August 2018

SRI International

Alumni Association

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MESSAGE FROM ARCHIVES CHAIRMAN DON NIELSON

Don Nielson

It was with considerable anticipation that we looked forward to this year's Spring Fling at the new Apple campus in Cupertino. A couple of Steering Committee members had made the early contacts, and it seemed promising that we could sit together and find out what Apple had become. As the pictures inside will show, the turnout was super and there was a lot of good greeting of friends. What turned disappointing was, first, that we could not all have lunch together in the second-floor eating area as had been promised, and, second, that the world's most valuable company felt it adequate to let us peer only virtually into a sparse model of its new circular mega-structure. The visitor center was little more than a lightly augmented Apple store. We know of Apple management's sensitivity about their operations and future products, but the wealth of stories they could tell about how they got where they are were nowhere to be found.

On a more positive note, you will find SRI's backlog of proprietary technology emerging in new spin-offs and an extension of research into artificial intelligence (AI) with continuous learning! Also, we are most grateful to our UK correspondents as they share their exploration of London's Imperial War Museum with us. And what could be more pleasing than to hear of the success of one of our own. Marie desJardins illustrates how the talent and expertise developed at SRI can blossom as they find another home. She has done splendidly, and we eagerly pass her story along.

Sometimes a technology is created at SRI that has broad and lasting impact. A military training technology called DFIRST is such an instance. John Prausa extensively recounts how it arose and prospered at SRI and how today, outside of SRI, this remarkable advancement and service is succeeding in the hands of Ravenswood Solutions, a wholly owned subsidiary.

Finally, I must acknowledge someone who, probably more than any other person, has contributed to the success of our alumni organization. Joyce Berry has been there from the beginning and given countless hours, willingly and consistently, for more than two decades! We will obviously miss her greatly as she retires from such dedicated service. Joyce, saying "Thanks a million" leaves you way underpaid!

Reunion 2018

The Annual Reunion is October 18, 2018. See announcement on page 15. The invitation flyer for the event is enclosed with this mailing.

Spring Fling at Apple Park Visitor Center

Close to 100 SRI alumni and guests enjoyed a Spring Fling visit to the Apple Park Visitor Center at the Apple headquarters site in Cupertino, California, on May 13, 2018. After a brief welcome and introduction from an Apple employee, most of the group gravitated to the Exhibition, a space with a plain white model of the Apple campus, which turns into a full-color photographic aerial view on iPads provided by employees. The roof of the circular main building (popularly known as "the spaceship") in the image can be raised to show the layout of the interior (visitors are not allowed in the main building). There was plenty of opportunity for socializing and greeting old friends and colleagues, especially by circulating among the indoor and outdoor tables of the Café while enjoying free catered box lunches from Whole Foods.

Thanks to Gary Bridges and Klaus Krause for photos of the event.













SRI International Launches SkillMil to Match Military Veterans with Civilian Job Opportunities

In April 2018, SRI announced the launch of the website of SkillMil, a spin-off venture designed to help military veterans find jobs by precisely matching a veteran's unique profile to job requisitions that closely reflect the veteran's skills and experience.

Veterans face a distinct challenge in the civilian job market because hiring managers do not understand the military jargon of codes and acronyms reflected in a veteran's resume, and traditional job search websites do not optimally match veterans' training and skillsets with the right job opportunities.

The SkillMil technology platform quantifies the percentage match of a veteran's skills and experience with open job requisitions. In addition to providing a percentage of job match, it lists the training and skills needed to achieve a 100% match, so that veterans can know exactly what they need to learn to qualify for a specific job. SkillMil also converts military jargon into an easy-to-understand "business English" language for hiring managers to grasp the skills, training, and field experience of a veteran and understand how the veteran's background can benefit a business.

As Manish Kothari, president of SRI Ventures, indicated, "SRI has deep expertise in artificial intelligence, including developing automated reasoning engines that can exhibit intelligent behavior in complex situations. We are proud to work with SkillMil in applying this technology to help veterans better select jobs for which they are highly qualified—and to help companies realize the tremendous value that veterans can bring to their business."

SkillMil founder and CEO Noel Gonzalez, who recently completed a fellowship at SRI, is a former submarine commanding officer with more than 22 years of experience in the fields of team management, resource operations, and high-risk operations. "Military veterans have highly desirable experience in a range of fields, from cyber intelligence, to supply chain logistics, to trauma and healthcare, as well as a mission-oriented work ethic—all of which can contribute significantly to a company's workforce. SkillMil lets hiring companies easily translate and match a veteran's skills, training, and experience with open job requisitions, enabling them to confidently hire veterans who are among the most talented, skilled, and seasoned professionals in the job market."

The SRI press release is at https://www.sri.com/newsroom/press-releases/sri-international-launches-skillmil-help-match-military-veterans-civilian.

SkillMil website: https://www.skillmil.com/.

DARPA Taps SRI to Develop Artificial Intelligence System That Learns Continually

In May 2018, the Defense Advanced Research Projects Agency (DARPA) selected SRI to develop a next-generation artificial intelligence (AI) system able to learn continuously and apply that learning to become better and more reliable at performing new tasks. The contract will be supported under DARPA's Lifelong Learning Machines (L2M) Program.

AI systems are central to many commercial and government applications. However, current AI systems cannot handle new scenarios that they are not trained on, repeatedly making the same mistakes. Even with retraining, they are prone to "catastrophic forgetting" when new content disrupts previous learning.

"Our goal is to address these limitations by enabling AI systems to know what to learn and when," explained Sek Chai, technical director in SRI's Center for Vision Technologies. "Since memory is a key element of cognitive function, our research is focused on understanding and applying biological memory transfers to new AI algorithms that can fundamentally improve their performance throughout their fielded lifetime experience."

