

# Alumni Association



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## MESSAGE FROM ARCHIVES CHAIRMAN DON NIELSON



*Don Nielson*

As we welcome spring 2021, we hope last spring's fatal viral blossom is finally dying. At the onset of the pandemic, SRI closed its 20 locations and convened a virus task force that as of now has addressed 329 individuals and managed their cases, including tracking. Weekly town hall meetings and published data have kept everyone informed and safe.

This issue of the newsletter has some fascinating accounts of ongoing SRI research—research that may require your fully secured thinking cap. First, Don Shockey brings us current on how his specialty of the analysis of material failures is now being applied to the burgeoning world of 3D printing. Next, you'll find a promising development in the ability to process encrypted data without first decrypting it. If that is a bit mind-numbing, maybe the example of tabulating and verifying voting records without revealing any content might make you more comfortable with its potential. This kind of processing is computationally intensive, and DARPA is asking SRI to find hardware accelerators to make it less so. Somewhat aligned and also from DARPA is the need for new integrated circuit chips to speed the realization of another explosive field, deep-learning AI machines. This project brings together two separate SRI groups, one in AI and the other in vision technologies, one in San Diego and one in Princeton. Remarkable how innovation blooms at the intersection of existing disciplines.

SRI news contributor Caren Rickhoff also reports on the ongoing preclinical research in antiviral drugs from Dr. Fauci's part of the NIH. SRI Biosciences has won a continuation contract for up to \$107 million over seven years directed at the treatment of HIV and other viral-related diseases. The last project concerns a very novel source of sustainable energy, flying a kite under water! All these

projects reveal SRI is where it must remain: at the leading edge of its respective fields of research.

I'm sure many of you have lost loved ones to COVID this past year, and one the SRI community lost was Dennis Finnigan. In reflecting on his life, two things became apparent that you'll read about: (1) he and two of his siblings made important contributions to SRI's history, and (2) they were but a part of a remarkable family.

We also saw the passing in the past few months of two Cooks who had been in SRI leadership roles: Charlie, the witty chemical physicist who rose to number two leader at SRI, and Paul, who as president materially changed SRI's direction toward profiting from our intellectual properties, a necessary part of today's revenue stream.

In our second Sondrestrom installment, Rachel and Clay Ross bring their experiences in Greenland to life. They describe in vivid detail SRI's scientific world there and their memorable adventures. Thank you so much, Rachel and Clay, for this entertaining look at Sondrestrom.

Finally, if you want to celebrate a truly beautiful break from a year's confinement, please join us for the Spring Fling at Filoli. You will feel free, and free it will be if you come. See the details on page 15 and sign up by May 24.

Please be sensibly safe so we can get this scourge behind us.



## SRI's FRASTA Technology Has Promise to Improve 3D-Printed Products

By Don Shockey

The SRI-developed FRASTA (FRActure-Surface Topography Analysis) technology is being deployed to improve the fracture resistance of 3D-printed materials.

3D printing, also known as additive manufacturing, is the process of building an object layer by layer by depositing powder and melting it with a laser or electron beam according to a digital 3D model. Various methods are used (e.g., powder bed fusion, material extrusion, and sheet lamination), and they are implemented on both desktop and industrial 3D printers. 3D printing enables the production of complex shapes using less material than traditional manufacturing methods and without the cost and time required to machine the shape. It is being hailed as the next industrial revolution in material production, with the market expected to reach \$41 billion by 2026 (Acumen Research and Consulting, "3D Printing Market—Global Industry Analysis, Market Size, Opportunities and Forecast, 2019–2026" <https://www.acumenresearchandconsulting.com/3d-printing-market>).

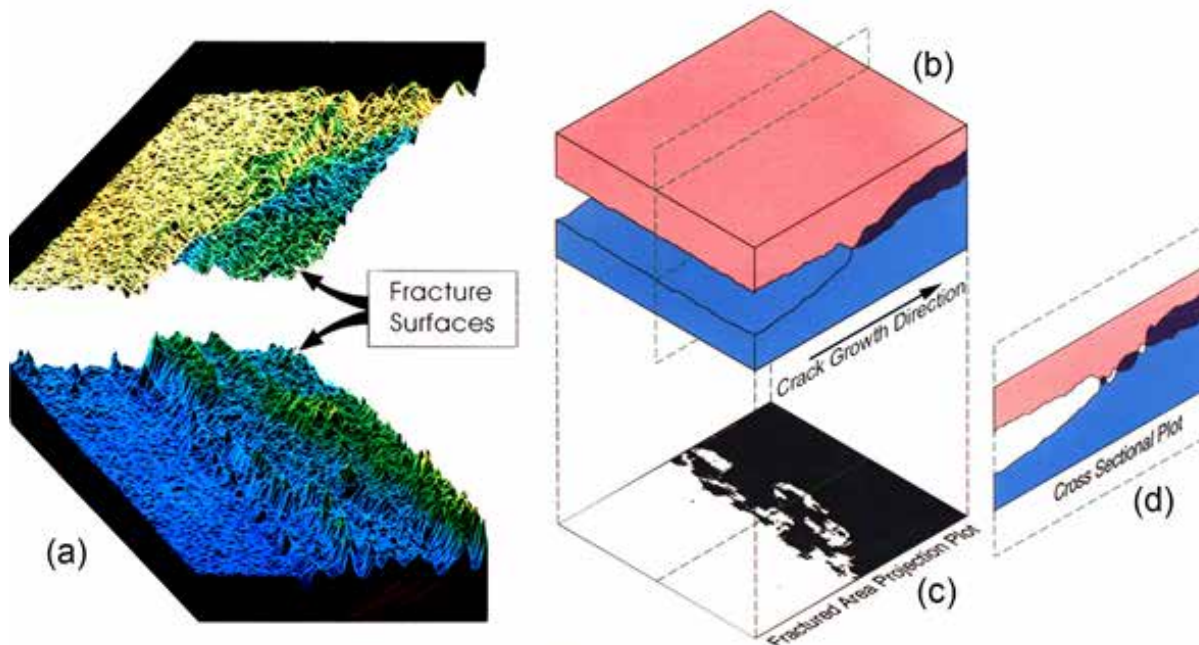
However, the process can produce defects in a material's microstructure that adversely affect fracture strength. As a

result, 3D-printed components are not yet used in fracture-critical structures. Thus, a goal is to identify the defects, link them to 3D-printing process parameters, and establish process protocols that do not produce deleterious features. SRI's unique FRASTA method can pinpoint fracture initiators in a 3D-printed material and thereby provide a route to materials with more reliable fracture properties.

### The FRASTA Technique—How and Why It Works

When something breaks, two fracture surfaces are produced. The surfaces are rough, and the roughness features on one surface align with those on the other. By making maps of the roughness of both surfaces with a confocal microscope, computationally aligning the maps with each other so that they are in the relative position of the fracture surfaces when the break occurred, and then incrementally separating the maps, FRASTA reconstructs the fracture process and identifies the weak spots in the microstructure.

The procedure is illustrated in the figure below. The roughness of the two opposing fracture surfaces (a) is mapped, and the maps are positioned in the manner of the fracture surfaces when the fracture surfaces were forming (b) and then displaced. This procedure reveals the location and shape of each microstructural defect and the growth and coalescence of these defects as map displacement is increased. The results can be presented as fractured area projection plots (c) or



*FRASTA Procedure. Fracture surface topography (a) is quantified, and the opposing topographs are positioned with respect to each other and then displaced to simulate the fracture process (b). Locations in the microstructure where defects exist, grow, and coalesce are revealed as white areas on projection plots (c) and cross-sectional plots (d).*

as cross-sectional plots (d), and the plots can be produced at different stages in the fracture process by changing the spacing between the map surfaces.

Thus, this analysis technique can reconstruct a fracture event in microstructural detail and, hence, identify defects and weak material features responsible for early failure. The technique has been applied and proven in a number of failure analysis investigations for government and industry, and a number of technical articles have been published in refereed professional journals.

### **FRASTA of a 3D-Printed Nickel-Titanium Alloy**

In a recent project with NASA, SRI applied FRASTA to the fracture surfaces of a 3D-printed nickel-titanium alloy that had been produced by commercial vendors using different selective-laser-melting machines with unique sets of build parameters. After the additive builds, the materials received post-processing heat treatments that were intended to produce a microstructure similar to that of wrought

material, with minimal residual effects from the additive parameters. Fracture specimens were then machined from the materials and loaded in tension to produce the fracture surfaces. SRI then mapped and analyzed the fracture surfaces with FRASTA.

The results showed that the defect activity was distinctly different in specimens that were processed differently, confirming the effects and importance of processing conditions and providing an explanation of mechanical property variability. Moreover, FRASTA pinpointed the defect sites on the fracture surfaces, enabling them to be examined metallographically and with energy-dispersive X-rays to characterize the responsible microstructural features. This information is suggesting specific changes in the processing procedures that may lead to additive materials with more reliable fracture properties. A detailed account of this investigation is given in a technical article published last fall in the *International Journal of Fracture* <https://rdcu.be/b7KQk>.

### **Designing the Crypto Future: SRI's Role in Next-Generation Encrypted Computing**

In this age of cloud computing and data sharing, data protection and encryption are critical. SRI is set to be a key player in the next generation of data encryption development with the award of an \$11.5 million Defense Advanced Research Projects Agency (DARPA) contract.

