellow chemical engineer Chip Zukoski are longtime friends and Gordon Conference tennis partners.

Alice and cold-weather friend, a new challenge for a California girl.

Beloved bi-coastal family pet, Stumpy.

Below: Alice's Stanford research group and kids gather at her Massachusetts home during a trip to set up Alice's MIT lab in February of 2003.



Later, at USC, Alice enjoyed the flexibility of the program they offered, the excellent teachers there, and undergraduate research opportunities that abounded. She took courses in chemical engineering, chemistry, music, and history—and met Brad Askins, the boy next door. Brad was a history major at the time (another good influence) but later became a computer scientist. Alice says he has always been a source of inspiration for her. Another bonus is that she has her own technical support person in Brad and is thus able to gain insight into complex computer issues that are outside of her area of expertise.

Alice and Brad moved to Princeton for grad school, experienced living with snow for the first time, adopted their cat, Stumpy, and found close friends to share their lives and ambitions with, friends like Chip Zukoski and Barbara Morgan. During this period, Alice also tremendously enjoyed conducting research with her mentors Bill Russel and Carol Hall.

Later, a year in Paris as a postdoc turned into a great adventure and made serious Francophiles out of both Alice and Brad. She has since returned to France several times for sabbatical stays and more recently has spent time in Germany as a Humboldt Fellow. She relishes the opportunity to return to Europe from time to time to conduct research or to transact Institute business and to sharpen her language skills.

Alice claims that her most effective training for university administration was in negotiating with her kids, Rebecca and David, when they were about four and two, respectively. At those ages, neither of them wanted to stay at a daycare facility in the morning and took a bit of on-site coaxing to accept the situation each day—but Alice was always quite anxious to leave before any of the other kids took the opportunity to decorate her attire with paint or sticky food. She found that the best approach was to “redirect” the kids attention so that they found something really interesting in the room, and thinking it was their own discovery, became engaged and forgot all about not wanting to stay. Alice says the same approach is true when you can get your colleagues to adopt a new and challenging idea and make it their own, truly engaging them—then you have done something worthwhile.

Now that their kids are eight and ten, Alice and Brad find themselves enjoying recitals, soccer games, cross-country skiing, and biking adventures. The whole family is fortunate that Brad has a flexible work schedule and can shuttle the

Below: Press conference announcing the establishment of the Institute for Soldier Nanotechnologies (ISN) at MIT. Also pictured from the left are Provost Robert Brown, Dean of Engineering Thomas Magnanti, ISN Director Edwin Thomas, and Chemical Engineering Professor Paula Hammond.

Left: At work and at play—Alice is shown lecturing at a conference in Les Houches, France, and in a more relaxed setting exploring the tidepools in Baja, California.



kids to the various activities they take part in. Family hikes and camping trips are the highlights of the year and take a high priority in the scheme of things.

THE STANFORD DAYS

Alice arrived in the chemical engineering department at Stanford to begin her academic career in late 1985 after returning from France, where she spent a year as a NSF NATO Postdoctoral Fellow at the Ecole Supérieure de Physique et de Chimie Industrielles in Paris. She had been vigorously recruited by several universities and her champions at Stanford felt fortunate to have won the battle.

During her sixteen years at Stanford, Alice established a world-wide reputation in the area of polymer solutions, colloidal dispersions, and interfacial behavior of proteins. She displayed an uncanny knack for developing and applying sophisticated tools to probe the intricacies of these complex systems, and often used statistical mechanics to interpret her experimental results. She was able to reveal the connections between molecular behavior and macroscopic manifestation in polymeric micelles, colloidal and protein crystallization processes, and polymer and protein adsorption phenomena in ways that were both foundational and revolutionary.

To accomplish all of this, Alice had a certain magnetism that allowed her to attract the best available PhD students into her group. Her ability to mentor and guide students through the highs and lows of doing research is legendary. It has been claimed that students were also attracted to her group meetings, which featured fine French cheeses, water crackers, home

made bread, and even, on occasion, some fine wine. And one cannot forget the many parties that she and Brad hosted at their home. Indeed, everyone looked forward to a celebration at the Gast household following another successful PhD defense by one of her students (she has had thirty PhD students in all). She was sometimes assisted by her colleague, Channing Robertson, who would entertain the kids with his reenactment of “the claw”—something he pulled from a grade-B horror movie. It is fair to say that Alice’s research group was a “family” of sorts, and created an atmosphere in which the very best was coaxed from the minds of many talented students.

