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# Tribute to Hanna Reisler

Photo by Ron Reisler

I was caught off guard that afternoon, perhaps half asleep or expecting a different call or more likely none at all. All I remember for sure is answering the phone and being taken by surprise. The person on the other end introduced himself as a new faculty member, a biochemist, in the UCLA Department of Chemistry. He had arrived recently from the Weizmann Institute in Israel. He asked if I had looked at the material his wife had sent to me a few weeks earlier. She was still in Israel with their infant son, but they would arrive soon in Los Angeles. She had apparently asked about joining my group. I had not looked at her stuff but promised to do so asap and get back to her with an answer.

It was 1977, and virtually all distant communication was carried out using telephones that are now called landlines and/or real mail with real stamps and real paper. Internet and email entered the scene much later. I read the material she had sent and found nothing all that unusual. She was far more experienced than other applicants, having done a postdoc at Johns Hopkins a half dozen years earlier. After that she had returned to Israel to a position at the Soreq Nuclear Research Center. I phoned her postdoc advisor at Hopkins, John Doering, and asked him a bunch of questions. He had a droll sense of humor, and was not much of a communicator. I might have also phoned Paul Dagdigian. In any event, an offer was made and accepted. A month or so later a plan was hatched in the West Los Angeles apartment of Hanna and Emil Reisler over tea and some Israeli and/or Polish sweet things. The plan amounted to nothing more than choosing a project and a schedule that accommodated child care for their son. She would show up at USC in a couple of months. I cannot help it if I am lucky.

My academic appointment at that time was in the Department of Electrical Engineering. Toward the end of Hanna's first year, I suggested to the Chair that raising her status to Research Assistant Professor, a nontenure-track position, was in order. This would be the first such appointment in Engineering. It did not engender enthusiasm, but my insistence won out. Later she was promoted to Research Associate Professor. We were in the Department of Chemistry by then, and the promotion went through without fanfare. The period 1977−87 was exciting in the extreme. Research output was exploding, funding was great, the laboratories were large and well equipped, and the students, postdocs, and visitors were a lot of fun to work with. A large center grant was landed in 1986 that wound up lasting 11 years. Hanna, like good red wine, improved with time. She picked up and innovated new methods deftly and with clear scientific purpose and no wasted motions. She enlisted and inspired students and postdocs. Each project she worked on yielded great results. Hanna was a leader who always went the extra mile, whether in science or along human dimensions. None of this was lost on me.

It would be easy to write about her research achievements during this period. They were many and of the highest caliber. We will get to her research soon, but right now I want to convey something else. I want to instill in you a picture of the person who held group gatherings in her home, taught students and postdocs how to write scientific papers and give scientific talks, helped recruit graduate students for the department, and was a joy to be around. A person who was a role model and inspiration. Group members during this period recall to this day her presence and influence, indelible imprints that last a lifetime. These things do not happen unless a person is made of the right stuff.

It was early 1987 when Hanna told me it was time for her to move on. She had identified a couple of local opportunities and asked me to write to them on her behalf. Of course I would do it, but my enthusiasm was low, and this is an understatement if ever there was one. It took a couple of days to come up with an alternative suggestion: a faculty position at USC. I had concluded that Hanna would be an excellent faculty member. It is hard to get such a thing wrong after working with a person for a decade, though I have seen it happen. She is an aggressive, no-nonsense researcher whose combination of critical judgment and Israeli-style optimism enable her to distill knowledge, identify opportunities, anticipate difficulties, and chart a path to success. She keeps her eye on the ball, so to speak. Most importantly, she was, and remains, totally dedicated to students at all levels, be they undergraduate, graduate, or postdoctoral. No emergency or crisis was too daunting to keep her from rising to the occasion, and there were myriad examples to support this statement. And this is just one aspect of her far-reaching, values-driven commitment. Hanna agreed that a faculty appointment would be great, but thought it had the chance of a snowball in hell. Anyway, it was worth a try.

There was no faculty search in place in Physical Chemistry, no discussion of the need for such a hire, or even a vague suggestion that such a slot might materialize in the foreseeable future. There was no identifiable lab space, and the Dean was broke and hostile toward us under the best of circumstances.

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To top it off, the department had a long-standing tradition of not hiring "one of our own". Our first move was clear: The project would be launched with a ferocity that captured attention.