#### **Chasing the Holy Grail**

Conventional data encryption methods translate data into a secret “code” that can be decoded only by people who have the decryption key. These methods protect data as they are transmitted across a network or are in storage. Processing or computing on the data, however, requires that they first be decrypted, presenting security and privacy vulnerabilities and threats. Fully homomorphic encryption (FHE), however, is a cryptographic technique that is widely considered the “holy grail of encryption”: It enables multiple users to process encrypted data while the data remain encrypted, preserving data privacy throughout the process.

SRI was awarded the DARPA contract to develop a new hardware accelerator chip to support FHE as part of DARPA's Data Protection in Virtual Environments (DPRIVE) program. SRI is one of four companies that

received DPRIVE awards. The resulting hardware and supporting software solutions could enable a practical FHE capability that could secure data being processed on, and sent to, untrusted clouds, especially the volumes of data required to train artificial intelligence and machine-learning models.



#### **The Challenge**

While FHE allows computations to be performed on encrypted data rather than on clear plaintext, with each homomorphic computation a certain amount of noise—or error—is generated that corrupts the encrypted data

representation. Once the noise accumulation reaches a certain threshold, it becomes impossible to recover the original underlying plaintext. Essentially, the data in need of protection are now lost. In addition, current computational “bootstrapping” structures that help address this untenable noise accumulation require massive computation overhead to perform. By rough estimates, computing in the FHE world is currently about a million times slower than computing in the plaintext world.

Solving these problems requires a new type of accelerator central processing unit architecture and supporting software to speed the processing time, which in turn will control the noise and reduce the overhead.

### SRI's World-Class Team

SRI has assembled a world-class team of researchers and engineers for this contract. “Creating a new hardware accelerator for FHE encrypted data is a unique technical challenge that requires expertise in co-processor architectures, hardware design, computer-aided verification of hardware, software, mathematics, and FHE algorithms,” said Dr. Karim Eldefrawy, principal computer scientist in SRI's Computer Science Lab. “With the team of world-class researchers we have assembled for this project, we are confident that in a few years we can develop a viable hardware solution that will make FHE data processing practical and commercially viable for a large set of applications.”

Sources:

SRI press release: <https://www.sri.com/press-release/sri-international-awarded-11-5-million-darpa-contract-to-accelerate-fully-homomorphic-encryption/>

DARPA article “Building Hardware to Enable Continuous Data Protections,” available at <https://www.darpa.mil/news-events/2020-03-02>

“Duality Technologies Awarded \$14.5M DARPA Contract to Develop World's Fastest Privacy-Preserving Hardware Accelerator,” available at <https://www.prnewswire.com/il/news-releases/duality-technologies-awarded-14-5m-darpa-contract-to-develop-worlds-fastest-privacy-preserving-hardware-accelerator-301221040.html>

### SRI Preclinical Research Supports New Drug Developments

SRI received a contract of up to \$107 million from the National Institutes of Health's National Institute of Allergy and Infectious Diseases (NIAID) and Division of AIDS to support basic and preclinical research on and treatments for human immunodeficiency virus (HIV), Mycobacterium tuberculosis complex, and hepatitis B and C viruses.



Under the seven-year contract, SRI Biosciences will provide a suite of preclinical product development services to support the formulation of potential therapeutic agents and conduct studies to assess the pharmacology and toxicology of these compounds. These services will be used to support product discovery and development leading to Investigational New Drug Applications, Investigational Device Exemptions, and/or New Drug Application filings with the US Food and Drug Administration.

“SRI has held this contract since the program began in 1991. Over the years, we have assisted in the development of dozens of new drugs to treat HIV infection, secondary bacterial infections, and other related infectious diseases. We are delighted that this contract will enable us to continue supporting NIAID's Division of AIDS in this life-saving work,” said Dr. Jon Mirsalis, vice president of SRI's Translational Development Section and principal investigator of the program.

This program has been funded in whole or in part with Federal funds from the Division of AIDS (DAIDS), National Institutes of Health, Department of Health and Human Services, under Contract No. 75N93021D00001.

Source:

SRI website: <https://www.sri.com/press-release/sri-awarded-107-million-niaid-daids-contract-to-provide-preclinical-services-for-hiv-therapeutics/>

## Creating Integrated Circuit Designs Better and Faster

SRI will apply its deep adaptive semantic logic (DASL) technology to accelerate the verification process for integrated circuit (IC) design. DASL, developed at SRI with support from a Defense Advanced Research Projects Agency (DARPA) contract, is a novel framework for automating the generation of deep neural networks. Machine learning algorithms today store and incorporate new information solely by training on additional data; these models have no knowledge of what real-world functions or systems they represent. The DASL framework incorporates user-provided formal knowledge to improve learning from data. Under a new DARPA contract, SRI will contribute to the Ditto Project, which is a part of DARPA's Artificial Intelligence (AI) Exploration Program. The goal is to develop a new class of computer-generated design models with embedded machine-learning algorithms to help engineers develop and train AI systems more quickly and accurately than they can today.

DASL's unified reasoning and learning system provides unprecedented ability to engage with and train AI by combining formal knowledge with neural networks. This integration of bottom-up, data-driven modeling with top-down, knowledge-based reasoning maximizes productivity by accelerating machine learning and reducing

data requirements. DASL has achieved state-of-the-art performance on image processing tasks using less than 4% of the data required by competing techniques.

SRI's Artificial Intelligence Center is collaborating with the Center for Vision Technologies, which has a rich history in circuit design. Working together, they will apply DASL to expedite IC verification processes. Reducing the amount of data needed for learning and circuit emulation will enable circuit designers to identify errors and make corrections faster, accelerating and expediting the IC design process.

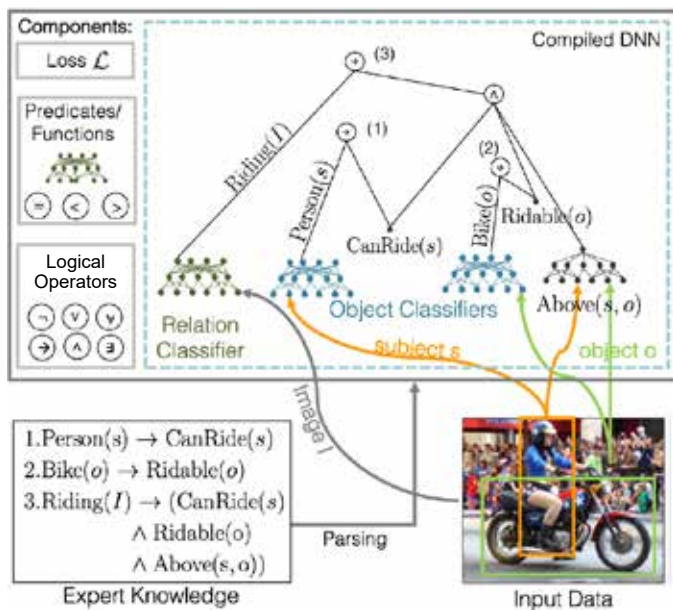
The program is in its first phase.

DASL is based in part on work supported by the Defense Advanced Research Projects Agency (DARPA) under Contract No. HR001118C0023.

Sources:

SRI press release: <https://www.sri.com/announcements/sri-international-receives-contract-on-ditto-project-under-darpa-ai-exploration-program/>

Sikka, K., Silberfarb, A., Byrnes, J., Sur, I., Chow, E., Divakaran, A., & Rohwer, R. Deep adaptive semantic logic (DASL): Compiling declarative knowledge into deep neural networks. 16 Mar 2020. <https://www.sri.com/publication/deep-adaptive-semantic-logic-dasl-compiling-declarative-knowledge-into-deep-neural-networks/>.



Source: Sikka et al., 2020.

*DASL technology for automating generation of compiled deep neural networks.*

## A Manta, a Kite, a Tide: Nature Inspires Eco-Friendly Hydrokinetic Turbines

With human populations increasing and global industrialization accelerating, reliable, renewable energy sources are critical. Solar, wind, and waves can supply clean renewable power, but none is as reliable as the tides. SRI aims to develop its Manta underwater kite system to provide reliable, eco-friendly, and cost-effective power from tides.

### The Manta Program

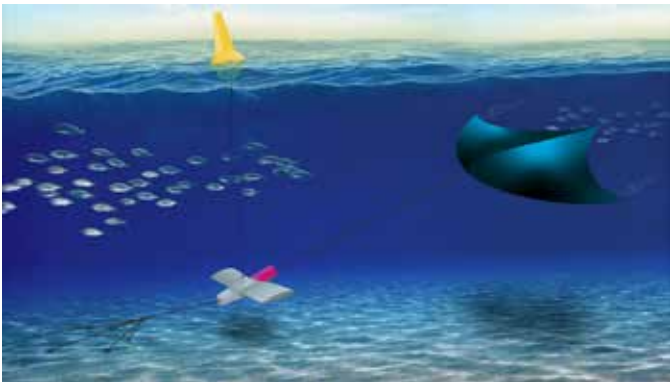
The Manta effort will be funded by a three-year, \$4.2 million award from the US Department of Energy's Advanced Research Projects Agency-Energy (ARPA-E) as part of its Submarine Hydrokinetic and Riverine Kilo-megawatt Systems (SHARKS) program. The SHARKS program supports the development of cost-competitive hydrokinetic turbines that generate electricity from ocean tides and river currents.

SRI, in collaboration with the University of California, Berkeley, will use the award to refine and demonstrate the Manta concept. The goal is to create a cost-competitive and environmentally, community-, and business-friendly application that provides a flexible, low-impact solution, one that communities can easily maintain, is safe for both humans and wildlife, and complements existing energy structures.