Alice was among the most popular teachers in the Stanford department. Her style was engaging and she set a high bar for the students. She loved to involve them in projects. Her “animal guts” project made the reactor design course much more interesting and entertaining for the students and offered numerous open-ended design problems for them to tackle. She would have the students demonstrate the fruits of their labor at a presentation for the entire department. Sometimes they cooked “gumbo” for their post-final party (following Alice’s family recipe, not the one in the excellent text by Scott Fogler). To recognize her efforts, Alice re-

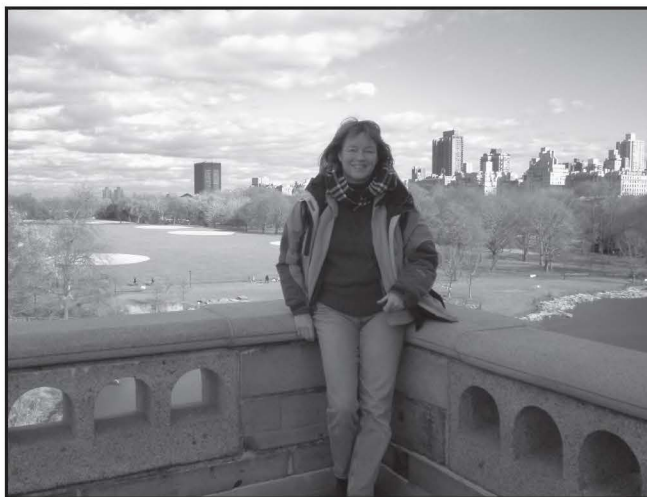
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ceived a Camille and Henry Dreyfus Teacher Scholar Award and was honored as Professor of the Year by Stanford's Society of Women Engineers.

Alice's research accomplishments did not go unnoticed for long. In 1992 she received two prestigious awards—the Allan P. Colburn Award from the AIChE and the National Academy of Science Award for Innovative Research. As could be expected, Alice found herself in great demand to give plenary talks, to organize conferences, and to serve on government panels. She did all these things with enthusiasm, but was always able to strike a balance between her family and her passion for research and teaching. Her fellow teachers viewed her as an extraordinary and remarkable faculty colleague in every sense of the word.

As Stanford began to embark on a bold new interdisciplinary research enterprise, dubbed Bio-X, she was pegged by her colleague, Channing Robertson, to play a key role in the design process for the James H. Clark Center, the focal point for the effort. In so doing she worked with Sir Norman Foster, the primary architect, as well as a multitude of faculty and administrators, to bring about Stanford's showcase cross-disciplinary enterprise. It was a daunting task, given the number of stakeholders involved, and a divergence of opinion soon arose as to how the project should go forward. Alice deserves much credit for her ingenuity and the leadership she provided during those exhilarating, yet trying, times. As a result of the project, Stanford is positioned to play a leadership role in redefining the way in which multidisciplinary research is conducted in the future. Alice's legacy in this regard will never fade, and the Stanford community is forever indebted to her.

As if her plate were not full enough, Alice somehow found time to work with the late Arthur Adamson (in the chemistry department at her alma mater, USC) in helping to revise the latest edition of the famous textbook, *Physical Chemistry of Surfaces*. It was a common sight at Stanford to see Alice return to campus after her kids were tucked away at home, burn-



Alice in the role of tourist, posing with New York's Central Park as a backdrop.

ing the midnight candle well into the next day as she toiled on revision after revision of the book. It was none other than a monumental labor of love for her. Because of her effort, generations of students will now have the benefit of her wisdom and her keen ability to communicate difficult topics in an understandable and palatable fashion.

Alice's days at Stanford were full of joy, discovery, some failures, and many successes. All of her colleagues there remember them well. Alice is missed in ways that her colleagues find difficult

to express and feel that MIT is incredibly fortunate to have such a treasure in its midst.

THE MOVE TO MIT

Alice was difficult to uproot from Stanford, her California home. One day, in early 2001 her fellow chemical engineer, Bob Brown, the MIT Provost, called her to discuss the possibility of potential new challenge for her—that of Associate Provost and Vice President for Research at MIT. After reflecting seriously and at length about her love of graduate education and research, she decided to take the plunge into academic administration and accepted the challenge. Alice says that “It has been a wonderful ride and I am very grateful that such an opportunity arose.”