Over the years many of you who are reading this Tribute have told me that Hanna's transition from a soft-money appointment to a tenured faculty member was a no-brainer, a seamless transition that had win-win written all over it. Do not kid yourself for a minute; it was a bold undertaking without precedent. To quote Dickens: "It was the best of times, it was the worst of times." The Department of Chemistry has made many appointments with unanimous approval. It has also made appointments that have aroused contention, for example, Arieh Warshel, George Olah, Stephen Bradforth, Surya Prakash, Hanna Reisler, Anna Krylov, and Curt Wittig. You be the judge. A few months after the project was launched, the faculty met to discuss Hanna's case and vote on it. The result was sent to the Dean: a recommendation that she be offered an appointment at the level of Associate Professor with tenure. Her dossier went through the upper committees. The ordeal was over. It would not be long before skeptics were claiming credit: "We in Chemistry get these things right." The lives of great people often involve unorthodox paths.

The anophorism "hit the ground running" does not do justice to Hanna's start and meteoric rise. Within a year she had NSF, AFOSR, and ARO support and DOE would soon follow, graduate students and postdocs were busy at work, and data were pouring out of her lab. In the first half dozen years, she pioneered studies of quantum fluctuations including overlapping resonances in the near-threshold unimolecular decomposition of small molecules, Fano profiles in photodissociation including control of reaction pathways, and complete state-to-state mapping of photoinitiated reactions over broad energy ranges. The 90s saw her group turn out 60 papers and establish collaborations with major theorists in the U.S. and abroad, and awards began accumulating at a rapid pace that would continue until now. Andrei Sanov was a Ph.D. student and Scott Reid was a postdoc in her group during the nineties. They will now tell you how it was and then I will continue. −CW

The Reisler lab at this time had three state-of-the-art arrangements for investigating a broad range of topics in molecular dynamics. There was also a surface science project in collaboration with the Wittig group downstairs. The "LIF machine" was used to study the spectroscopy and photodissociation of small molecules, leading to the discovery of quantum fluctuations in near-threshold unimolecular decomposition. The "CID machine" (Collision Induced Dissociation) was developed to investigate how molecules below dissociation threshold decompose following collisions in crossed molecular beams. The "Carbon machine", was used to study reactions of supersonically cooled molecules with carbon atoms. The surface science project examined molecules scattered from crystalline surfaces.

The group's favorite molecule during this period was $NO_2$. Its structural and spectroscopic properties facilitated several fundamental breakthroughs, and it was studied with great success on three of the four instruments mentioned above. Work done on the LIF machine uncovered the quantum-state structure, spectroscopy, and reactivity of $NO_2$ just below and just above dissociation threshold. On the CID front, highly excited $NO_2$ collided with atoms and molecules, and its dissociation shed light on collisional energy transfer. On the surface machine, analogous processes were examined using Mg(100) surfaces.

The Northridge earthquake hit in January 1994, and our laboratories (sixth floor) sustained serious damage. The CID machine, a stainless steel behemoth with a 4 $m^2$ footprint, literally took a walk (5 cm). Moving it back was impractical, so optical paths were reconfigured. An imprint on the floor showing the machine's original location remained for decades.

In 1995, correlated $NO_2$ product-state distributions were measured by varying the position of an optical prism on a crude manual translation stage. Correlations obtained using this imaginative, albeit primitive, technique proved so informative that Hanna set her sights on a better way to obtain the critical speed and angular distributions. Ion imaging had been invented by David Chandler and Paul Houston in 1987. It was attractive but in its infancy, so Hanna visited David at Sandia National Laboratories to learn from a master. A particle detector and CCD camera were then purchased and the imaging machine emerged. Resolution left much to be desired, but early successes marked the beginning of the imaging era in the Reisler group.

The imaging field has since flourished, with ion and photoelectron imaging now standard tools in gas-phase spectroscopy and dynamics. In the half dozen years that followed the construction of our apparatus, the field experienced two major developments: velocity-map imaging (Eppink and Parker, 1997) greatly improved resolution; and the inverse Abel transformation revolutionized transformation quality. The latter was introduced by the Reisler group in 2002. It is known as the BAsis Set EXpansion (BASEX) method, and its use is widespread. Now back to CW.