“In creating the SHARKS program, ARPA-E has recognized that tidal energy is a massively underutilized resource,” explains SRI Principal Research Engineer Roy Kornbluh. “There are terawatts of untapped energy in the world’s oceans, rivers, and estuaries waiting to be converted into clean and renewable energy.”

### Conceptual Design

Manta will generate power using an underwater kite to capture the power of water currents, similar to an airborne kite that is lifted by the wind. The name “Manta” was inspired by the graceful movement of manta rays through the water.



Manta’s power conversion system is simple, based on a kite payout and reel-in pumping action. The payout of the kite spins a generator that creates electricity from the tidal flows. The same generator acts as a motor to reel the kite back in with little effort when the kite is pointed at the generator. The kite system is sized to be easily serviced by one or two people with readily available watercraft. The kite motion can be adapted seasonally or to avoid storms, watercraft, or animals. Unlike spinning rotors, kites pose less of a threat to sea creatures.

Manta’s advantage is its ability to produce power with minimal structure and installation costs. Manta has a relatively lightweight, low-cost polymer composite-coated foam structure that is safe for shared-use and wildlife interactions. This makes Manta ideal for use in remote locations, obviating the need to tap into a distant electrical grid network or use diesel generators, which create significant pollution.

### Manta’s New Technology

Manta uses some impressive new technology to achieve these beneficial results. The power “generator” that transforms kite motion into electrical current uses a new SRI-designed transmission system integrated into the kite’s tether. This system allows for a smaller structure that efficiently couples the pull of the kite motion directly to rotary generators. SRI’s novel design allows the generators to spin at higher speeds without needing high-ratio gearing, making for a less expensive system. The result is that the Manta is simpler, more compact, and more efficient.

### Manta’s Future

By demonstrating this site-adaptable kite-energy system, SRI’s goal is for the Manta technology to achieve commercial use. Through Manta, SRI will showcase the viability of a system that produces low LCOE (levelized cost of energy) through the efficient generation of electricity from rivers and tides.

SRI’s Manta system represents a transformative technology that checks all the boxes: economical application, ease to set up and operate, environmentally friendly, and scalable.

Sources:

SRI article from The Dish: <https://medium.com/dish/sris-manta-underwater-kite-system-to-provide-reliable-eco-friendly-and-cost-effective-power-from-2ca2e9c28c42>

ARPA-E website: <https://arpa-e.energy.gov/news-and-media/press-releases/us-department-energy-announces-35-million-funding-hydrokinetic>

## Dennis Finnigan, the Finnigan Brothers, and SRI

*By Don Nielson*

One of SRI's most noteworthy colleagues was Dennis Finnigan, whom we lost recently to the COVID-19 virus and whose obituary is included in this issue. Dennis did SRI proud, and his passing prompts a review of his contributions to SRI and to his community of clients. (See also his SRI Alumni Fall of Fame award <https://alumni.sri.com/halloffame-archive.html#1998>.)

But there is also an interesting and larger story to tell about how not only Dennis, but also two of his brothers contributed to SRI and how they and their other four siblings left their imprint on our world. It is a remarkable story that we can give you but a glimpse into here.

### The "SRI Brothers"

Of the seven children in the Finnigan family, brothers Dennis, Paul, and Robert left their mark on SRI. We'll start with Paul.

#### Paul

We recently celebrated Paul's contributions to SRI via his Alumni Hall of Fame award (see the December 2020 Newsletter), granted for his establishment in the 1960s of a project management and accountability system for SRI.

After leaving SRI in 1970, Paul joined McKinsey & Company for a time and then led the medical division of Systems Industries. With an eye for computing and telecommunications, he saw a technical solution to an emerging need. In late 1978, Paul and a few collaborators placed a call to a phone they had coupled to an Apple II computer equipped with a voice-recording capability, and voicemail became a reality ([www.finniganusa.com](http://www.finniganusa.com)). Within six months Paul founded Voicemail International, with Dennis as chairman of the board. Digital storage at the time was too expensive for this message service to be added to each personal computer, so it was targeted for situations where a company needed to broadcast a message to hundreds or more. One of the first adopters was the airline industry, which had an internal need to schedule and reschedule pilots and attendants. This and other opportunities took the service global. By 1987, thirty Voicemail Centers were operating across Europe and the Pacific Rim, with an equal number operated by other information providers.

To ensure compatibility between the various voicemail systems, in 1987 Paul became a cofounder of the International Voicemail Association that would standardize the technology and enable universal compatibility. He continued as its first president until 1999, and the association continues to serve the worldwide voice services industry today.

Finally, FinniganUSA, Paul's consulting company, provided the patented technology that enabled the founding of Netnumber.com, a global directory service for wireless communication that allows subscribers to retain their phone number regardless of the carrier they use—another advance that affects all of us.

#### Robert

Now to Robert. Robert left Lawrence Livermore Lab in 1962 to come to SRI, following colleague Michael Uthe to build the process controls group. In his group was one of SRI's little-known wunderkinds, Ken Shoulders. Ken had little academic training but was a creative genius. He had developed a new quadrupole mass spectrometer that, because of its sensitivity, Robert believed had commercial potential. So, quickly, Robert and Uthe left SRI to join another company to pursue this potential. Unable to attract internal sponsorship to produce the spectrometer, however, Robert offered it to SRI to commercialize. Today, that may have been possible, but at that juncture SRI wasn't in that business and refused. Still, Robert returned to enlist collaboration from SRI staff and was able to complete development of the new spectrometer. They then combined the spectrometer with a computer-controlled gas chromatograph to complete the product.

Between 1964 and 1966, they sold 500 units. Then Robert, with William Fies of SRI, founded Finnigan Instruments to pursue the increasing global market. Because their product could measure minute quantities of harmful pesticides and pollutants, it eventually enabled the Environmental Protection Agency to quantitatively fulfill its mission and set national standards. Its sensitivity also opened the door to drug testing.

After selling Finnigan Instruments in 1990 and following very much in brother Paul's footsteps, Robert helped to found international organizations in the scientific measurement theory (metrology) and the promulgation of international standards for measurement so that legal definitions were, in fact, transnational. Now, to Dennis.

## Dennis

Whereas Paul and Robert were only briefly at SRI, Dennis would come and stay. After a brief stint in the US Air Force, Dennis attended San Jose State and then Stanford, graduating in business in 1954. He immediately came to SRI, joining the Business Management Group. Through his project leadership and ultimately in senior management, he became SRI's principal contact for the dominant industrialists of Scandinavia and particularly Sweden. Dennis's relationships there were exemplary.

Because Sweden had remained out of World War II, its postwar industries thrived in the absence of competition from the ravaged rest of Europe. Two of Sweden's largest industrialists were Marcus Wallenberg and Axel Johnson. Through the efforts of SRI's Hoot Gibson, these men, and others, became familiar with SRI through attending SRI's prestigious International Industrial Conference in 1957. These two kingpins of the Swedish industrial economy had seen in their companies and in their country in general a complacency that was being threatened by the rebuilding and modernization of their European competitors. Thus, Wallenberg and Johnson were open to SRI's overtures for industrial development and restructuring. Aided by the hiring of Raoul Gatien in Stockholm, SRI carried out projects involving 45 different companies between 1956 and 1971, and SRI's Stockholm office grew to 30 employees. Dennis, who had become head of SRI's consulting practice in electronic data processing, became one of SRI's principal leaders of those efforts and ultimately the face of SRI in that region.

Space will only permit a couple of accounts about how Dennis represented SRI there for about two decades. Projects for the two industrialists involved major companies like SAS, ASEA, Volvo, Scania, Saab, and Orrefors. Remarkable was the trust that Dennis and his Stockholm colleagues developed with their clients. Work for the Wallenberg group ran as just one project from 1959 to 1981, with individual projects proceeding on the basis of nothing more than a handshake! Many of these projects were of a "technical" not strategic kind. When they veered into the latter frame, Dennis had to choose between the industrialists since they might have conflicting goals. He did this with complete fidelity, in some cases having to set up separate, secret SRI offices in Stockholm to carry them out.

One interesting challenge Dennis faced when working for Axel Johnson and his 132 separate companies was how to introduce data processing into each. Dennis proposed setting up a completely separate company to take that technology into the combine. Though it took some convincing, Johnson eventually agreed and a 133rd company, Datema, was formed. Datema not only performed its primary role of upgrading the Johnson companies, but its data processing services were also successful far beyond them. By taking its computer-based modernization methods elsewhere, even into the retail world, Datema became one of the Johnson group's largest companies and served as a model across Europe. It even introduced retail self-scanning as early as 1999.

Because of SRI's successes in Sweden and because of Dennis's identification with them, in 1982 the King of Sweden awarded him the country's highest award, the Royal Order of the North Star. The citation read "for the creation of good and useful establishments" and the training of hundreds of "Swedish men and women." Among the latter were six company presidents: two of SAS and at least four of other major Wallenberg and Johnson companies.



There is one more thing. Dennis was in Stockholm in 1982 and received a call from Marcus Wallenberg. Wallenberg was ill and not expected to live much longer and sent his limo to bring Dennis to him. Wallenberg greeted Dennis at the door and in the ensuing conversation asked him if he would perform a duty totally personal to Wallenberg and his family. Dennis promised, of course. But the point is that the overture would never have come without the trust that Dennis and all those SRI folks who contributed to the work there had developed over two decades. They displayed integrity, objectivity, and technical talent without striving for the client dependence sought by most management consulting companies. No, SRI left all these client companies to grow independent of ongoing SRI involvement. An SRI trait.