Alice found that some of the interesting issues that have always motivated her emerge in a totally unpredictable fashion and intersect with the government and industrial communities. She found she had to actively work with government and academic groups to improve the visa processes for international students and scholars. She has also been engaged in defending the ability of universities to freely publish their fundamental research results and to openly collaborate with students and colleagues from abroad. Because Washington is the source of both opportunities and problems for university research, and because all universities are subject to a similar set of opportunities and obstacles, Alice is frequently a participant in Washington activities of various sorts.

In addition to policy issues, Alice enjoys being responsible for and promoting interdisciplinary research at MIT. The intellectual span of these interdisciplinary activities is considerable, ranging from the Plasma Science and Fusion Center to the Computational and Systems Biology Initiative, to the Institute for Soldier Nanotechnologies.

In her oversight of important labs and centers, Alice brings the same talent as a supportive mentor that has always been evident in her interactions with students. She enjoys having the opportunity to work with laboratory directors in making their programs even more vibrant and exciting. Alice also enjoys meeting the critics and sponsors of the labs, centers, and programs she oversees, and communicating the Institute's support and appreciation for them. She is always willing to provide liaison with sponsors or to help a lab develop an exciting new program.

Alice says the best part of her job is the opportunity to encourage new initiatives and to nurture new efforts. Although every situation is different, they often require that she assemble just the right combination of people with just the right intellectual skills to address the opportunity at hand, making sure they have the interpersonal skills that will lead to rapid development of a cohesive team. She is comfortable remaining in the background and allowing the team to determine its own destiny, providing enthusiastic support when it is needed. A good example of this process is the Institute for Soldier Nanotechnologies at MIT. This was MIT's response to a RFP from the Army, which promised a five-year grant at the level of \$10M/year. As one might expect, competition was intense and many good proposals were submitted. One requirement of the proposal was creation of a new facility—and Alice and a team of faculty and project managers designed and constructed one in record time. She was at ease functioning as the project manager, balancing the budget while at the same time ensuring that the research needs of the program, faculty, and students were not compromised. Alice's support and collegiality during this process led to a great sense of accomplishment and satisfaction among her team members, who expressed their appreciation and their willingness to join her in any future endeavors.

Another of Alice's areas that draws on her breadth of experience is the Office of Technology Licensing. Alice has worked hard to balance the interests of faculty, who receive compensation for the intellectual property that they generate, and the needs of the university, which provided the supportive environment and which actually owns and licenses the IP. She remarks that a few years ago, she "learned a lot about intellectual property from some very smart lawyers during an interesting consulting experience."

One of Alice's challenges is working to keep the university and the funding communities focused on the proper role of university research as a vehicle for the education of young

people. In addition, there is a fine line between research and development. In times of tight budgets or international economic tension, there is often the tendency to push university researchers toward technology development problems, just to "help out." But, as Alice points out, "All you end up doing is diminishing basic research at a time when industry and the country need it most."

All of this may seem to be a major departure from her former activities as a teacher and scholar, but Alice views her research interests as interdisciplinary and she credits her mentors Bill Russel and Carol Hall with teaching her to apply concepts from one field to other areas. Her work at Stanford in helping to design the Clark Center and working with the Materials Center and the Synchrotron Laboratory were experiences that she has been able to draw on many times since arriving at MIT. Alice comments that she is always surprised to find how important past experiences and things learned along the way can be, and usually in unexpected ways. Her experience as an investigator at Stanford's Synchrotron Radiation Laboratory has come in handy more than once in working with some of MIT's laboratories, especially when some of the lab's investigators are not aware of her background.

Alice's diverse experiences have also served her well in her work on behalf of international students and scholars. She gained valuable experience from her postdoctoral year in Paris working on fluid mechanics or something like it, as well as from the better part of a year (split over several trips) spent working on biophysical issues in Munich, as an Alexander Von Humboldt Awardee. Not only did these experiences give her a first-hand understanding of what it is like to be a researcher in a foreign country dealing with different cultures and government systems, but she also made a number of close contacts who can now share insights on what it is like to deal with the U.S. Government when they come over here on international collaborations.

Among her varied activities, Alice values most the days she spends with her research group in the Landau building at MIT. There she can work with talented undergraduate, graduate, and postdoctoral students and think about science and development of their research projects. She has always viewed her students as her best research "products" and has been fortunate to work with the best.

All in all, Alice says she loves MIT and cannot think of a better place to be working as an advocate for research and interdisciplinary collaborations. "MIT is just this most amazing place," Alice is fond of saying, usually after discovering another area of fascinating research. Alice goes on, "MIT is probably one of the few places on the planet where my family would rather come in and meet me on a Friday night, to see something like a student robot competition, than have me come home to them." □