Biological memory transfer is a complex sequence of dynamic processes, with local and global synchronization patterns. These processes support memories with flexibility in expression for future thinking, foresight, planning, and creativity. As part of the L2M program, SRI researchers will develop AI algorithms based on biological mechanisms in

memory consolidation and replay. With this AI technology, future cognitive systems, such as autonomous robots, may be able to learn continually after initial deployment, improving execution performance and overall safety.

The SRI press release is at https://www.sri.com/newsroom/press-releases/sri-international-selected-darpa-develop-artificial-intelligence-system.

SRI and Ionis Pharmaceuticals Collaboration: Macromolecular Delivery System Meets Antisense Drug Discovery

SRI announced a research agreement with Ionis Pharmaceuticals that combines SRI's proprietary FOX Three Molecular Guidance cellular targeting system (MGS) with Ionis's proprietary antisense drug discovery platform.

SRI's FOX Three MGS technology is designed to overcome cellular barriers that prevent intracellular delivery of large-molecule biotherapeutics. The platform uses proprietary technology that enables the delivery of macromolecular payloads to selected cells and subcellular locations in those cells. SRI has demonstrated that the FOX Three MGS technology can deliver more than a dozen different types of payloads, such as functional enzymes, antibodies, DNA, liposomes, and nanoparticles, to intracellular molecular-target locations previously considered "undruggable." The term *undruggable* was coined to describe proteins that could not be targeted pharmacologically. Clearly, by rendering previously undruggable targets druggable, FOX Three MGS opens a new frontier in medicine, enabling development of new therapeutic classes that target a wide range of diseases.

"Fox Three creates the potential to greatly expand the use of biotherapeutics," said Nathan Collins, vice president of SRI Biosciences. "Ionis is an ideal partner to further explore the utility of this technology in the intracellular delivery of nucleic-acid-based drugs. We look forward to seeing what we can accomplish through thoughtful combination of our novel technologies."

The SRI press release is at https://www.sri.com/newsroom/press-releases/sri-international-announces-drug-research-collaboration-ionis.

The SRI description of the FOX Three Molecular Guidance System is at https://www.sri.com/work/projects/cell-targeted-drug-delivery.

SRI Launches New Venture Ambit Analytics to Improve Workplace Communications

SRI's new spin-off venture Ambit Analytics, Inc., will use ground-breaking acoustic analytics technology developed at SRI to coach employees and help managers across an organization to master 1:1 communication skills through real-time data and insights combined with personalized coaching to drive behavior change and provide ongoing reinforcement and support.

Although communications training is valued by many companies, it is difficult to scale such programs to cover all the employees who could benefit. Ambit aims to expand the reach of such programs through the use of advanced natural and acoustic language processing technology delivered directly to an employee's phone and computer. The Ambit technology platform uses machine learning to find key characteristics of speech that identify opportunities for employee feedback and coaching.

"Employees, particularly millennials, are increasingly requesting coaching and training to improve communication, a key leadership and collaboration skill; however, less than 1 percent of today's workforce has access to an executive coach," said Greg Lok, Ambit's CEO and co-founder. "Ambit is here to serve employees, employers, and executives to empower them with the tools necessary to be great leaders."

The SRI press release is at https://www.sri.com/newsroom/press-releases/sri-international-launches-new-venture-ambit-analytics-improve-workplace.

Ambit website: http://www.ambit.ai/.

UK Alumni Visit the Imperial War Museum Display Commemorating the 100th Anniversary of the End of World War I

By Peter Weisshuhn and David Gibby

On Sunday, May 27, seven UK SRI alumni met up at the Imperial War Museum in London. This summer, on the 100th anniversary of the end of "The Great War," World War I, the museum created a very informative display of documentation, weapons, uniforms, and photos of the leaders and the conditions of the battlefield. On display were lots of maps explaining the various battles, newspaper headlines and accounts, diaries, and letters—all of which helped visitors understand something of what it must have been like to be there. Central to the conflict was the trench warfare in France and Belgium. It looks primitive now, as do some of the weapons, like bayonets, medieval cudgels—even a club with nails protruding—and body armor reminiscent of jousting knights. A hand-painted camouflage suit for sharpshooters like a Ku Klux Klan robe was also on display. The mass-produced steel helmet, a late entry into the war, is credited with saving many lives. The arrival of the tank capable of driving over trenches made that type of warfare obsolete.

World War I lasted 4 years and killed about 15 million to 18 million. World War II in 6 years, with more countries involved and mass bombings, killed an estimated 50 million to 80 million directly. These figures for direct war dead cannot account for the numbers of deaths from suicides and broken health and spirits caused by the wars. But from a statistical perspective, the World War II total accounts for "only" about 3.5% of the populations involved, with the USSR and Poland around 15%. Modern warfare, in contrast to the past, will be fought increasingly by remote control. Fewer soldiers will die, but the death toll among civilians will grow, as we see already in the Middle East.

This was a very thought-provoking exhibition, making clear the futility and insanity of war and making us wonder why folks appear to have learned so little in the years since. It also made us realize the human race is not easily extinguished.

After the visit to the museum, we had a very enjoyable lunch at the nearby Three Stags pub. In the photo of us at the lunch table, we are (left to right) Nick and Sally Sturcke, Peter Weisshuhn, Gia Campari, Jeanette and David Gibby, and Bob Morgen.

"Train Like You Fight": The Story of DFIRST and XCTC at SRI

By John Prausa

Following the withdrawal of troops after the war in Vietnam, studies were commissioned to evaluate the performance and effectiveness of U.S. service members during combat. One of the conclusions was that the training soldiers received prior to deployment was neither relevant nor effective for the conditions they would eventually experience. Out of those studies came a commitment to "train like you fight"; in order to create such a realistic training environment, the notion of "instrumented training" was developed. Instrument the participants, record their actions, and provide a playback of their actions under simulated combat conditions in order to reinforce positive actions and correct mistakes. SRI was a pioneer in this field in the early 1970s; John McHenry and teams from the Engineering Group helped develop the first instrumented training system for training Naval Aviators.