**The Other Four Finnigan Siblings**

The Finnigans were a truly remarkable family. Here is the accounting: one other brother led the nationwide marketing program for Owens Corning Fiberglass, another was instrumental in creating the world’s first nationwide donor blood bank, one was a career officer in the USAF, and the lone sister directed Macy’s nationwide bridal program.

I once jokingly asked Paul what his mother fed them for breakfast. He replied that his mother died in childbirth at age 37, leaving his dad to raise this incredible family.



*The Finnigan brothers with their father in August 1957 (Dennis, Paul, and Robert are on the right).*

**WHAT ARE THEY DOING NOW?**

**Peter E. Hart, Former Director of SRI’s AI Center, Inducted into the Rensselaer Alumni Association Hall of Fame**

On January 27, 2021, Rensselaer Polytechnic Institute announced that Peter E. Hart has been inducted into its Alumni Hall of Fame in recognition of his contributions to society. In particular, Rensselaer cited Peter’s role in the development of Shakey the Robot in 1972.



Peter was a key member of the SRI Artificial Intelligence Center team that, according to the Rensselaer citation, “combined research in robotics, computer vision, and natural language processing to create the world’s first general-purpose mobile robot able to reason about its own actions.” The innovations from Shakey’s development had far-reaching effects on robotics, artificial intelligence, and computer science. (Shakey is on display in the Computer History Museum in Mountain View,

CA.) Further, in 1973 Peter and R. O. Duda wrote the book *Pattern Classification and Scene Analysis*, which also had profound impacts on computer science and artificial intelligence.

After leaving SRI, Peter joined the Ricoh Group, where he founded Ricoh Innovations, Inc., to create new technology and business opportunities. He was also founding director of the Fairchild/Schlumberger Artificial Intelligence Center and was a founder of Syntelligence, which specializes in expert systems for financial risk analysis.

The chair of the Rensselaer Alumni Hall of Fame Selection Committee summarized Peter’s accomplishments this way: “Peter E. Hart truly embodies the growing legacy of innovation and change that Rensselaer alumni and alumnae have brought to the world for almost two centuries.”

Congratulations to Peter on this most impressive honor.

Source: <https://www.ecse.rpi.edu/news/rensselaer-polytechnic-institute-alumni-association-inducts-renowned-computer-scientist-and>

## Sondrestrom Stories

*This is the second in a series of articles about SRI staff who spent time at the Sondrestrom Research Facility in Greenland. For a history of the facility and more staff experiences in Greenland, please see the December 2020 issue of the newsletter.*

### Memories of Greenland

*By Rachel and Clay Ross*

There we were hurtling down a steep snow- and tundra-covered “trail,” hanging on with white knuckles to a wooden Greenlandic hunting sled, as the dog team, struggling to stay ahead of the accelerating sled, parted to bring into view the huge boulder right in the center of our path...

Wait, wait. That’s no way to start. Let’s go back to the beginning.

When former NEXRAD colleague Linda Hawke-Gerrans asked us to write an installment for the SRI Alumni Newsletter series on the experiences of SRI staff members who spent time at the Sondrestrom Research Facility in Greenland, we have to admit it was a little overwhelming. How do we boil down into just a few pages the 18 months of the unique and completely new adventures we were so privileged to experience? It seemed too daunting. We still look back on those days as the best of our lives (sorry, Kids!) and wanted to do them justice. But after reading the excellent first installment articles in the December 2020 issue, “The Sondrestrom Radar – A Brief History” by Mary McCready and “My Greenland Adventure” by Tom Lovelace, we were inspired! We headed for the attic and searched through many old, dusty boxes until we miraculously found our old Greenland photo album and a stash of letters and printed emails which serve as a great chronicle of our time there. The wonderful memories started flooding in and rekindled recollections of the Greenland site’s interesting work and science, the many adventures and side trips we took, and the incredible people we met along the way.

### The Chance for Adventure

John Kelly and Mary McCready first approached us in 1992 to see if we would be interested in joining the crew at the SRI radar site in Sondrestrom for at least a yearlong stint. Clay, a hardware engineer, had been leading and working on several projects in the System Technology Division. Rachel, a software engineer, was wrapping up duties with the NEXRAD group on the Terminal Doppler Weather Radar

(TDWR) siting project. SRI preferred to send couples to the site who could both fill a needed role (it could be a little isolating up there without full-time employment), and, as a young married couple, we were looking for just such an adventure. We had heard many stories from colleagues in the halls of G Building about their scientific journeys to the Arctic, the equatorial regions, and places in between, and we were ready for our turn!

The project sent us in fall 1992 on a weeklong trip to Greenland, meant to introduce us to the Sondrestrom site and crew and help us decide if this move was for us. However, because of an airplane mechanical problem, we instead landed at Thule Air Base in northernmost Greenland and were stuck there for three dark days before heading down to Sondrestrom and the site. We were so clueless that when we landed at Thule, we asked someone if we could get a taxi to Sondrestrom! After the laughing stopped, we were told that Sondrestrom was hundreds of miles away and that Greenland did not have roads between towns. Despite our ignorance, we were sold on this Arctic adventure and made plans to move there the following March.

### Kellyville – Our Arctic Home

We arrived in March 1993 (Figure 1), just a few months after the US Air Force had turned the Sondrestrom Air Base over to Greenland Home Rule. This gave the town less of a military feel than in the past. The population of about 300 locals, a mixture of native Greenlanders and Danish expats, were running the airport, the main commercial arrival hub for Greenland, and the surrounding infrastructure left by the military. We had access to the bowling alley, gym, movie theater, chapel, store, and a couple of restaurants. If we ever needed a touch of civilization during our stay in Greenland, we could head to the Sondrestrom (Kangerlussuaq) Airport



*Figure 1. Rachel and Clay arrive at Sondrestrom.*

on Wednesdays when the weekly flight arrived from Denmark and mingle with the hundreds of travelers laying over for an hour or two before catching helicopters and smaller planes to their final destinations of Greenlandic towns and villages.

The radar site (nicknamed Kellyville after project leader John Kelly) was 10 miles outside town, along a small, lonely road that ended near the port servicing large ships bringing in supplies on the 120-mile Kangerlussuaq Fjord in the summer when the fjord was ice free. The radar site (Figure 2) consisted of the radar itself, the main site building, the generator building, various other instruments and outbuildings, and the five house trailers where the site crew lived. We had a nice little single-wide trailer (Figure 3) that provided a cozy home for our 18-month stint. The main site building was where we worked and where the visiting scientists lived and worked during their visits. It consisted of a large equipment high-bay, offices and radar control rooms, and guest living quarters complete with kitchen and living room. The transmitter/receiver equipment (Figure 4) in the high-bay was right out of a Frankenstein movie, with metal tubes, banks of large capacitors, a klystron, a large oil tank, and the occasional high voltage sparks!



Figure 2. Sondrestrom after spring thaw.



Figure 3. Our house trailer with Lake Helen in the background.



Figure 4. Equipment right out of a Frankenstein movie.

### The People and the Work

The site crew consisted of six people with varied skills, each dedicated to their part of keeping the site going. We were led by Craig and Denise Heinselman who had been at the site since its beginning in 1982. Craig was the site manager and an electrical engineer. He also was the local outdoorsman, generously sharing his love of “the nature” of Greenland. He introduced us to rock and ice climbing, hunting, *snescootering* (snowmobiling), and some great backpacking. Denise had worked full time at the site for many years but now provided part-time support to the site and full-time support to the Heinselman’s family of two young Greenland-born daughters. The Heinselmans both spoke excellent Danish and knew lots of people in town, always game to introduce us to locals and help us participate and become a small part of the community.

The site mechanic was native Greenlandic Brian Søgaard from the coastal town of Sisimiut. He was an expert snowmobiler; spoke Greenlandic, Danish, and English; never ate vegetables (they don’t grow any in Greenland); and was particularly fond of Steven Segal movies. He introduced us to the Greenlandic delicacy *mattak*, or whale skin, which you eat raw. It tastes like you can imagine (similar to what a human knuckle might taste like?)!

Jens Jacobsen was an electrical engineer from the Danish Meteorological Institute (DMI) responsible for DMI’s on-site instrumentation, providing a Danish presence on the crew, and generally making fun of Norwegians whenever possible.

Clay and Rachel rounded out the site crew, providing

hardware and software engineering. As a site crew living and working together, adventuring in the Arctic, and binge-watching *Star Trek* episodes on VHS tape, there was an almost familial atmosphere that made the site a very special place to work and live.

The work was interesting and varied. Our main objective was to maintain the radar and its data collection systems, run the radar as needed (especially during prescribed monthly coordinated 32-hour runs called “World Days”), and maintain and support the many other instruments in and around the site. The work had an all-hands-on-deck feeling. We could easily find ourselves debugging a troublesome network data issue, pulling an all-night shift on a radar run, building a new walkway to a crew member’s house trailer, or heading to town to shop at the *butik* for the site’s food staples. One of most important and fun parts of the job was to support visiting scientists and their work. These scientists came from all over the United States and the world to use the radar and surrounding instruments to test their theories and publish their papers. We would pick them up at the airport and introduce them to the site and their living quarters, assist them as needed with their experiments and equipment, and get to know them through site activities like movie nights, winter outdoor barbeques, hikes to the ice cap, and football games on frozen Lake Helen. We once even hosted the famous Norm Nielsen (see December 2020 issue) for Easter dinner at our house trailer! The site was always filled with a special energy when scientists were visiting, keen on collecting their important data and looking for adventure in this Arctic land. We even recall a researcher jumping, screaming, and then singing during one radar run as a nice auroral display passed overhead (Figure 5) and we assume validated their hypothesis and their funding.



