

First Ladies of HFES

By Francis T. Durso

Learning about the four women in the stories below was one of the most fun and rewarding activities of my year as President of the Human Factors and Ergonomics Society. I wrote the four stories for the *HFES Bulletin* and am excited that HFES has decided to gather the stories in order to highlight them here.

This adventure into the role of women in the Society was inspired by the photograph from the genesis meeting in Tulsa, Oklahoma, where I noticed one woman among the hundred men. I enjoyed interviewing her contemporaries and searching through news from the 1940s and 1950s so much that I decided to continue to look at other first women in our Society.

I think you will find the four women featured here to be truly remarkable. As I learned more about them, I also started learning more about women in HFES today. I hope you enjoy reading about these four women and the results of their pioneering efforts as much as I enjoyed writing about them.



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Finding Eve

On September 25, 1957, 100 people gathered in Tulsa, Oklahoma. The photo at left shows the attendees at that meeting. The folks who met in that Tulsa hotel were similar in a number of ways. Many had sacrificed in some way in the war against the Axis. They all lived to celebrate VE and VJ Days and were currently fighting the Asian influenza pandemic that would ultimately take 70,000 lives in the United States and over a million worldwide. They had seen remarkable advances in technology from the war. Most important, they had seen the issues that arise when people used those technologies. And they would soon see more. Sputnik would launch in nine days, and the first U.S. nuclear power plant would open in Pennsylvania in December. All had an interest in what was being called "the human factor." Oh, and they were all men.

Well, almost.

Look again. On the left side of the hall; in the third row behind the gentleman with the socks, next to the dashing man with the bowtie, is a . . . woman.

Who was she?

I had to know. The date of this photo was six years before Friedan's *The Feminine Mystique* (1963) and even before someone in the States used the phrase "women's liberation." Birth control pills had yet to be approved by the FDA. The UN had only just met to rule on "the nationality of married women."

A search through early HFES records and a phone call or two raised a couple of hypotheses about who this woman was. Walter Harper, now in his 90s, was gracious enough to spend 30 minutes with me on the phone. It was a fun and illuminating half hour. Walter served in the British Eighth Army under Montgomery in the western (that would be African) desert, serving in a tank regiment supporting the Gordon Highlanders Scottish Infantry battalion. He was there when the British liberated Tripoli. He spoke to me of Chapanis and others. Frank Taylor, I learned, was a great conjuror, making 50-cent pieces appear and disappear. But did Walter remember the woman at the first meeting?

He did. She was Ruth Hoyt, later Ruth Hoyt Cameron. Ruth earned her nursing degree in the States and received her PhD in psychology in 1952 from McGill University in Quebec with a Pi Lambda Theta recognition under D. O. Hebb. Most psychologists will recognize the founder of Hebbian learning, who began the reuniting of mind and brain in modern psychology. Ruth's thesis was entitled "Intelligence in Schizophrenic Patients with Lobotomy." Later, she endowed a fellowship, one of the five at McGill to support students seeking their doctorates.

Like many of the other members at that first meeting, Ruth was there to follow up on the advances made in World War II in military technology and the human operators responsible for them. Many of those operators began in the military and now were working for the government. Ruth relied on veterans hospital patients and physicians for her dissertation, which was funded by the Canadian Department of Veteran Affairs.

Although she was born in Methuen, Massachusetts, when she was at the Human Factors Society meeting, 43-year-old Ruth was known as "one of the Canadians," a group of five who worked in Canada on human factors-related issues. By 1957, Ruth was working for the Defence Research Board (DRB) of the Department of National Defence. She acted as a liaison between the Defence Medical Research Laboratory (DRML) in Toronto and DRB headquarters in Ottawa. Defence Board HQ managed 11 labs at the time. Ruth worked there until she retired in 1975.

Ruth was the first woman member of the Human Factors Society, appearing on the March 15, 1958, membership rolls. Walter remembers the human being behind the successful liaison between Canadian Defence and the Society. He recalls telling Ruth that she wouldn't need "to wear the hat, there will only be guys there," but Ruth told him no proper woman from Boston would go without one. Ruth was a gourmet chef, and Walter recalls fondly the meals she made on his field trips from DRML to HQ.

The discipline and Society have grown much since that first meeting in 1957. That growth has been not only in size but also in diversity. There was one woman at the first meeting, and only a couple on the first membership roster from 1958. Now there are 1,610 women in HFES, 35% of the Society's membership.