Fast forward 20 years; following the first Gulf War (1990-1991), similar concerns were expressed about the effectiveness and readiness of National Guard soldiers for combat missions. Because of those perceived deficiencies, Congress directed the Department of Defense (DoD) to take steps to improve the combat readiness of the National Guard. Based on that guidance, the Defense Advanced Research Projects Agency (DARPA) and the Army National Guard (ARNG) initiated the Simulation in Training for Advanced Readiness (SIMITAR) program. This program lasted five years (1992-1997) and funded a number of R&D projects. Although the majority of these projects were simulation based, the DARPA Program Manager knew they needed a technology solution for a "culminating event," an instrumented live exercise in which the skills learned through simulation could be demonstrated under close-to-real combat conditions. The system was to be mounted on combat armor systems (M1 Abrams tanks, Bradley Fighting Vehicles, and various support vehicles), had to support up to 60 vehicles in a mock engagement spread over a 20 km x 30 km area, and had to withstand all the rigors of an operational environment. Being a DARPA program, the live training system also had ambitious goals:

- It could be taken to the soldiers. Because National Guardsmen typically had limited time for training, the system had to be transportable, not tied to a fixed location, and easily set up and taken down.
- It could not use lasers for determining hit or miss. The U.S. Army's preeminent training system at the time used a form of laser tag to determine whether weapons were pointed at the correct target and if a "kill" could have been achieved.
- It could not interfere with or impact the effectiveness of the weapons systems themselves.
- It had to be developed and deployed for a third the cost of then-comparable U.S. Army systems.

Since the mid-1970s, SRI researchers and engineers had supported the development of many advanced instrumentation systems, almost always in a research or assessment role. Although the SRI teams performed critical roles in identifying and evaluating new and advanced technologies to support the need for effective training, they had not, to any significant degree, built systems for deployment in operationally realistic environments. But the requirements and challenges of the SIMITAR live instrumentation system caught the interest of the SRI team. Taking the opportunity to put those many years of design experience into practice, in 1994 the SRI team put together a notional design and were invited to meet with the DARPA Program Manager to discuss the approach. It was a short meeting—the DARPA PM said that other companies had come in with poorly thought out ideas that far exceeded his budget. Could SRI design, build, and field a deployable system that could perform engagement simulation for 60 moving vehicles and provide an After Action Review, all for $4 million and in one year? The answer was "yes."

With only a year to design and produce the system, the SRI team immediately got to work. In meeting numerous technical challenges, the SRI team developed innovative solutions, such as:

- Instrumentation. A key, underlying part of the SRI solution was the use of GPS to determine absolute and relative location of all participants. A Participant Instrumentation Package (PIP) was designed to house and integrate all instrumentation being installed on the vehicles. Each PIP had a single-board computer, two GPS receivers, a communications device, and associated electronics and was interfaced to the host vehicle through a cabling and wiring harness. Since the PIP was to be installed on all participants in the exercise, it had to meet stringent size and price constraints and had to be producible in quantity.

- Communication. Each participant's knowing his own location was necessary but not adequate to adjudicate engagements between players. The SRI design was based on each player's knowing the location of every

other player (a "map" of the entire playfield). This was accomplished through a specialized radio design and advanced communication network for interplayer communication and real-time communication back to a common base station. Although rudimentary by today's standards, the network developed for this system was designed to handle significant volumes of data, communicate at a refresh rate necessary for near real-time operations, and provide exceptional reliability without interfering with the military systems on the host vehicles.

- Pointing. Another design challenge was the requirement to determine where the main guns of the Abrams and Bradleys were pointing without the use of lasers. The SRI team used a technique called GPS interferometry—two GPS antennas mounted on the gun barrel exactly six GPS wavelengths (a little over 1 meter) apart. The separation of the antennas and GPS carrier phase measurement differences at the two antennas were used to determine a pointing solution. The system collected the firing and ammunition selection signals and then, based on the pointing angle, determined which other vehicles were within the pointing cone of the gun. Simulation based on unclassified Army Materiel Systems Analysis Activity (AMSAA) data was then used to determine whether a hit was likely and, if so, what damage level would have been achieved.

- Visualization. All of the information was collected at a base station in real time to monitor the exercise and then transmitted to a trailer for the After Action Review. Here, the "fog of war" was lifted and the soldiers could see exactly where they were in 2D throughout the exercise, how they maneuvered, and who shot whom. It was an eye-opening experience for the soldiers.

Over that first year, the SRI team made many trips to military installations, including Camp Roberts on the California Central Coast, to learn about the vehicles they had to instrument and to conduct tests. As the technology began to mature, the team traveled to the Orchard Training Area (OTA) near Boise, Idaho, where the proof of principle exercise was to be held. It was there that the team learned the meaning of "being in the field." Working around the schedules of the soldiers, the SRI team endured long, sometimes sleepless, nights in all weather conditions. Tests were conducted, results analyzed, changes made, more tests, more learning.

Figure 1. Pointing on an Abrams tank.

Figure 2. Soldiers in a Mobile After Action Review tent.

Leading up to the initial demonstration and then the later training exercise, software continued to be written, cables procured, PIPs built (sometimes on conference room tables), computer and display systems configured, vans procured and outfitted for the rigors of the field, communications towers configured, and many supplies procured.

Finally, in October 1995, the final test and operational evaluation took place at OTA. As the instrumented vehicles rolled out of the yard, the SRI team watched anxiously as the vehicle GPS units reported back to the base station and showed up on the displays. Over the next several hours, the vehicles engaged in armored combat, maneuvering over the 20 km x 30 km range area and "engaging" enemy vehicles. The exercise went through multiple iterations and required a number of "interventions" by the SRI team. In the middle of the night, when the soldiers and vehicles were in cantonment, the SRI engineers deployed across the exercise area, climbing vehicles to repair antennas and cables, replace batteries, and perform other repairs. When "End Ex" was

declared, the SRI team knew they had met and exceeded the challenge. The test was a success and received high praise from the Army National Guard. The Deployable Force-on-Force Instrumented Range SysTem (DFIRST) was born.