Figure 5. The Sondrestrom Radar backlit by the Aurora Borealis.

### One Howling Adventure

Despite the unique and valuable work opportunities the site provided, our biggest memories are of the special people and exploits we were so privileged to experience during our time in this beautiful country. For two Bay Area natives, the foreign landscape, climate, and culture made every day a new experience. One of our most memorable outings was a weekend guided dogsled trip to a small cabin (Figure 6), named “the Wedding Place,” about a four-hour journey west



Figure 6. The Wedding Place cabin and our transportation.

of the site. We rode on separate wooden hunting sleds, each pulled by nine sled dogs and driven by Hans and Elias, two Greenlandic hunters (and part-time guides) from the nearby town of Sisimiut. On the way out, we enjoyed getting to know our guides as the dogs (Figure 7) did all the work pulling us through the beautiful Arctic landscape of frozen lakes and snow-covered hills. We would get off the sleds and run alongside on the way up the hills (poor dogs!) and hang on tightly for the harrowing rides down. At one point, Hans spotted an Arctic hare near the trail, stopped the sleds, and jumped off before we knew what was happening and bagged it on his first shot (poor bunny!). The cabin was a simple



Figure 7. The view from a dog sled.

plywood structure no bigger than the typical SRI office with no amenities. Upon arrival, the dogs were unharnessed and fed their winter meal of seal meat and fat before settling in for a restful night. Hans and Elias prepared a delicious walrus-meat and fresh rabbit stew for our dinner. We savored the “interesting” new tastes and quietly left our boxes of Kraft Mac And Cheese in our packs. Sleeping arrangements were tight, with all of us on the small platform covered with caribou pelts, but we were warm and comfortable.

The next morning, on the trip back, Hans and Elias let us drive Elias’s sled, giving us some brief instructions in broken English as we both nodded and smiled. We were both enjoying the ride, letting the dogs do all the work, when up ahead, the sled holding Elias and Hans, disappeared from view heading down a hill. Apparently, we missed the part of the instructions where one of us (Clay) was supposed to jump onto the back of the sled and operate the brake on downhills. So, we were just sitting helplessly on the sled as we topped the hill and started heading down. At the bottom, Elias and Hans watched and didn’t appear concerned. We began to pick up speed and the dogs began a mad sprint just to stay ahead of the sled. As we rounded a fairly tame curve, we both saw it at the same time. In the middle of the trail was a huuuuuuge rock. Our eyebrows rose as the dogs, running ahead in a fan shape, proceeded to split ranks, run around the boulder, and deftly come back together on the other side. The sled was now heading, unencumbered, straight for the rock! There was no time for a plan as the brake lay useless at the back of the sled. We didn’t have time to share even a look or shout a warning. We only had time to do what any self-preserving tourist would do: We jumped off the sled. After rolling to a stop cushioned by snow and our parkas, we sat up expecting to see the sled turned into kindling on top of a pile of dogs. But, miraculously, all had made it over the rock and down the hill unscathed. Elias even let us drive the sled again, and at the next hill Clay jumped on back and braked the whole way down. From tourists to experts!

We so enjoyed the experience and were so impressed by the power and grace of these beautiful dogs that just a few months later, we adopted a Greenlandic sled dog (Figure 8) from a nearby town and named her *Milak* (the Greenlandic word for “spot”). She came home with us and lived out her life in sunny California, always favoring those trips up to snowy Tahoe.

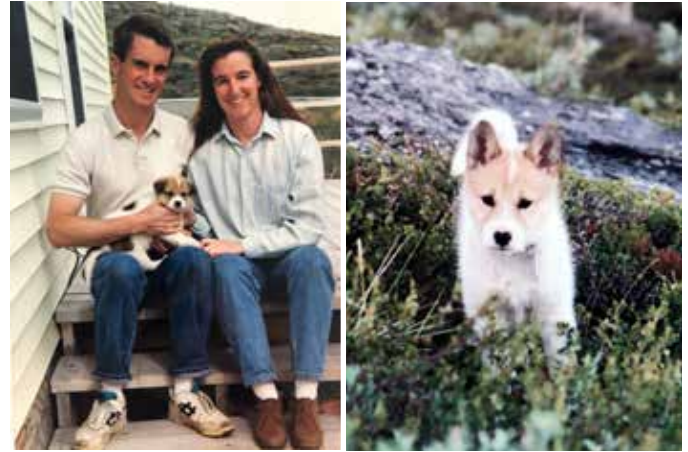


Figure 8. Clay, Rachel, and our Greenlandic sled dog Milak.

### Time in the Sky

One of the most fantastic things about Greenland is its millions of acres of beautiful, unique, untouched, and generally inaccessible scenery. Settlements are hundreds of miles apart with no roads joining them. The only means of getting around are by foot, dogsled, snescooter, or by commuter plane or helicopter to several of the larger towns. Without days to spare for travel, there is almost no way to see the majority of this fantastic country.

Fortunately, there is one other way: Some residents in town had formed a flying club and purchased a four-seat plane several years before we arrived. Club membership was open to anyone after a short check ride and very nominal membership fees. Their plane (Figure 9) was the same type that Clay had flown several years earlier, so the transition was seamless. This removed our barriers to exploration and enabled us to travel along the west coast of Greenland, south to the capital city of Nuuk, and north to Ilulissat, the “iceberg capital of the northern hemisphere.” We ventured over the



Figure 9. Jens, Clay, and Brian with the Sondrestrom Flying Club’s plane.

edge of the ice cap, following ice flows and looking into the sapphire blue waters of ice cap lakes. We flew through narrow fjords that were 3,000 feet high and completely inaccessible by any other means. We circled herds of grazing musk oxen (Figure 10) and caribou, safe from the billions of mosquitoes that filled the air above the tundra.



Figure 10. Musk oxen near Sondrestrom, Greenland.

One of the “obligations” of being a member of the flying club was to fly tourists to Paradise Valley, an isolated fisherman’s haven about 30 miles from town. Clay would fly the tourists from the Sondrestrom airport to a gravel strip along the river (Figure 11), where they would spend two nights under the midnight sun filling their ice chests with large Arctic char before being picked up for their flight home. The scenery was completely unspoiled: a meandering river in a treeless valley bordered by steep cliffs rising 1,500 feet on both sides. The river continued to the west from the campground until it met the main arm of the fjord. The club pilots were not paid for making these trips; in fact, they battled each other for the opportunity to take these flights. This was one of the most beautiful places Clay had ever landed.



Figure 11. The Sondrestrom Flying Club’s plane in Paradise Valley.

We made several trips to Ilulissat (Figure 12) where there is a small airport overlooking the fjord. On two of these trips, we chartered a boat into the fjord, which was packed with icebergs that calved from the Greenland Ice Sheet, taking over two years to travel the 40 miles to Ilulissat.



Figure 12. The beautiful town of Ilulissat.

On a different trip to Ilulissat, Clay flew a film crew from NASA to get some B-roll shots for a movie they were making about Greenland. After flying low across the tundra, lakes, rivers, ice cap, and fjord to get the best shots for the movie, we landed at Ilulissat for the obligatory fjord cruise. When we returned to the airport for the flight home, the weather briefer told us that Sondrestrom was fogged in and we couldn’t return that night. But in the spirit of classic Greenland hospitality and compassion, he offered the four of us a place to stay in his house that night. We anticipated a traditional Greenlandic home not much bigger than the Wedding Place hut, so we were completely stunned when he pulled up to his house on the “Gold Coast,” a row of atypically huge houses overlooking the Ilulissat fjord and bay. Each of us had our own comfortable bed and enjoyed the stay while cooking dinner and breakfast together and getting to learn from our host about life as a Danish expat in Greenland. If the next day had not been our fifth wedding anniversary, Clay probably would have figured out an excuse to remain in Ilulissat for several more days.

### A Special Place

In our many years working at SRI, we were provided with so many fond memories, lifelong friendships, and travels far and wide. But it was our time in Greenland that still stands out as one of the best of our lives. Special thanks to John Kelly and Mary McCready for the job opportunity and to Craig and Denise Heinselman for their leadership and hospitality and helping us make the most of our time in Greenland.

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ALUMNI NEWS

**Spring Fling at Filoli on Thursday, May 27**

Please join us for a free lunch and visit to the beautiful spring gardens at Filoli, 86 Cañada Road in Woodside, on Thursday, May 27. If you need a ride, please let us know by emailing [steering-committee-alumni@sri.com](mailto:steering-committee-alumni@sri.com), or consider using Lyft or Uber.

We will meet at 11:30 a.m. at the location shown on the Filoli map included on the reverse side of the event flyer.

This is a free event for all alumni members and their guests. When you arrive, please check in with Dave Harvey (wearing an SRI Alumni hat). Please send in your completed reservation form, including the number of box lunches you'll require, to the SRI Alumni Association by the deadline of Monday, May 24. If you'd prefer, you can email the required information to [steering-committee-alumni@sri.com](mailto:steering-committee-alumni@sri.com). For questions, please contact Dave Harvey at [dave.harvey620@gmail.com](mailto:dave.harvey620@gmail.com). We hope to see you there!



**Who Do You Believe Made an Exceptional Contribution to the Success of SRI? Nominate That Person for the SRI Alumni Hall of Fame!**

The SRI Alumni Hall of Fame honors former staff members who made exceptional contributions to the success of SRI.