The year was 2000. An anonymous donor had appeared out of the blue and given 20 M$ to the University for the explicit purpose of supporting women in science and engineering. The advancement guys in the upper administration had thanked her profusely, assured her it would be put to good use, and commenced preparing for its absorption. Donations of this nature are vulnerable to being squandered or morphed into something unrecognizable by the strong forces that circulate in the abyss. Hanna spotted the shenanigans and sprang into action: devised a plan, rounded up supporters, and set up meetings with the administration. Gloves came off only as a last resort. The adage: "The first person in the room with a real plan wins" held true. Provost Lloyd Armstrong is a good guy and he was sold on her plan.

The Women in Science and Engineering (WiSE) Program is now one of the most successful of its kind nationwide. It is run by faculty in science and engineering rather than the upper administration. Its impact at USC has been absolutely remarkable, a game changer of major proportions, and a poster child for faculty oversight versus one-size-fits-all, top-down micromanagement. It is inconceivable that the WiSE program would be what it is today were it run out of the Provost's office. Hanna is responsible for this jewel in the crown.

Serving as department chair is something one does out of a sense of duty, not because it is some kind of glorious position or a stepping stone. Hanna and I agreed to a tandem arrangement: 2001−2003 for myself, and 2003−2005 for her. She served the Department extremely well: a half dozen faculty hires, a comprehensive long-term departmental plan whose value accrued for many years, and maneuvering the ship though crisis after crisis. Her commitment to students and



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postdocs remained paramount during this time. Indeed, it has been a constant of motion throughout her career. Dealing with the Deans during this period was trickier than usual, and on several occasions they were informed, by her, that the Department Chair's loyalty is to the faculty, not the administration. Hers was a selfless contribution to the betterment of the Chemistry Department, and by any reasonable metric it was a great success.

Hanna has served for the past decade as Faculty Development Director for Natural Sciences and Mathematics (NS&M) in the College of Letters, Arts, and Sciences. Is this just another administrative title in a world gone mad with such nonsense? No way. She has interacted vigorously, frequently, and on a broad range of topics with each and every untenured faculty member in the Departments of Chemistry, Physics, Biological Sciences, Earth Sciences, Psychology, and Mathematics. All interactions are one-on-one and every case is treated as a special case. She has hammered them on writing, organization, and priorities, and advised them on critical decisions and timing. She has guided them through their third and fifth year reviews prior to submission of their tenure dossiers. It is impossible to overstate the impact of this work. It has resulted in the bar being raised throughout NS&M: promotions based on achievement, not excuses, and a morale and effectiveness in the young professors that is unprecedented in the five decades I have been here. The position did not exist before she was asked to take it on. Interestingly, she had already been doing it informally, and the College was so impressed they decided to institutionalize it. For all I know, they claim credit. This stands as one of the most important contributions ever made by a faculty member in the College. Incidentally, the Hanna Reisler Mentorship Award was established by the WiSE Program in her honor.

Fast forward to the present. In March 2019, Dr. Carol Folt was appointed USC's 12th President in the school's 138-year history. Responsibility for the appointment rested with the Board of Trustees, but eight senior, highly respected faculty members participated in the search, which was a first. Hanna was one of them and not surprisingly emerged as a leader. This is a critical, complex process under the best of circumstances, and we certainly did not have the best of circumstances. The result has been hailed as a major victory: unanimous Board approval and resounding faculty and student support. It took no small amount of delicate interaction and skilled maneuvering to get there. Hanna made an enormous contribution to the betterment of a significant educational institution.

Hanna occasionally mentions the R-word (retirement). Any bets! A person whose exercise regimen includes 26 pushups plus other exercises (since the early 70s) does not simply fade away. A person whose research prowess remains unattenuated by time's passage does not start looking for the light switch. A person of legendary commitment to the Freshman Chemistry Program serves a self-imposed life sentence. A person whose values and drive have proven contagious is never out of fashion. In other words, Professor Reisler has just now hit her stride. Years ago, her choice of an academic career was the right person making the right move at the right time. We are all lucky.

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University of Southern California
**Andrei Sanov**
University of Arizona
**Scott Reid**
Marquette University
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## ■ ASSOCIATED CONTENT

### Supporting Information

The Supporting Information is available free of charge on the ACS Publications website at DOI: 10.1021/acs.jpca.9b04339.

Table of contents for the Hanna Reisler Festschrift (PDF)



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