Following the successful demonstration at OTA, the Army National Guard made plans to showcase the new system. The following summer, DFIRST was used to support annual training of the 116th Armor Brigade of the Idaho National Guard as part of a SIMITAR showcase hosted by DARPA. Notable attendees of the VIP day who watched the technology in action included the Secretary of the Army and the Governor of Idaho. Next, DFIRST was successfully demonstrated at Camp Roberts in California and other locations, leading to requests from the leadership of State National Guards to have their own training systems. Working with the State Adjutants General and their legislative members, Congress earmarked funds to purchase and deploy more systems for "home-station training." Beginning in 1999 and continuing through 2013, nine systems were built, delivered, and used to support home-station training at the original test sites of OTA, Idaho, and Camp Roberts, California, as well as at sites in Kentucky, Mississippi, Minnesota, Texas, Virginia, Indiana, and South Carolina. Over this time, technology upgrades and improvements were made to different parts of the system, forming the basis for new and upgraded systems at the deployed sites. Because of the inherent flexibility of the system to evolve to meet the changing nature of the Army National Guard's combat role, the system became known as "FlexTrain" and was used to train ARNG troops prior to their deployments.

During this same time period, the threats to our country were changing and the military training environment was adapting. Conflicts were less about force on force (armored vehicle versus armored vehicle) and evolved to more contemporary operating environments (towns and cities). The Army National Guard needed its own combat training capability for this new threat, with the focus less on maneuvering armored vehicles and more on training individual soldiers and their units. This new paradigm required a training environment that replicated overseas locations as much as possible, so ARNG added a requirement for role players (adversaries as well as civilians), simulated villages, vehicles of all types, and a simulated combat environment (i.e., pyrotechnics). These new requirements drove major changes to SRI's FlexTrain system, including instrumentation that could be easily carried by each soldier and adaptable to multiple vehicle types, a network and display system to handle many more participants (up to 2,000), the ability to cover a larger area (40 km x 40 km), and the ability to operate in a simulated city-like environment. These changes meant adding new technical capabilities to FlexTrain, including the ability to detect soldiers when they were inside buildings, 3D modeling and visualization, integration and synchronization of real-time video, and the ability to support multiple simultaneous exercise control and After Action Review stations.

The first demonstration of these new capabilities was held in 2005 at the Wendell H. Ford Regional Training Center in Kentucky. Army National Guard leaders responded enthusiastically to the training demonstration, commenting: "Our objective was to develop a home-station, fully instrumented, battalion field training exercise to replicate as nearly as possible the combat conditions experienced by our soldiers fighting in the contemporary operating environment. This will reduce the post mobilization time required to train the units to fight as components of larger, brigade operations." The participating soldiers called it "the best training we've ever received." Thus, in 2005 the eXportable Combat Training Capability (XCTC) was initiated.

Figure 3. Soldiers preparing for Annual Training.

Following a series of successful demonstration exercises, the ARNG sought to make XCTC a formal program with a prime contractor who could integrate these capabilities into a dynamic training exercise in which free-flowing participants' reactions could change the scenario. Just as had happened years earlier, in 2008 ARNG asked SRI to take over leadership of the program. And, just as 10 years earlier, the answer was "yes." In addition to the traditional role of providing reference instrumentation, SRI took over responsibility for all exercise planning, execution, and control; logistics; battlefield effects; role players; visual effects; and management of the entire operation. SRI added new engineering, planning, and analyst teams to support

the significantly increased scope and tempo of the summer exercise season. One of the most significant challenges of this new environment was the need to create the realistic sights and sounds of a battlefield. Working with the same companies that made Hollywood action movies, SRI turned these military ranges into giant movie-like sets. With them came non-pyrotechnic explosives, fake smoke, moulage (simulated injuries), wardrobes to change actors and role players into the indigenous populations, and 100 to 200 local hires to participate as role players. Realizing it would not be cost-effective to scale with highly trained engineers as system operators, the SRI team started to experiment with the hiring and training of college interns and local "technician" types on a temporary basis. This would prove to be a critical innovation down the line.

Since inception of the formal XCTC program in 2008, there have from four to seven summertime XCTC exercises each year, some occurring simultaneously at four different locations. This schedule is due to the unique challenge of the Army National Guard, which relies heavily on college students who are unavailable to commit two weeks for training during the October through April timeframe. Planning for each exercise begins 18 to 24 months in advance, based on the deployment schedules of the units being trained. The SRI Exercise Control team led a rigorous planning process to ensure maximum effectiveness of the training received by the units. During the non-summer months, the SRI Logistics team also housed and maintained the instrumentation and equipment, all in preparation for the following year's training cycle. Then, in the spring, the SRI Deployment teams began loading the equipment for transportation to that year's training sites. It was like a traveling circus going from training range to training range using 30 or more semi-trailers filled with instrumentation, power generators, towable antennas, numerous tents for After Action Reviews, and dressing rooms for the Hollywood subcontractors and administration. The Exercise Control, Instrumentation Support, and Logistics Support staff deploy along with all of the equipment a month in advance for setup and testing. Then, following 15 to 21 consecutive days of training, a one-week tear-down process is conducted and the equipment is loaded in the trailers and transported to the next training site. From the initiation of the XCTC program in 2005 through 2015, SRI supported 33 separate training exercises in 16 states.