All former staff members are eligible, but nominees should meet the following criteria:

- Significant, lasting contributions to the success of SRI
- Contributions recognized by staff, management, or clients
- Contributions in any area of research, management, or service, such as
  - Establishing a new laboratory or a new field of research
  - Performing an outstanding recognized service
  - Clearly demonstrating qualities of leadership, vision, and creativity
- What did the person leave behind?
  - Enhanced reputation for SRI
  - New or enhanced research, business, or support activity or facility.

Please prepare a write-up of about 300 words indicating how your nominee meets these criteria. If you have questions about the nomination process, members of the Steering Committee will be happy to answer them. Send the write-up or questions to [steering-committee-alumni@sri.com](mailto:steering-committee-alumni@sri.com) or SRI Alumni Association, 333 Ravenswood Avenue, AC-108, Menlo Park, CA 94025-3493.

The distinguished inductees are further honored by having their names engraved on brass plates permanently displayed on a wooden plaque in the I Building foyer. Current-year inductees also have their framed citations and photos mounted next to the wooden plaque (see photo below).



The SRI Alumni Association welcomes new members:

- Richard America**
- Joshua Arndt**
- Douglas Bergner**
- Gregory Faris**
- Matt Puster**
- Csaba Szabo**
- John Yarborough**

We look forward to your participation in the Alumni Association and hope to see you at our next group event.

**SRI International Alumni Association**

**Cash Flow/Income and Expense**

Year ending December 31, 2020

|   |                   |                    |
|---|-------------------|--------------------|
| <b>CASH BALANCE as of 01/01/20</b>                          |                   | <b>\$30,873.84</b> |
| <b>INCOME</b>   |                   |                    |
| Cash income from membership dues and fees                   | \$5,325.00        |                    |
| Dividend income from SRI Federal Credit Union account funds | \$19.80           |                    |
| Contributed funds   |                   |                    |
| SRI Federal Credit Union for 2019                           | \$1,200.00        |                    |
| SRI Federal Credit Union for 2020                           | \$1,200.00        |                    |
| <b>TOTAL INCOME</b>   | <b>\$7,744.80</b> | <b>\$7,744.80</b>  |
| <b>EXPENSE</b>  |                   |                    |
| Hall of Fame plaque and plates                              | \$119.14          |                    |
| Publications (postage, printing, etc.)                      | \$724.19          |                    |
| <b>TOTAL EXPENSE</b>  | <b>\$843.33</b>   | <b>\$843.33</b>    |
| <b>CASH BALANCE as of 12/31/20</b>                          |                   | <b>\$37,775.31</b> |

**Directory Addendum**

The enclosed directory addendum (covering the period December 1, 2020, to March 31, 2021) contains new members and corrections. Please add it to your 2021 Directory.



**Charles Jacob Cook\***

Charles Jacob Cook, also known as CJ and Charlie to friends and colleagues, died January 20, 2021, at age 97. Born in 1923 in West Point, Nebraska, Charles moved to Lincoln, Nebraska, at age 14.

Charles served as a first lieutenant combat pilot in the US Army Air Corps 94th Bombardment Group

at Bury St. Edmonds, England, from October 1944 to March 1945. He and his crew were assigned 35 missions over Germany in their *Lady Luck* B-17 Flying Fortress; the total combat time was more than 286 hours. Despite being shot down twice, he and his crew returned safely to base without injuries. Charles returned to the United States on HMS *Queen Elizabeth* on April 14, 1945. He organized reunions with his crew until 2013.

After the war, Charles married his high school sweetheart, Jean Day, and earned a PhD in physics and mathematics from the University of Nebraska, studying under theoretical physicist Professor Ted Jorgensen. Charles and Jean moved with their two young daughters to Los Altos, California, in 1954, when he accepted a position as physicist in the Chemical Physics Department at SRI. In 1962, he became head of the Molecular Physics Department. That year he also accepted a one-year fellowship at the famous Applied Mathematics Department, Queens University, Belfast, Northern Ireland. On his return, the three atomic and molecular theorists from England and Northern Ireland he invited to spend sabbaticals at SRI proved very beneficial to the development and growth of the Molecular Physics Department. In 1968, Charles completed the Advanced Management Program at Harvard Business School.

Through increasing responsibilities at SRI, Charles rose to become senior vice president, Office of the President. He retired from SRI in 1981. Among his legacies to SRI was the Molecular Physics Laboratory, which ultimately gained international renown. In addition, as a music lover who played the tuba and trumpet, he founded SRI's Institooters musical group. He also was a founding member of the SRI flying club. Charles was inducted into the SRI Alumni Association Hall of Fame in 1998.

From 1981 to 1987, Charles worked at Bechtel in San Francisco, California, where he established seven new business lines.

Charles's interest in education led him to teaching at Foothill and San Jose City colleges, as well as at Shanghai University. In 1963, he was elected to the Los Altos Schools Board of Trustees, serving as president from 1965 to 1968.

In retirement, Charles spent a decade as a volunteer executive and board member of Executive Service Corps Assist, with travels to China, Czechoslovakia (Slovakia), and other parts of the world. With a passion for flying, he volunteered for Angel Flight, providing nonemergency air travel for children and adults with serious medical conditions.

Charles was preceded in death by Jean, his beloved wife of 69 years; infant children Charles Thomas and Suzanne; brother, Marshall, and sister, Alice Wolvin. He is survived by his daughters, Nancy and Sally, along with three grandchildren, five great grandchildren, and numerous nephews and nieces.

The family is especially grateful for the skilled medical and home care support that touched Charles's life: Palo Alto VA Home Based Care nurses and private care staff Fita Falikaona, Maria Rodas, Flora Moreno, and Gabriel Rodriguez.

*Based on an obituary published on February 16, 2021, in the Los Altos Town Crier.*

**Paul M. Cook\***

Paul M. Cook, an early SRI researcher and founder of Raychem, died peacefully on December 14, 2020, at age 96. He was a renowned Silicon Valley leader.

Paul was born in Ridgewood, New Jersey, and his boyhood foreshadowed his busy life. Having developed an interest in chemistry at a young age, Paul created a laboratory in the basement of his parents' house, and he also performed magic shows, participated in three sports, played clarinet in the high school orchestra, built a telescope, and ran a paper route.

After graduating from high school in 1941, Paul pursued his interest in chemical engineering at the Massachusetts Institute of Technology (MIT), studying with Warren K. Lewis. He paused his education in 1943 to enlist in the Army Specialized Training Program, through which he studied mechanical engineering for two terms at Stanford University. Paul joined the famed 10th Mountain Division

as a lieutenant, serving in combat in Italy toward the end of World War II. On completion of his military service, he returned to MIT and earned his BS degree in 1947.

In 1948, Paul was SRI employee 48, joining as a chemical engineer. He later headed SRI's Radiation Chemistry Laboratory, where he saw potential in the use of high-energy electrons to alter the molecular structure of polymers.

In 1957, from a tiny building in Redwood City, California, Paul founded Raychem Corporation to develop commercial applications for the new field of radiation chemistry. With an original focus on wire and cable that used radiation cross-linked polymer insulation targeted for military and aerospace applications, Raychem pioneered commercial applications for radiochemistry, and it grew to be a Fortune 500 company. Paul was CEO until 1990, inspiring a new generation of innovators through his leadership.

Paul returned to SRI to serve on the board of directors for nine years, six as chairman.

Paul loved new technology, innovators, and doers. After retiring from Raychem, Paul continued to launch companies such as Cellnet Data Systems, DIVA Systems, AgileTV, and Promptu Systems. At his death, he was chairman of his latest venture, Vox Frontera, Inc., a voice recognition company.

Paul was honored with many awards: the Winthrop-Sears Medal from the Chemical Industry Association in 1986, the National Medal of Technology from Ronald Reagan in 1988, the Bay Area Council's Bay Area Business Hall of Fame Award in 1999, and SRI's Weldon B. "Hoot" Gibson Achievement Award in 2008.

In the spirit of giving back, Paul was active with his alma mater, MIT, serving as chair of the Chemical Department and becoming a member of the MIT Corporation.

As involved as he was in technology and business, Paul was generous in sharing his time and knowledge. He was passionate about helping those in their early careers, offering mentoring, insights, and advice. He also contributed to many charitable causes. Yet Paul always had time for his family and friends, expressing his love and support in fun and creative ways.

Paul Cook was truly one of Silicon Valley's remarkable leaders who helped steer the world of innovation today.

Paul is survived by his wife, Marcia; his son, Gavin; his

stepchildren, Richard Souter and Susan Lengyel; and nine grandchildren.

*Based on an obituary published in Legacy.com and on an SRI announcement dated December 18, 2020.*

### Mary Ann Dahlberg\*



Mary Ann Dahlberg, a Menlo Park resident for 44 years, died on March 11, 2021, at the age of 90.

Mary was born in Berkeley, California, and graduated as an English major from the University of Washington in Seattle. She returned to California where she worked at then Standard Oil

Company of California in San Francisco. Moving to the Peninsula, she was an administrative assistant at SRI until her retirement.

A lover of nature, Mary enjoyed walking trips. For many years she made an annual pilgrimage to Yosemite National Park. She was fortunate to have experienced two lengthy visits to Europe focused on art and architecture. She considered her greatest blessings to be close friends and her beloved family.

Survivors include niece Catherine Curtis of Fairfax, Virginia; nephews Richard Cheney of New York City and James Cheney of Santa Rosa; a great niece and three great nephews.