Whirly-Girl

By Francis T. Durso, President

Discovering the identity of the woman among the 100 men who started the Human Factors Society (see "Finding Eve" in the December 2013 issue of the Bulletin) got me wondering about the first woman to be honored with Fellow status by the Society. Who was she? What did she do? Did it take a while to recognize her? Were women held to lower standards, or were they more likely to be truly impressive to be honored in this way?

Finding the first woman to be inducted as Fellow in our Society was a little easier than identifying the woman at the Tulsa conference. In the March 1958 membership list, there were about 300 members. Three were women. Only one appears on our Fellow list: Dora Jean Dougherty McKeown (Strother).

So who was Dora? Did she live up to Fellow status? OMG, did she! (The initialism is a blatant attempt to appeal to our younger members and show that I'm in the groove. So, what's a groove and why is it good to be in one? Never mind.)

Dora was inducted into the first Fellows class in 1968 along with 23 men. Donald Broadbent was one of Dora's classmates, as was John Karlin (of all-digit dialing fame) and Jerome Lederer (of black box fame; he did the safety check on The Spirit of St. Louis). Al Chapanis would be given the honor two years later.

Dora was the first woman to check out on the B-29. She trained World War II pilots on the aircraft. Dora went on to design helicopter cockpits for Bell Aviation. Early helicopters (whirlybirds) had cockpit controls more akin to airplane controls than to modern helicopter controls. Imagine powering an aircraft that could move in any of the three axes but using instruments from a fixed-wing aircraft. Dora also served as a test pilot for Bell. She held the rotorcraft world records for altitude and distance from 1961 to 1966. She was with Bell for 28 years.

Dora earned a PhD in aviation education from New York University and taught at the University of Illinois. She's in the Military Aviation Hall of Fame.

Finding out about our early members is interesting; I always learn a lot. That was especially true exploring Dora's career. According to an interview with Dora that I uncovered, the Civilian Pilot Training Program trained a small percentage of women to disguise the fact that ultimately the pilots would be used in combat one day.

Dora was a Whirly-Girl (International Women Helicopter Pilots) and a WASP—Woman Airforce Service Pilot. Her status as a WASP leads to two remarkable stories.

First is how Dora came to be the first female Superfortress pilot. It turns out that male pilots were reluctant to fly the B-29 because of engine fires that were common on its predecessor, the B-17. Lt. Col. Paul Tibbets (who later piloted the Enola Gay) decided to put together a female pilot and female copilot team to fly the plane so that the men would see that it was safe. I suspect it must have been embarrassing for men of my father's generation to refuse to get in a plane that you just saw landed by two women.

The second story is that Dora testified in an effort to make WASP service count as active-duty service. Women aviators from the Second World War secured veteran status and benefits in 1977 in part because of our Whirly-Girl.

I'm saddened to report that we lost Dora this past November. She was 91.

Top Girl

By Francis T. Durso, President

In 1943, Gloria Indus Lauer is a 17-year-old girl about to graduate from high school in Ames, Iowa. The world has been bonkers for a couple of years now. The war has changed everything. The pennies are made of steel. Frankfurters are gone, replaced with victory sausages that just aren't as good. They've even banned presliced bread to save on metal, but it doesn't matter so much now that they're rationing bread too. There has been a lot of new rationing this year. A year Donna Tartt captures with "weak tea without sugar and hungry to bed."

Gloria, like other teens, does her bit and holds onto the idea that really, there's lots to be happy about. That new guy, Frank Sinatra, who premiered on "Your Hit Parade" last Saturday, sounded like a dreamboat. Then there was that new Mickey Rooney movie, *Girl Crazy*. That was a gas. Sure, you know some girls who aren't rationed can get khaki whacki, but Holy Mackerel!

So, there are good things to keep you hoping in 1943 America. You notice a lot of people seem to be putting their hope in science. Looking toward science just seems part of what you hear everywhere. Maybe it helps us win the war and make the world a better place. Gloria's dad, a professor at the university (and for whom the HFES Safety Award is named), believes it. Her teachers believe it too. So does the government. Last year it started a "Search for Science Talent," and Gloria is going to compete this year.

"The second annual Science Talent Search began last November when some 25,000 school principals and teachers were asked to cooperate in finding the graduating seniors—both boys and girls—who appeared most likely to succeed as scientists" (*Science*, 1943; dashes in the original). From 15,000 seniors, the field was reduced to 40 finalists.