For a program to have long-term success, it must continue to upgrade in order to stay responsive to evolving training needs. The SRI team worked closely with their Army National Guard sponsors to identify system and technology upgrades, and in 2012, the SRI engineering and development teams undertook a major upgrade to the system that included:

- Redesigned player units. As in any technology-based system, improvements to the core technology allow greater functionality in smaller and smaller packages. These instrumentation packages, carried by the soldiers, were beginning to approach the size of a portable phone and operated with greatly improved and more efficient batteries (72-hour battery life).
- A completely redesigned data handling and transport system. This revolutionary design provided for an increased capacity of up to 65,000 players while still achieving the necessary data rates and latency requirements.
- A redesigned display system with greater functionality for the operators and more features for the After Action Reviews, including interfaces to virtual, constructive, and battle-tracking systems.
- An improved training experience through incorporation of video data. Small numbers of videographers with hand-held video cameras were embedded with the troops during the training and recorded scenes as seen through the eyes of the soldier. These videos were then time/geo-synchronized with real-time 2D and 3D displays to provide yet another level of feedback to soldiers during the After Action Review.

Figure 4. Display with integrated video.

The success of the program has been leveraged by other DoD organizations. The system was used to support joint test and evaluation programs, by the U.S. Army Reserves to train Reserve soldiers, and by the Defense Threat Reduction Agency.

From its inception in 1994 through 2015, the program generated $500 million of revenue for SRI. Of greater

importance is the role SRI, the DFIRST and FlexTrain systems, and the XCTC program have had in training Army National Guard soldiers. As one DoD client put it: "Quite simply, no other organization had the rare combination of talent required to drive a paradigm shift in military training, as did SRI during its development and production of XCTC."

The success of the program also created challenges for SRI. With changing requirements and the need for technology upgrades, SRI typically received funding for R&D and system improvements and upgrades. But that portion of the program began to diminish while the operational support for exercises grew. As a result, the nature of the business began to move away from the core SRI mission of advanced research and science. Also, the success of the program brought greater visibility and increased competitive and price pressures. The need for overhead rates and costs more consistent with the XCTC business model led SRI management and the Board of Directors to make a decision to spin out the business. In January 2015, Ravenswood Solutions was created as a wholly owned, for-profit subsidiary of SRI. As a wholly owned subsidiary, Ravenswood Solutions has a separate management team and Board of Directors and operates independently of SRI. Substantial planning took place during 2015, and a CEO was hired mid-year. In January 2016, the majority of the staff that had previously made up the Instrumentation and Simulation Program in the Engineering Group at SRI transitioned to the new company. In all, 90 staff left SRI and took positions with Ravenswood.

Since starting full operations in January 2016, Ravenswood Solutions has continued the SRI tradition of outstanding, cost-effective training support for the Army National Guard, the U.S. Army, and DoD clients. The Army National Guard remains a solid customer, and six XCTC exercises are being conducted during the summer of 2018 (and seven are being planned for summer 2019). The Ravenswood Solutions team continues to build on the foundation created at SRI, developing new technical features and capabilities and working to expand the client base. Ravenswood has added the U.S. Army Test and Evaluation Command as a major client with significant long-term growth potential. The U.S. Marine Corps and other elements of the U.S. Army are in active discussions concerning use of FlexTrain and associated instrumentation. Add international opportunities to the mix and the future is quite bright for Ravenswood Solutions.

Figure 5. SRI Deployment Team.

John Prausa joined SRI in 1975 and worked in Engineering R&D until his retirement in 2017. He became Vice President, Systems Development Division (SDD) in 1990, then Vice President, Engineering and Systems Division (ESD), and was appointed Sr. Vice President of the Engineering and Systems Group (ESG) in 2011. His entire career at SRI was spent working with teams from Engineering conducting research, development, and deployment of technologies and systems. He currently serves on the Board of SRI's spin-out Ravenswood Solutions.

News from Marie desJardins: New Position, Honors, Successful Advocacy, and a Longtime Goal Achieved

Seventeen years after leaving SRI to join the faculty at the University of Maryland, Baltimore County, I will be leaving UMBC to become the inaugural Dean of the College of Organizational, Computational, and Information Sciences at Simmons College (Simmons University as of September 1) in Boston. In an exciting period of transformation, Simmons will be welcoming four inaugural deans to reenergize and reimagine the institution.

My time at UMBC has been an incredible journey, culminating in several years of leadership development as an American Council on Education Fellow and as the inaugural Associate Dean for the College of Engineering and Information Technology.

The past year has been particularly rewarding in other ways as well. My work in artificial intelligence and computer science education has been recognized with a Distinguished Alumni in Computer Science award from UC Berkeley, the A. Richard Newton Educator Award from AnitaB.org, and recognition as a Fellow of the Association for the Advancement of Artificial Intelligence. I was also at the Maryland State House on May 8 to attend a signing ceremony for legislation that establishes K-12 computer science requirements and allocates $7 million over three years for computer science teacher preparation and advocacy; this legislation grew out of the past seven years of grassroots action, and the funding will be administered by the Maryland Center for Computing Education, which I cofounded at the University System of Maryland.

In less career-focused news, I also achieved the longtime goal of becoming the B division champion at the 2018 American Crossword Puzzle Tournament in Stamford, Connecticut. I was ranked 14th overall (out of more than 650 competitors), second in the mid-Atlantic, and first for competitors in their 50s. If anybody needs some tips on making it through the Saturday New York Times puzzle, feel free to get in touch!

Photo by Don Christensen

I continue to be grateful to SRI for launching my career and being my "first home" after my doctoral studies. Hello to all of my fellow SRI alumni, and if you are in the Boston area, I hope to connect with you after my move!

Regards,
Marie desJardins

Marie joined SRI as a member of the Applied AI Technology Program in September 1991, six months before finishing her Ph.D. dissertation at Berkeley—also known as "the six busiest months of her life." In AAITP, she worked on applied planning and learning systems. After moving to the AI Center several years later, she branched out into multiagent systems and intelligent tutoring systems, and was promoted to Senior Computer Scientist. Throughout her time at SRI and since, she has been a vocal advocate for computer science education and diversity in computer science, especially through her mentoring of junior women in the research community.