*Based on an obituary published in Palo Alto Online in March 2021.*

### Dennis Michael Finnigan, Sr.\*



Sir Dennis Michael Finnigan, Sr., of Lake Oswego, Oregon, passed away on Monday, December 28, 2020, at the age of 92 after a short illness and stroke.

Dennis was born in 1928 in Kenmore, New York, to Charles and Marie Finnigan. He was the fourth boy in a family of six surviving boys

and one girl. His mother died at the age of 37 in childbirth, which also took the life of a sister. Dennis graduated from Amherst Central High School in 1946 and joined the US Air Force at age 18, serving at various bases from 1946 to 1949. He graduated from Stanford University in 1953 and from the Stanford Graduate School of Business in 1954. After graduating, Dennis joined SRI in Menlo Park.

Dennis spent 28 years in various senior management consulting positions at SRI. He was one of the key people in developing SRI's reputation as an early leader in applying operations research (OR) to industrial and business problems. One of several Stanford Business School graduates who formed its core, Dennis was one of the more versatile leaders in SRI's Economics and Management Group over four decades.

In the late 1950s, Dennis led OR projects on logistics problems for defense agencies. In the 1960s, he was director of the Management Sciences Division during its rapid growth period, when the division included information management, industrial operations research, systems analysis, new education technology, and the Naval Warfare Research Center. Dennis pioneered industrial OR work in Europe and became a favorite consultant to the Wallenberg industrial empire of Sweden. In the 1970s, under Dennis's leadership, the SRI Stockholm office became a center for modernization of European industry. Major restructuring projects were undertaken for clients including SAS airlines, Saab-Scania, and the Johnson group. For these contributions, the King of Sweden honored Dennis by knighting him and inducting him into the prestigious Royal Order of the North Star, the highest honor bestowed to a non-Swedish citizen.

Dennis finished his career at SRI as vice president in charge of international operations and marketing. During his tenure at SRI, he received numerous awards, including being named a charter member of the SRI Hall of Fame. Dennis left behind a legacy of top-quality, innovative applications of OR to solving both government and business problems.

After leaving SRI in 1981, Dennis formed his own consulting company and continued working with international clients until he semiretired in 1996. He cofounded several companies engaged in voicemail, telecommunications, teleconferencing, and related services. Over the years, his extensive travel took him to almost every continent, and he continued throughout his lifetime to maintain contact with former clients and friends all over the world.

Dennis's most cherished personal accomplishment was his family. Dennis married Barbara Pfeiffer in 1951, and they raised six girls and three boys at their home in Los Altos, California. In 1993, Dennis and Barbara moved to West Linn, Oregon, to be closer to several daughters and grandchildren. They celebrated their 69th wedding anniversary in June 2020.

Dennis made friends wherever he went, taking the time to talk to everyone he met. He commanded respect and admiration from those in his personal and business relationships. Those who knew him described him as a giant among men, a grand human being, a man of principle with a strong Catholic faith, a dear friend and wise mentor, smart, funny, and a wonderful family man. He will be dearly missed.

Dennis is survived by his wife, Barbara; his nine children, Cecilia, Eileen, Dennis Jr., Kathleen, Peggy, Teresa, Timothy, Kevin, and Marie; 15 grandchildren and eight great grandchildren; two brothers, Robert and Paul; as well as numerous nieces and nephews and their families.

*Based on an obituary published by Riverview Abbey Funeral Home and the SRI Alumni Association Hall of Fame tribute.*

### William McKell Hadly\*



William "Bill" McKell Hadly died November 14, 2020, at the age of 87.

Bill married his wife, Jane, in 1957, and they had six children.

Bill had a long career in the US Army, starting with four years at West Point as a cadet and then 24 years of active duty. During active service that included a tour of Vietnam where he was wounded, Bill was decorated with two Legion of Merit awards, five Bronze Stars (one for valor), two Meritorious Service Medals, one Air Medal, five Army Commendation Medals (one for valor), and the Purple Heart.

After retiring from the Army, Bill joined SRI in Menlo Park, where he remained for 20 years. He established and then became director of the Center for Technology Transfer and Integration. In that role, Bill introduced SRI's innovative research to military and commercial customers and

integrated it into their field operations. As an adjunct, Bill brought problems from customers back to SRI researchers. Examples of Bill's work include transitioning computers into tactical operations at Fort Bragg and assisting Sprint at its Kansas City site.

After retirement, Bill and Jane moved to Montana, where he enjoyed fly fishing, hiking, golf, and charity work. Finding the winters too cold after some years, they moved to Tucson, Arizona. There, Bill continued his hiking, golf, and charity work. He and Jane also enjoyed traveling in the United States and abroad.

Bill is survived by Jane, five of their children, and 11 grandchildren.

*Based on The Boys of Benning and biographical information online at <http://usma1955.com/PWP/HadlW.htm>.*

### Marilyn Margaret McDonald



Marilyn Miller McDonald died peacefully on January 20, 2021, at the age of 85.

Born in Scranton, Pennsylvania, Marilyn grew up in San Francisco and South Pasadena, California, settling in Palo Alto, California, after meeting her husband, Bob, at Stanford University. In the words of

those who knew her, Marilyn was "a dynamo," "a doer," and "a force."

In midlife, as soon as her four children were in school, Marilyn added a teaching certificate and a master of library science degree from San Jose State University and an MBA from Golden Gate University to her BA and MA degrees in economics from Stanford. During her career, she was an office manager at the Stanford Alumni Association, a research librarian at SRI, and co-head librarian at Gunn High School. At Foothill College, she started as librarian before being promoted to dean of learning resources and converting the library from a card catalogue to a fully digitized system. In preparation for her next role as the Foothill-De Anza Community College District archivist, she trained with the Western Archives Institute and became an active member of the Society of California Archivists.

After her retirement, Marilyn dedicated her time to organizations such as the Woman's Club of Palo Alto and Channing House.

Naturally athletic, Marilyn skied, danced, and played a variety of racket sports. She coached her daughters' soccer teams and later became a Giants and 49ers fan. She regularly rounded up friends and family for skiing and camping trips, theater outings, birthday parties, and backyard barbecues. She was an expert maker and improver all her life, as evidenced by her superb skills in cooking, crafts, drawing, and quilting. The secret to Marilyn's mastery of many skills was that she did her research, fearlessly asked questions, and could call on, when necessary, her ready assistant, Bob.

Marilyn and Bob also traveled around the world. She had boundless curiosity about other cultures and took a special interest in textile arts.

Marilyn encouraged her children to be as bold in embracing life's opportunities as she was and took great pride in their accomplishments.

In addition to her husband, Marilyn is survived by her daughters, Regan, Page, and Karin; her son, Evan; and six grandchildren.

*Based on an obituary in Palo Alto Online.*

### Joan Taylor MacKenzie

A resident of Menlo Park, California, for 50 years, Joan Taylor MacKenzie was 94 when she died on December 10, 2020.

Joan was born in Attleboro, Massachusetts. She earned degrees from Stanford University, Golden Gate University, and the University of San Francisco. Joan was an industrial economist at SRI. In addition, she published a book of poetry, *Mounting Losses: Poems of Life, Love, and Landscape*, in 2010.

Joan loved her family and is remembered for her many adventures with them. She is survived by her daughter, son, and grandson.

*Based on an obituary published in the San Jose Mercury News/San Mateo County Times on January 15, 2021.*

### Joseph David Mandell



Joseph “Joe” Mandell died at the age of 91 on February 19, 2021.

Joe was born across the street from his future wife, Marion Bruskin, in New Brunswick, New Jersey. They attended the same junior high, high school, and university. Joe was well known for arguing with the high school chemistry teacher, and he was usually right! He and

Marion married in 1951 after she finished her BA and Joe completed his master’s degree. They moved to Pasadena, California, where Joe earned his doctorate in microbiology at the California Institute of Technology. Joe studied viruses with Linus Pauling, and Marion worked to support him during graduate school.

After Joe completed his PhD, the couple moved to Long Island, New York, where he had a postdoctorate fellowship. In 1958, they moved to Palo Alto, California, and Joe joined SRI as a researcher.

After years of research, Joe decided to switch to teaching. He became chair of the Biology Department at University of Santa Clara where he taught microbiology, biology, and genetics. Thereafter, Joe moved to West Valley College and taught biology, microbiology, and chemistry. Joe was known for making his classes especially fun. He liked to include science jokes at the ends of his exams, and the sound of giggles would let him know when a student had reached the end of a test. His microbiology labs included food applications like making sourdough starter, yogurt, and beer.

Joe was an avid folk dancer and teacher, and, along with Marion, ran a children’s folk dance club at Ohlone School that attracted 50 to 60 children per night. Joe volunteered in the schools and with the Friends of the Palo Alto Library and also served on the board of the Mendocino Woodlands Camp Association. A dedicated mycologist, Joe was president of the San Francisco Mycological Society for two years, started a small commercial mushroom farm, and served as a mushroom expert for the poison control center.

After retirement, Joe fulfilled a lifetime dream of learning to play violin, playing for 15 years with the South Bay Community Orchestra and attending music camp every summer. Joe also made some of the furniture that is still in

the family home, and he built the counter for the ice cream store now known as Rick’s Rather Rich.

Joe loved gardening, and to protect his garden began trapping the ever-hungry multitude of squirrels and relocating them (over 100 in a year) to Baylands Park. Joe discovered that the squirrels learned about accessing his tomatoes from each other; by relocating those with “tomato training” he was able to reduce the number of tomatoes that disappeared.