Gloria went on to win that competition (. . .well, win the girl part, anyway), taking "Top Girl." Her counterpart, Reinhart Schiffhaeur (competing under the *nom de guerre* Ray Schiff) appears with Gloria in the accompanying photo. Each walked away with a \$2,400 scholarship (about \$32,000 today). Currently, that competition, the Intel Search for Science Talent, is arguably the world's most prestigious science fair. Today there is only one winner; women have claimed it recently about a third of the time.

Sure, Gloria won a national award in science, but after all, back then it was just the girl category. Would she finish college in a timely fashion and apply to graduate school? Let's leap ahead to 1948 and see if Gloria is applying to graduate school. Actually, no. She already has her PhD by 1948! Lest you think I mistyped, I'll repeat myself. Five years after she graduated high school, Gloria was awarded a doctorate from Columbia University. In those 60 months, Gloria joined the Tri-

Delts, married Harry Grace, earned a BA (2 years), and a master's (1 year) from Ohio State University, and by the middle of 1948, she was Dr. Grace.

Dr. Grace went on to work for SDC—Systems Development Corporation—in what is now recognized as the epicenter of human factors, Santa Monica, California. SDC has been called the world's first computer software company. During the Cold War, SDC began as RAND Corporation's systems engineering group for the U.S. military.

Now, there are probably more difficult tasks than tracing the work of someone who was employed at SDC during the Cold War. Indeed, when I talked to contemporaries of Gloria's, I had no impression that she spoke freely about the work she was doing. Self-aggrandizement did not seem to be her way. Eventually, SDC morphed into Unisys, Lockheed Martin, and L-3 Communications. Hardware jocks may remember "the Burroughs" or UNIVAC. For the rest of us, if you think that timesharing, multiple users, intercomputer communications, and e-mail are important contributions to our lifestyle today, thank SDC.

Gloria Lauer Grace also went on to become the first woman president of the Human Factors Society. She was elected in 1978. It would be another 15 years before our second woman president, Deborah A. Boehm-Davis, would take office. Throughout the history of the Society, only six women have served as president: Betty M. Sanders, Wendy A. Rogers, Kathleen L. Mosier, and Mica R. Endsley, in addition to Debbie and Gloria.

In the middle of the last century, it wasn't easy for women to be recognized for their science abilities and to advance to a position of respect and authority as Gloria did. Frankly, it doesn't look all that easy today either. Only a half dozen women presidents? I learned while researching the last installment of this series ("Whirly Girl," February 2014 *Bulletin*) that only 10% of the HFES Fellows are women, even though 35% of the membership is female ("Finding Eve," December 2013 *Bulletin*). Our discipline is not alone in this gender gap. The STEM initiatives highlight this same concern throughout the sciences and engineering. We're not alone, but we could take a lead in correcting it.

What would we do with Gloria today? How could we draw her into our discipline, nurture her, and give her what she would need to excel? If a Gloria were at the Annual Meeting in Chicago this October, how would we know? And if we did know, what would we do? HFES does ask these questions. The Society has a committee to engage young professionals and facilitate their transition into the discipline and the Society. HFES also has initiatives to encourage students and introduce them to human factors engineering and engineering psychology.

If we look at our membership, at the student level, about half (51%) are women. Our transitional composition drops a little, with 46% of those with bachelor's or master's being women. However, transitional membership with a doctorate drops to 31% women and becomes 28% when we look at Full Members with doctorates. Between student and doctorate the percentage of women goes from 51% to 28%.

The Society tracks this information and continues with its recruitment and retention efforts.

But perhaps we, as individuals, can do more. I'd like to encourage you to try something. This October, reach out to a few young people before they commit to a career. Take a graduate student or the new member of your company and talk about the value of completing the doctorate and the value of joining HFES. You might contact your local high school and offer to speak to a science class. If you are at a university, hold a meeting for the new students in your major. Give a lecture, show a PowerPoint, or just talk about the discipline of human factors. Who knows? Maybe five years from now, one of them will be a new PhD ready to join us for the 2019 Annual Meeting.

Many thanks to Lynn "Woodward & Bernstein" Strother for providing the research assistance and archival information that made this story possible.