2018 Annual SRI Alumni Reunion in Menlo Park: October 18

SRI Alumni Association members who will be in the Bay Area on October 18 are encouraged to come to the annual reunion. It will be held in the International Building from 4:00 until 7:00 p.m. The program generally includes a presentation on the state of SRI and a technical presentation featuring a current SRI project or emerging technology. A special feature of the reunion will be the induction of one or more SRI alumni into the Alumni Hall of Fame. You can count on sumptuous hors d'oeuvres, excellent drinks, delightful conversation, and plenty of door prizes.

The charge is $35 for each attendee. An invitation to the reunion with sign-up form is included with this mailing; members receiving electronic distribution will need to print the sign-up form from their email attachment. Please complete the form and return it with your check by October 12.

Alumni Association Membership Renewals Due by November 30

It's almost time to renew your SRI Alumni Association membership for 2019. Membership renewal forms will be mailed to association members in early October. The fee is $25 per member, due by November 30, 2018. All members who renew on time will be included in the 2019 Alumni Directory, which will be issued in January.

The SRI Alumni Association welcomes new members:

Marwan Bardawil
Cindy Daniell
Terry Henry
Emi Iwatani
Rich "Jake" Jacobson
Gerald Kaufmann
Kai Hung Lau
Ramya Mehul
John Murray
Christine Padilla
Nahid Sidki
William Wilkinson

And welcomes back previous members:

Thomas C. Poulter, Jr.
Roger Vickers

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

Directory Addendum

The enclosed directory addendum (covering the period April 1, 2018, to July 31, 2018) contains new members and corrections. Please add it to your 2018 Directory.

Wanted: Your Submissions

We welcome articles and shorter items from all Alumni Association members to be considered for publication in the newsletter. Have you done something interesting or traveled to interesting places? Received any awards or honors? Your fellow alumni want to know! Please send items to steering-committee-alumni@sri.com.

The Alumni Association would like to extend our heartfelt thanks to Joyce Berry, Membership co-chair of the Alumni Association's Steering Committee, who will be resigning her duties after more than 20 years of service. Joyce has been a tremendous asset, not only performing membership duties but also filling in otherwise to keep the Alumni Association running smoothly. We will sorely miss her dedication and tireless spirit. The Alumni Association wouldn't be what it is without Joyce. When you see Joyce at future alumni events, please pass on your thanks to her as well for all her hard work over so many years. We hope she'll stay in touch and we wish her all the best in her new endeavors.

CREDIT UNION NEWS

Gordon England*

Gordon England, a former SRI staff member in the United Kingdom, died May 4, 2018, after a long and difficult illness over a number of years, initially at home and then for the last four years in a nursing home nearby in Bath.

Gordon was born in April 1935 in Barnsley, Yorkshire, England. After attending Barnsley Grammar School, he graduated from the London School of Economics.

Gordon spent 11 enjoyable years with SRI in the UK, from 1977 until 1988. He joined as UK Marketing Director based at SRI's London office in Buckingham Gate, having received his acceptance letter from Menlo Park addressed to "Mr Croydon, London etc."

In 1979, he became Marketing Director, SRI Europe, Middle East and Africa (SRI EMEA), based in SRI's Regional Office in Croydon with responsibility for marketing SRI across the region. There were then marketing offices in Central London, Stockholm, Eindhoven, Bonn (later Frankfurt), Milan, and Madrid.

In 1981-82, Gordon was Director of the Management and Economics Department for EMEA with responsibility for leading business and management consulting professionals. He was subsequently Executive Director for SRI's Professional, Marketing and Administrative resources in the region.

As well as adding offices in Europe during Gordon's time, SRI expanded in Croydon from a small rented office on Dingwall Road to several floors of the NLA Tower, and finally to a complete newly built Menlo Park House nearby.

Gordon always offered good leadership and active support to staff, often representing SRI to its clients at the highest level in Europe and elsewhere.

Gordon loved sport. He was on the university badminton team and particularly enjoyed watching football (soccer to our U.S. colleagues). He also enjoyed many of London's cultural offerings: concerts, theatres, galleries, and museums. He was also an avid reader.

Gordon leaves much loved Dragica, his Croatian wife of 55 years. After Gordon left SRI, they did much voluntary work in Croatia together during the Croatian War and then enjoyed long holidays on the island of Hvar in retirement. Dragica, who speaks perfect English, recalls that on moving home a few years ago to provincial Bath, she was asked her name and replied, "Mrs. England." The response was "Yes, we know you are in England, but what is your name?"!

Gordon was a good friend to all who knew him. In addition to Dragica, he leaves a much loved family, including sons and grandchildren, nieces, and nephews. He is sorely missed.

Based on an obituary provided by Nick Sturcke and Dragica England.

Robert H. Eustis

Robert (Bob) Eustis, a former thermodynamics engineer at SRI, died May 24, 2018, at his home on the Stanford campus. He was 98 years old.

Bob was born in Minneapolis, Minnesota, in 1920. He attended Minneapolis public schools and was active in Boy Scout and church youth activities and leadership. He graduated from the University of Minnesota in 1942, receiving a bachelor's degree in mechanical engineering with high distinction. He enlisted in the Air Force in 1944 and was assigned to the Aircraft Engine Research Lab of NACA (later NASA), where he headed the Fundamental Turbine Research Section. After discharge in 1947, he entered MIT as an instructor (later assistant professor) and a doctoral student in mechanical engineering. Bob joined a Philadelphia-based start-up in 1951 as chief engineer, and while there finished his Sc.D. dissertation in 1953.

At this point the family moved to California, and Bob joined SRI in 1953 as head of the Heat and Mechanics section. In 1954, Bob was asked to teach a course in thermodynamics in the mechanical engineering department at Stanford University, and in 1955 he joined the faculty full time as an assistant professor. Thus began a 35-year career that ended in 1990, when Bob reached the then mandatory retirement age of 70. During these years, Bob combined teaching, mentoring, and research with professorial duties. One of Bob's major efforts was to introduce more science into the mechanical engineering curriculum so that graduate students would be better able to adapt during their careers as engineering evolved. During his career, Bob received many distinctions and awards in technology and education, including a medal of achievement from the Academy of Sciences of the Soviet Union for his work in magnetohydrodynamics.