Joe was always known for his kindness, cheer, and warmheartedness. He was quick with a joke, and everyone enjoyed his intelligent and interesting conversations. He will be fondly remembered by all who knew him.

Joe is survived by his wife, Marion, and his children, Linnea, Dana, and Douglas.

*Based on an obituary published in Palo Alto Online.*

### Bryce Perry



Bryce Perry died on June 2, 2020. He was 74 years old.

Bryce was born in Duxbury, Massachusetts. His family moved to New York and Maine before settling in Arlington, Massachusetts. While in high school, Bryce was active in the chess club, did stop-motion photography, and published a newspaper called the *Spectator*.

At Antioch College in Ohio, Bryce was involved in the student-run fire department, serving as engineer responsible for two trucks and an ambulance. While at college, he married Frances Hamaker from Palo Alto, California. After graduation, they joined in the Peace Corps and were stationed in the town of Labasa in the Fiji Islands where they taught science and math at Sangam High School.

After some travel, they settled in Palo Alto. Bryce worked at SRI in the Molecular Physics Laboratory, during which time he earned an MS degree in electrical engineering at Stanford University. Bryce later worked at Spectra Physics as a product manager and at ILC Technologies, managing space station lighting.

In the 1980s, Bryce was active in the Palo Alto chess club

and organized large chess tournaments. He volunteered with the Boy Scouts as a scout master. After retirement, he worked in information technology and as a photographer, mentored a chess club at Gunn High School, and square danced. Starting in 1999, he also attended the Burning Man arts festival in Nevada more than a dozen times.

Bryce was active in the Unitarian Universalist Church of Palo Alto, where he served on the board of trustees and as president of the board and founded and led men's groups.

Bryce was preceded in death by his brother, Fred, and his sister, Jana. He is survived by his wife, Fran; two sons, John and Michael; and three grandsons.

*Based on an obituary published in Palo Alto Online.*

### Alex Spiridon\*



Alex Spiridon was 81 years old when he died peacefully on January 31, 2021. He was afflicted with Parkinson's disease for more than 20 years and Lewy body dementia for six years. His strong will and spirit never gave up, a characteristic demonstrated throughout his life.

Alex was born in Aleppo, Syria, where his father was stationed in the French military. Family and religion were staples throughout his life. His extended family instilled in Alex a strong religious ethic, which he fostered by attending church and studying the Bible.

After completing primary school in Aleppo, Alex attended a private boarding school in Lebanon, Broumana High School. There he excelled and developed an interest in mathematics. When he wasn't studying, he enjoyed exploring one of his favorite mountainous regions near Cedars, Lebanon. He then pursued a degree in electrical engineering from the American University of Beirut. His education continued in the United States where he obtained both a master's degree and a PhD in electrical engineering from the Massachusetts Institute of Technology, graduating in the top one percent of his class.

On graduation, Alex returned to Lebanon and worked for IBM for one-and-a-half years, after which he returned to the United States to work for Western Electric in New Jersey and then Lincoln Research Labs in Boston. In 1973

he married Nana Nammour, and in 1978 they moved to California where Alex joined SRI as a research scientist. His tenure at SRI continued for almost 20 years, followed by seven years at Lawrence Livermore National Laboratory.

In 1999, Alex was diagnosed with Parkinson's disease. Even after he retired in 2005, he kept himself occupied by researching the disease, a personal cause he was passionate about. In 2014, he was also diagnosed with Lewy body dementia. Through Alex's strong belief in mind over matter, he did not let either of these diseases impede his life, something admired by everyone he touched.

Alex enjoyed traveling, good food, playing cards and backgammon, and the outdoors. He also spent hours tending his garden where he grew fruits and vegetables. He introduced his daughters to these activities, which they continue to enjoy to this day.

He is survived by his wife, Nana; two daughters, Liza and Grace; and two granddaughters.

*Based on an obituary published in Palo Alto Online.*

### Paul Lung Tuan\*

Paul Lung Tuan died a few days shy of age 92 on December 6, 2020.

Born in Shanghai to Render and Mai Ling Tuan, Paul was the first of five children. After enduring the Chinese civil war and the Japanese occupation during World War II, he graduated from the University of Shanghai in 1948 with a BA degree in accounting, which he used at China Airlines and then at United Airlines while attending the University of Denver in Colorado.

Armed with an MBA degree and drafted into the US Army in 1954, Paul became an army auditor in Washington, DC, and Germany. Paul also obtained US citizenship with the help of the D.A.R. and his activities with the 2nd Army marching band.

In 1956, out of the army and back in Denver, Paul married Jessie Chow, and he pursued work in new fields, primarily computer systems. They had two children.

From 1959 to 1961, Paul worked for Burroughs Corporation, first as a sales tech representative in Hawaii and then as a district manager of tech services in Detroit, Michigan. He

was lured to Salt Lake City to set up the computer center at the University of Utah and became its director. In 1963, Paul obtained a National Science Foundation grant to purchase an IBM mainframe, which was at the time the largest computer west of the Rockies.

Advanced education was important to Paul, and the family of now five moved to Palo Alto, California, in 1965, where he obtained an MS, an engineer's degree, and a PhD from Stanford University while working full time at SRI.

In 1971, after spending a year as an assistant professor of industrial engineering at the University of Utah, Paul accepted a job as a US government advisor on systems analysis to Taiwan. In 1975, the family returned to Palo Alto, where Paul worked at SRI on challenging projects in transportation, including BART and the Boston subway. One of his favorite projects involved the Seoul subway. He also pioneered the use of metered on-ramps and synchronized traffic lights, among myriad other innovations we now take for granted.

At the age of 60 Paul almost retired but instead went to work as a vice president at Fair Isaac Corporation, helping to develop the FICO credit score.

After Paul retired at the age of 72, he and Jessie traveled to Canada, China, France, and South America. In his free time, he learned Tai Chi and enjoyed spending time with fellow veterans at his local chapter of the American Legion.

Paul is survived by his wife of 64 years, Jessie Tuan; children Linda, Steven, and Brian; four grandchildren; sister Pansy; brothers Douglas and Ben; and many nieces and nephews.

*Based on an obituary published in the San Jose Mercury News/San Mateo County Times on December 20, 2020.*

*Note:* We recently learned of the death of former SRI staff member **Charles Stancomb\***. His obituary will be published in a future newsletter when more complete information is available.

## Raymond Joseph Twery



Raymond "Ray" Joseph Twery, 91, died peacefully on February 6, 2021.

Ray was born to Benjamin and Rose Twery in Chicago, Illinois. He graduated as a candidate for a PhD in statistics from the University of Illinois Urbana-Champaign. As a graduate student, he had the honor of performing analyses using ILLIAC I, the first computer built and owned entirely by an educational institution in the United States.

Ray's diverse career included work as a researcher in behavioral psychology, an accountant with Peat Marwick Mitchell, an analyst with SRI, and a manager of statistical marketing with Celanese Corporation, Southern Screw, and Stark Industries. Ray had a passion for teaching statistics. He lectured at the University of North Carolina at Charlotte, Queens College in Charlotte, and East Mecklenburg High School.

Ray thrived on working with others and continued to seek opportunities in retirement as a part-time tax preparer, real estate appraiser, and volunteer consultant to new entrepreneurs. He enjoyed conversing with anyone, about anything, at any time. He was a math guy, loved history and brain challenges, and was widely admired as a good man.

Ray was devoted to his wife, Maxine, and four sons. He was an avid tennis player for many years, a member of the Fairmeadows Swim Club in Charlotte, and an active congregant at Temple Israel, including many years as a religious educator.

Ray was preceded in death by wife Maxine. He is survived by his sons, Michael, Scott, Seth, and Bruce, and eight grandchildren.

*Based on an obituary published in the Charlotte Observer on February 14, 2021.*

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\*Member of the SRI Alumni Association

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Editorial committee: Mimi Campbell and Caren Rickhoff / Design & layout: Linda Hawke-Gerrans*

Please consider joining the SRI Alumni Association. The association was founded in 1996 to provide former staff members the opportunity to keep in touch with SRI and their colleagues, to support the institute in a variety of ways, and to help perpetuate SRI's traditions and values.

SRI Alumni Association members enjoy many activities and services:

- **Alumni Association Newsletter**—Published three times a year, giving news about SRI programs, Alumni Association activities, and individual members (see past issues at <https://alumni.sri.com/newsletter.html>).
- **Membership Directory**—A regularly updated resource of contact information for association members.
- **Annual Reunion Meeting**—An opportunity for:
  - Socializing with other Alumni Association members.
  - Viewing the Alumni Hall of Fame Induction ceremony.
  - Hearing a prominent SRI speaker describe an important SRI project or organizational development.
- **Spring Fling**—A picnic or visit to a Bay Area point of interest; past trips have been to the Computer History Museum, the Hiller Aviation Museum, NASA-Ames, and the California Academy of Sciences.
- **SRI Archives**—Association members maintain and catalog SRI's photographic and nonproject archives.

We encourage you to participate in the SRI Alumni Association. Your first year's membership is free. Your membership thereafter will be \$25 per year. By completing and returning the application below, you will be enrolled and will receive future issues of the newsletter and invitations to all alumni events. Please indicate how you would like your information to appear in the Membership Directory. If you prefer that some or all of your contact information not be published in the directory, please indicate your preference below. Also, please indicate whether you would prefer receiving the newsletter as an electronic copy (PDF, which saves the association printing/ mailing costs) or as a hard copy. If you prefer to complete an application online, please do so at <https://alumni.sri.com/join.html>.

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