Making Change

By Francis T. Durso, HFES President

It was 2:00 in the morning at the Hilton near George Mason University. A young woman from the university was working as the cashier. Whenever she needed to make change, she had to turn her back on customers and on the open doorway just beyond. That night, as she turned away from the open doorway, from nowhere she felt a tap on her shoulder: "Do you mind making change?"

This setup seemed like a safety issue to 21-year-old Nancy Jaworski. Nancy was taking a human factors class and recognized several human factors issues. Maybe she should just complain to her boss about the danger. So, as many young girls Nancy's age would do, she conducted a task analysis, designed a prototype of safer, more efficient workstation, and sent the sketch to the Hilton management. She didn't hear back. (The Hiltons had just had their daughter, Paris. Maybe they had their hands full?)

During the previous years at GMU, Nancy had become more and more intrigued with people and technology. She had switched from her major in Spanish and Latin to psychology. Then, as a psych major, she took computer science and, just as the disciplines themselves were wondering, she wondered about what would happen if she combined psychology and computer science. But still something was missing.

During her last year of undergrad, Nancy wrote to Mike Strub at a local human factors group. She wrote to Mike because of her recent discovery of the class on human factors. We can all resonate to the unfortunate fact that human factors is often something that has to be discovered, even today. To her surprise, Nancy

came to realize that Mike had been the judge of her eighth-grade science fair project on noise pollution. The experimental group of mice was exposed to rock songs, power tools, and her brother's drums. Those mice became obese and ate their young. (YOU try listening to '80s rock.)

From college, Nancy—now Nancy Cooke—went to New Mexico State University to study under Roger Schvaneveldt (priming, Pathfinder, aviation). During this transition, she had her first contact with Bill Howell, a figure who would come to influence her throughout her career. This first contact was when Bill called Nancy to tell her that going to NMSU (and not Rice) was the worst mistake of her life. Well, it wasn't too bad, because when Nancy graduated from NMSU, Howell, chair of the department at Rice, called to offer Dr. Cooke her first tenure-track position.

Today Nancy is a leader in our discipline. She is internationally known for her work on teams and uninhabited aerial vehicles. She is one of 28 women Fellows in HFES. She sits as the first female chair of the National Research Council's Board on Human-Systems Integration. Inspired by the events of 9/11, she founded a nonprofit aimed at developing and promoting human factors. At the annual meeting in Chicago, she will become the second woman ever to receive the Arnold M. Small President's Distinguished Service Award for a career of making change, big change.

Nancy joins the other women in this series—the first female member, first female Fellow, first female president—as the first woman to serve as editor in chief of the Society's flagship journal, *Human Factors*. The journal was founded in 1958, but it would wait 47 years before being directed by a woman. During her tenure as editor, Nancy virtually doubled the journal's Impact Factor, which hit a high of over 1.5, the highest it has been before or since.

Indeed, women are an equal part of our Society and its annual meeting as well as partners in the leadership of the discipline. Women lead our discipline through research, practice, and service. Currently, all three HFES journals are edited by women. Four of the five divisions in the Society are chaired by women. Any scan through the research literature shows women have an equal part of our discipline. Equal in all ways except perhaps one.

The one exception is recognition of accomplishments. Women seem less likely to be nominated for, and therefore to win, awards and designations than their male counterparts. For example, the Society has almost three times as many male Fellows as female ones.

I spoke with Nancy about women and awards, and she suggested that women do not view awards in the same way that men do. Because of that, they are less likely to self-promote, relying instead on "coming to mind" when nominations go forward. As much as I admire the Zen of this position, I would also argue that such recognition serves a purpose for the next generation of women. A friend much smarter than I (actually that covers all my friends) once told me he seeks awards not because they matter to him but because they matter to others. I think he's

right, and I think it is time for all of us—men and women—to encourage women to seek the recognition they deserve.

The day after I put together Nancy's story, I heard Emma Watson speak to the United Nations about gender equality and the launching of the "He For She" initiative. Ms. Watson spoke eloquently and passionately about the role of men in achieving gender equality. She reminded us that no country has gender equality. I encourage you to listen to her speech. I also encourage you to take up the banner not only here in our professional Society and in our discipline but elsewhere. Let us all be proactive in helping women gain the recognition they have earned.

By the way, if you happened to visit that Hilton near George Mason University in the 1980s and 1990s, you would have seen Nancy's prototype actually implemented. When I asked her how she felt that her idea was implemented without any credit, she told me that making change is what matters. And now you know that she was the woman who made that change.