Bob was an engineer of diverse interests and talents. After retirement, he restored a vintage Bentley with a friend. He also patented what he called a "box barrel" or a "smart barrel," a method to speed up the aging process of wine without negatively affecting quality. Always interested in woodwork, he invented a new sort of steel-reinforced furniture joint that he guaranteed for life. He then

started a successful high-end furniture design company. In 2018, a New England chair manufacturer reported that 30,000 chairs had been made using the patented joint.

Bob's wife, Kay, died in 2003. Bob is survived by partner Phyllis Willits, sister Carol, son Jeffrey, daughter Karen, grandsons Adron and David, and great-grandchildren Penelope and Mabel.

Based on obituaries published by the Palo Alto Weekly *and the Stanford University News website.*

Edwin Max Kinderman*

Edwin "Ed" Max Kinderman died April 5, 2018, in his Palo Alto home. He was 101 years old.

Born August 21, 1916, in Cincinnati, Ohio, he grew up in Dayton and then Rocky River, Ohio. He graduated from Oberlin College in 1937 and went on to earn a doctorate in physical chemistry from Notre Dame University in 1941. He moved to Portland in 1941 to begin a job teaching chemistry at the University of Portland.

World War II interrupted his academic career when he was hired as a chemist for the Manhattan Project. While on the project, he worked at the University of California Radiation Lab in Berkeley and at a uranium separation plant in Oak Ridge, Tennessee. In 1945, he resumed teaching at the University of Portland until 1949, when General Electric hired him to work at the Hanford Atomic Works site in Richland, Washington. There, he worked on research for producing plutonium to be used in American nuclear weapons. He left Richland in 1956 to move to Palo Alto and work in the physical chemistry department of SRI in Menlo Park. He worked at SRI for nearly 40 years, until 1994.

After "retiring," Ed worked actively for another 10 years with collaborators Hew Crane and Ripudaman Malhotra on a book, a survey of U.S. energy policy titled *A Cubic Mile of Oil*, published by The Oxford University Press in 2010. Beyond his long and distinguished research career, Ed was deeply involved in community service pursuits to promote education and civil rights throughout his life.

Ed is survived by sons Gibbs, Albert, and Joel; daughter Mary; and 13 grandchildren and 17 great-grandchildren.

Based on obituaries published by the Palo Alto Weekly *and the* Pocahontas Times *(Marlington, West Virginia).*

William Wei Lee*

William Wei Lee died peacefully on April 22, 2018, at Sunny View, his assisted-living community in Cupertino, California. He was 94 years old.

Born in San Francisco Chinatown in 1923, William attended the University of California at Berkeley, where he obtained a B.S. degree in chemistry. After finishing his service as an army chemical engineer during World War II, he returned to California and married his childhood sweetheart, Pauline. The family moved to Minneapolis, Minnesota, where he received a doctorate in organic chemistry from the University of Minnesota. After a brief sojourn in Ohio, he returned to California in 1954 and joined SRI, where he worked as an organic chemist until his retirement in 1987.

William was an active member of Wesley United Methodist church in Palo Alto. Watercolor painting and sketching became a passion for him over the years, as did camping, spending time with extended family, and family road trips. His friends and family came to count on him for his quiet and solid demeanor as well as his thoughtful opinions.

He is survived by his brother Henry; sons Peter, Kerwin, and Roderick; granddaughter Sharon; and great-granddaughter Hannah.

Based on an obituary provided by Peter Lee.

Peter Lim*

Peter Lim, a longtime SRI staff member, died in Palo Alto on April 4, 2018, at age 91, 11 days short of his 92nd birthday.

Peter was born in Oakland, California, where he lived until he was 7 years old. He and his family moved to China for 4 years, but then moved back to Oakland because it was safer given the global situation at the time. In 1944, during his junior year at Oakland High, he left school and attempted to enlist in the military but was rejected for poor eyesight. Rather than re-enrolling in high school, he took radio operating courses and then joined the Merchant Marines as a Radio Officer. After being discharged, Peter was too old to return to high school, so he took University of California extension

courses and then transferred to UC Berkeley. He earned a B.S. degree in chemistry in 1951 and a Ph.D. in agricultural chemistry in 1956, when he joined SRI—his only employer until he retired in April 2017.

Peter began work at SRI as an Associate Chemist in the Chemistry Department of the Physical Sciences Division to work with B. R. Baker, who had just arrived from the Southern Research Institute to start a program for the synthesis of new potential anticancer agents sponsored by the National Cancer Institute (NCI). At that time, infrared (IR) spectroscopy was just emerging as an extremely useful technique for identifying structures of organic molecules. Peter became an expert in the analysis of IR spectra and used that capability to analyze all the reaction products of new molecules generated by 12 to 15 organic chemists in SRI's cancer group.

When analytical chemistry was spun off from the synthesis program and funded as a separate contract at NCI, Peter applied for and received this major NCI analytical project, which continues to this day under the leadership of senior chemists trained by Peter. This was the start of the analytical chemistry group in Life Sciences. Peter served as the group's leader, and in 1979, he became Director of the Department of Pharmaceutical Analysis in the Life Sciences Division. For more than 25 years, he maintained a staff of 10 to 15 chemists at a sold time greater than 90%.

Other significant analytical programs brought to SRI under Peter's leadership included a project from the Walter Reed Institute to analyze antimalarial compounds and a project from the U.S. Army for analyzing chemical defense agents. In addition, many short-term commercial projects were obtained as a result of Peter's expertise and reputation for high-quality work. SRI still provides analytical chemistry services to NCI and other bioscience organizations. His legacy is demonstrating the kind of excellent work that it takes to continue to satisfy the needs of a major client over many years. In recognition of his achievements, Peter was inducted into the SRI Alumni Hall of Fame in 2003.

