



Your RRSD Leadership Team

We all thank you for being a member of the ANS RRSD and we look forward to meeting and working with you. Please don't hesitate to reach out to us with suggestions or if you would like to get involved

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Leonel E. Lagos - Vice Chair
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Executive Committee

(Terms Expiring)

Luke T. Reid	(2018)
Young Soo Park	(2018)
Kimberly Monti	(2019)
Stephen L. Canfield	(2019)
Ji Sup Yoon	(2019)
Shikha Prasad	(2019)
Kevin E. Cooper	(2020)
Dale A. Dalma	(2020)
Phillip D. Heermann	(2020)

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rrsd.ans.org

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rrsd.ans.org/contact-us

A Message from the Chair

Welcome to the 2018 Winter Newsletter.

We are now in the middle of all the activity I discussed in our last newsletter. I hope everyone reading this has a chance to participate – and find value in – all RRSD-related activities. The Executive Committee has committed to raising awareness of these opportunities for our members, as well as using these collaborative opportunities to bring broader awareness to our activities.

Of the activities discussed, next on this list is the Waste Management Symposium (March 18-22nd, wmsym.org) whose theme this year is “Nuclear and Industrial Robotics, Remote Systems and other Emerging Technologies.” DOE-EM has facilitated the participation of a score of academic and industrial participants showing off their devices for D&D, autonomous inspection, human augmentation, etc. Multiple panels and paper sessions will focus on robotic applications and needs across the nuclear industry. If you are reading the last sentence, it is certainly the type of event you are looking for.

Internationally, the activities continue. Several ANS RRSD members from within the DOE Complex and similar institutions world-wide visited Korea in November to further our collaborations with Korean researchers and institutions. And the need is there. D&D and emergency response are global issues and the workload to improve our response can – and should – be an international collaboration. IEEE hosted a workshop on the deployment of robotics in hazardous environments at the Intelligent Robotics and Systems conference in Vancouver in September. The workshop included talks from the England, South Korea, Japan, Estonia, Italy, and the United States. ANS RRSD also congratulates the University of Manchester who is leading a new [multimillion pound program](#) to clean up the world's nuclear waste. This hub includes international partners from US,

Italy, and Japan.

To further this international collaboration and encourage participation from the broader robotics community, RRSD is planning its next topical in 2019 in conjunction with IEEE. A planning meeting for this event is scheduled for Friday, March 23rd, the morning after the WM Symposium in Phoenix, AZ. For this to be a success, we need your help. If you would like to participate in organizing or running this first IEEE/RRSD topical on the use of robotics and remote systems in hazardous environments, please contact me directly at mpryor@utexas.edu.



Thank you for your time and I hope to see you at the WM Symposium or our upcoming conference!

Regards,

Mitch Pryor

Chair, RRSD

RRSD Mission

The Mission of the Robotics and Remote Systems Division is to promote the development and application of robotic and remote systems for hazardous environments for the purpose of reducing hazardous exposure to individuals, reducing environmental hazards and reducing the cost of performing work.

PAST EVENTS

There has been a notable uptick in the interest in robotics and remote systems for nuclear applications. This has created a broader and more diverse set of participants (both individuals and societies) in the area of robotics in hazardous environments. In the last year alone, there were multiple events starting with our very successful topical in Pittsburg in the summer of 2016.

2017 IROS Forum on ‘The Future of Robotics and Automation in Nuclear Facilities and Environments’

The IEEE Robotics and Automation Society Technical Committee on Robotics and Automation in Nuclear Facilities, in cooperation with ANS RRSD, hosted its third workshop/forum at the 2018 IEEE/RSJ International Conference on Robotics and Intelligent Systems on September 26th in Vancouver, BC. “The Open Forum on the Future of Robotics and Automation in Nuclear Facilities & Environments” was attended by approximately 25 participants. Fourteen presentations were given by attendees from the USA, UK, Italy, South Korea, and Japan.

In addition to very interesting talks about research progress around the world, the program included an overview of the emerging US DOE environmental management robotics and remotes systems technology roadmap, an update on robotics and remote systems activities at Fukushima, and an overview of activities and plans at the Nuclear Robotics Lab at the Korean Atomic Energy Research Institute. The proceedings for the forum are available upon request.

Contact William Hamel, whamel@utk.edu

ISOFIC 2017 and KAERI NRL-ANS RRSD Joint Workshop

International Symposium on Future I&C for Nuclear Power Plants was held on November 26-30, 2017 in Kyeongju, South Korea. Representatives from the RRSD were invited by KNS RRSD (host Jisup Yoon, KAERI) to participate in joint technical sessions. A side benefit of this trip was considered as an opportunity to view the technology status and make initial connections for future collaborations

Of particular interest during the conference was the mutual exchange of the robotics roadmaps of DOE-EM (by Wendell Chun) and Korean Ministry of Trade, Industry, and Energy (MOTIE, Kyunghoon Kim, Robotics PD). MOTIE’s robotics program is industry oriented with its recent focus on embracing the coming 4th industrial revolution.