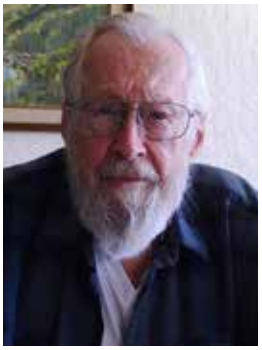
During his career and in retirement, Peter's passions included stamp collecting, classical music, telling stories, and caring for his fruit trees in the backyard.

Peter is survived by Helen, his wife of more than 65 years; daughter Erika; son Arne; and grandsons Stephen and Anthony.

P.S. A few years ago, Erika and Arne were able to arrange for Peter to finally receive a high school diploma from Oakland High—something that he had not previously received, despite his numerous accomplishments over many years.

Based on an obituary provided by Arne Lim.

Louis H. (Bud) Rorden



Louis H. (Bud) Rorden, former SRI research engineer, died at his home in Felton, California, on July 11, 2018, after a struggle with idiopathic pulmonary fibrosis. He was 87 years old.

A highly accomplished engineer and businessman, Bud was a pioneer in the electronics industry and worked with many others in the fledgling Bay Area digital industry. He worked in SRI's Electronics and Radio Sciences Laboratory, also known as the Communications Laboratory, from 1957 to 1966. He left SRI to co-found an SRI spin-off, Develco, Inc., of which he later became CEO.

At SRI, Bud built the electronics for an airborne radar used to measure the reflectivity of the ground or ice. It was housed in a PBY (patrol bomber aircraft) that traveled to the far north of Alaska. Ray Vincent, who worked with Bud in the early years at SRI, recalled that Bud had saved the lives of everyone on one of the PBY data-gathering flights. After most of the crew developed headaches, Bud recognized it as carbon monoxide poisoning, and Ray then discovered a cracked exhaust pipe on the power generator in the rear of the PBY. The generator was immediately shut down, and the crew and project staff recovered rapidly. According to SRI's George Carpenter, Bud also built a variety of instruments to measure the characteristics of VLF signals, some of which were housed on small missiles fired to high altitudes.

Don Nielson, who also worked with Bud, said that he was an uncommonly talented engineer with a quick wit and confidence in his considerable skills. He was admired and respected by all on the staff of the Communications Laboratory. Don recalls that Bud was able to press forward on a project design, from concept to full hardware, and could design and build anything electronic, from radios to signal processors and a host of other devices. At Develco, Bud built radio channel measuring equipment to characterize the environment for the first mobile digital radio network, as well as equipment Don used for his thesis at Stanford to analyze the unusual characteristics of a transequatorial radio path.

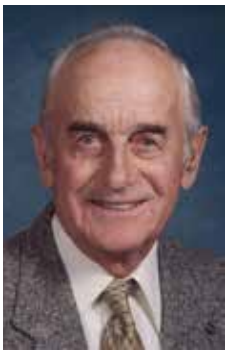
Bud patented many methods and devices in his long engineering career, including a method and apparatus for communicating data in a wellbore and for detecting the influx of gas, a conductivity method and apparatus for measuring strata resistivity adjacent to a borehole, a borehole liquid acoustic wave transducer, a gimballed antenna, and combinatorial coded telemetry.

Also a serious amateur winemaker, Bud developed methods of producing wines of exceptional quality and character over the decades. He was one of the early helpers at Ridge Vineyards, which was founded by four other SRI engineers. He helped establish Cantiga Wineworks, which is owned and operated by Bud's son and daughter-in-law in the Sierra Foothills. Cantiga wines are poured at many SRI events. Bud passed his winemaking knowledge on to his children, and his legacy continues both at Cantiga and at the family home winery ("The Whinery") maintained by Bud's daughter and son-in-law.

Bud will be remembered for his warmth, generosity, sense of humor, and keen intellect, both here in California and in his second, half-time home in Merimbula, New South Wales, Australia. He is survived by his wife, Judy; first wife Peggy; children Meg, Jeanie, Annabel, and Richard; and six grandchildren.

Obituary provided by Jeanie Graham.

Henry "Hank" Rudnicki*



Henry "Hank" Rudnicki, a high-speed movie photographer, died May 2, 2018, at his Santa Cruz home. He was 92 years old.

Born in 1926 in Youngstown, Ohio, Hank joined the Marines at 17 and rose to the rank of sergeant. He served as a photographer in World War II and again in the Korean War. A pioneer in the field of high-speed motion picture technology, he worked under famed aerospace engineer Wernher von Braun documenting rocket engine tests to help engineers understand why the early engines kept exploding. He also worked in the defense industry and at SRI, where engineers with Ph.D. degrees came to respect the innovations of a man with only a high school education.

Hank joined SRI in 1973 and was the lead High Speed Photographer for Poulter Laboratory until his retirement in 1988. In particular, his work was instrumental in understanding the behavior of impulsively loaded cylindrical shells representing rocket booster sections loaded by X-ray lasers as part of the U.S. government's Strategic Defense Initiative (SDI) program. During his career, he continued to develop new techniques for improving high-speed photographic images by coming up with systems to limit the explosive smoke and debris from obscuring the target view.

Hank was creative, energetic and full of ideas. He was a man of integrity, a talented oil painter, a master carpenter, a golfer who never kept score, and an adventurous traveler who twice drove his family in a VW van through Mexico. Later, he and his wife, Karine, spent several months each year volunteering at a center for Navajo foster children in Gallup, New Mexico. Hank and Karine had three daughters, who were encouraged to ignore gender stereotypes. "Don't ever let anyone tell you that you can't do something, kid," Hank always said.

Hank is survived by his brother Edmund; daughters Peggy, Regina, and Mary; and grandchildren Cody, Garren, and Jack.

Based on an obituary published by the Santa Cruz Sentinel.

*Member of the SRI Alumni Association

The SRI Alumni Newsletter is published three times a year (in April, August, and December) by the SRI Alumni Association.

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