Following the ISOFIC was a visit to KAERI (Korea Atomic Energy Research Institute), where we had an opportunity to review the many robots developed at its Nuclear Robotics Laboratory (NRL, Kyungmin Jeong). Shifting away from the traditional development for nuclear facility operations,

their application domain is expanding to D&D and emergency response. On the next day was a joint workshop for technical exchange with KAERI NRL. There were invited speaker was from other institutions including Korea Institute of Science and Technology (KIST) discussing a new lunar rover.

The last day was a luncheon meeting between the U.S. visitors and Mr. Woochul Kim from the MSIT (Ministry of Science and ICT). He schedules US-Korea relations, and discussed opportunities for collaboration. Mr. Kim has open line opportunities for D&D activities including robotics, and would like to add another new line item for both countries to collaborate on. He has some candidate Korean entities that they would fund from their side that matches US investments.

*Contact Young Soo Park (ypark@anl.gov),
or Jisup Yoon (jsyoona@kaeri.re.kr)*



UPCOMING EVENTS

2018 Waste Management Symposia: ‘Nuclear and Industrial Robotics, Remote Systems and Other Emerging Technologies’

RRSD members, join us in Phoenix, AZ, March 18 - 22, 2018 for the 44th annual Waste Management Symposia, the World’s Largest Radioactive Waste and Material Conference. The 2018 Waste Management Symposia (WM2018) will explore the theme **Nuclear and Industrial Robotics, Remote Systems and Other Emerging Technologies** as a common thread across all 10 of the Conference subject matter tracks throughout the conference week, as participants from over 30 countries gather to discuss effective solutions to the management and disposition of radioactive wastes, and the decommissioning of nuclear facilities.

WM2018 will include presentations describing research, development and operational experiences over the complete spectrum of nuclear waste activities. These presentations are complemented by a large exhibition showcasing a wide variety of products and services related to the industry, the US DOE and other government agencies. The exhibition will also showcase the 2018 theme with a Robotics Pavilion showcasing an extensive display of the latest robotic technology from over 20 government and industry leaders with interactive floor and table top demonstrations.

In addition, WM2018 will feature 8 Panels during the week lead by over 48 expert Panelists depicting:

- DOE - Environmental Management (EM) Robotics
- Robotics - Exoskeleton (Worker Augmentation)
- International Innovations in Robotic Decommissioning Technology
- DOE-EM Robotics and Emerging Technologies Roadmap
- Robotics and Emerging Technologies - US Federal Agencies Engagement
- Leveraging Innovations in Science & Technology to Benefit Safety Performance
- Lessons Learned from Industrial Robotics Deployment to Apply to Nuclear
- Remotely Operated Vehicles for Emergency and Disaster Response

Don’t miss the opportunity to exchange ideas, technical information and solutions with RRSD members and 2,000 nuclear waste industry delegates from around the world. Please visit our website, www.wmsym.org, for more information and to register.

Contact Gary Benda, gbenda@wmarizona.org

DOE EM Robotics Roadmap Activity

The EM mission is to continue the reduction of its environmental liability with high-hazard and high-consequence materials, and at the same time minimize the risk to its workers. The nature of this work exposes the workforce to ionizing radiation, which is why robotics have become an enabling technology with significant safety and efficiency potential. In February of 2017, the technology development office within EM kicked-off a roadmap activity for robotics and remote systems. The roadmap is intended to provide a framework to plan, develop, coordinate, and integrate these potential solutions. The specific purpose of the roadmap is to capture the needs of the various DOE facilities, and to match potential solutions for addressing those needs in a meaningful way.

Over the next ten months, a core team of specialists collected the needs from many sites, and compiled those needs into seventeen categories of needs. This task was followed by an activity to identify key robotic and remote system technologies that could be potential solutions to the aggregated needs. The team identified 18 classes of robotic and remote system technologies. Potential solutions, including recent and emerging technologies, were grouped into incremental timeframes of 5 years, 5-10 years, and 10

years and beyond for planning availability purposes. This assessment was based on the technology readiness of the individual technologies based on recommendation of experts in the field.

There was some preliminary analysis done on matching solutions to the needs to synthesize the data at a broad level. The collected site needs and key technologies were documented in a roadmap report entitled: DOE EM Research and Technology Roadmap: Robotics and Remote Systems for Nuclear Cleanup was assembled. This document is in its final review and should be available to the public in early 2018.

Contact Wendell Chun, wendell.chun@gmail.com, or Jason Wheeler (jvwheel@sandia.gov)

Upcoming Meetings

2018 WM Symposia (3/18/2019, Phoenix, AZ)

2018 ANS Annual Meeting (6/17-21/ 2018, Philadelphia, PA)

WearRAcon 2018 (3/21-23, 2018, Scottsdale, AZ)

2019 ANS/IEEE Joint meeting on Robotics in Hazardous Environ-

Welcome to the RRSB Community!

