



GAIN June 2021 Highlights Report

July 2021

Changing the World's Energy Future

Donna Marie Kemp Spangler



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July 1, 2021

Message from GAIN Director Christine King



GAIN's involvement in state-level engagement is expanding, even as we continue in our traditional role to pair nuclear technology developers with resources at the Department of Energy (DOE) national laboratories. With the support of DOE, we are an enthusiastic participant in the National Association of Regulatory Utility Commissioners (NARUC) Nuclear Energy Partnership. The NARUC-DOE Nuclear Partnership, launched in March 2021, meets monthly to explore advanced nuclear technologies and represents 20 states and various universities. This partnership provides opportunities for state public service commissioners and their staff to better understand barriers and possibilities related to the U.S. nuclear fleet, the nation's largest source of zero-carbon power.

On June 4, I took part in a discussion on the latest developments in Advanced Nuclear Technology. That discussion was moderated by Georgia Public Service Commissioner and Partnership Co-Chair Tim Echols, and it also included presentations from Jeffrey Merrifield, a partner in Pillsbury Law; Nicholas McMurray, nuclear program director of ClearPath; and Shannon Bragg-Sitton, lead for the Integrated Energy Systems at Idaho National Laboratory. On July 1, I also participated in a NARUC-DOE Nuclear Energy Partnership meeting with state utility regulators and regulatory staff to build on the discussions held in June. Discussing how nuclear technology will serve us in a clean-energy future with state-level utility commissioners helps secure technology-inclusive, clean-energy policies which will be critical to commercializing new nuclear technologies.

GAIN is working closely with nuclear innovators to match them with the right resources at the national labs. One way we do that is through our Nuclear Energy Vouchers. We have awarded 62 vouchers so far and 36 have been completed. To better understand what has been accomplished with these projects, I invite you to read the one-page summaries [here](#) on our website.

As an industry we are actively working on successful "First-of-a-Kind" or FOAK demonstration projects; however, looking ahead at other demonstration or deployment projects that may be needed in the future, we want to hear from developers. What kinds of contracting processes will you need in the future to be able to partner with DOE or national labs? I encourage you to reach out to Rachel Taow at Rachel.taow@inl.gov with your thoughts and insights regarding contract/process modernization.

GAIN June 2021 Short Highlights

GAIN was invited to speak at 6 events. This includes the GAIN webinars, workshops, and the following:

- June 3: GAIN hosted a discussion about repowering coal plants with advanced nuclear technology with various national labs. TerraPraxis, a non-profit company, is leading a larger consortium researching how to repower 2TW of coal plants and considering the screening tools, models, construction technology, and broader research necessary to enable efficient replacement of coal plants. The meeting was to ensure the national labs were ready for any questions that might come from a similar Department of Energy (DOE) briefing delivered the following week.
- June 4: GAIN Director Christine King presented an overview of advanced nuclear technologies in a National Association of Regulatory Utility Commissioners (NARUC)-DOE's Nuclear Energy Partnership Webinar, "Introduction to Advanced Nuclear." The group meets monthly to explore advanced nuclear technologies and represents 20 states and various universities. Click on the links to view the [presentation](#) and [recording](#).
- June 7: GAIN participated in virtual tour from Oppenheimer Leadership Program to discuss how we help private industry connect with the right national lab resources to further their development of commercially viable technologies.
- June 9: GAIN hosted the Repowering Coal discussion for a significant contingent of DOE staff. Representatives from the following DOE offices attended: Office of Nuclear Energy, Office of Fossil Energy and Carbon Management, Office of Electricity, Office of Technology Transitions, and Loan Programs Office..
- June 21: Lori Braase presented a GAIN Status Overview at the Nuclear Energy Institute's Advanced Reactor Forum.
- June 23-24: GAIN Director Christine King participated in a meeting with DOE's Office of Nuclear Energy's planning for program activities for FY22.

GAIN Announced Third-Round FY 2021 Nuclear Energy Vouchers



- On June 10, 2021, GAIN announced two nuclear companies will be provided GAIN Nuclear Energy (NE) Vouchers to accelerate the innovation and application of advanced nuclear technologies.
- Engineered Solutions Group LLC of Brevard, NC was awarded a voucher to work with Oak Ridge National Laboratory for the development of its small modular reactor containment cable and Environmental Protection Agency Systems.
- Vega Wave Systems, Inc. of West Chicago, IL was awarded a voucher with Argonne National Laboratory for radiation testing for high-resolution, radiation-hardened camera systems.
- NE vouchers provide advanced nuclear technology innovators with access to the extensive nuclear research capabilities and expertise available across the U.S. Department of Energy (DOE) national laboratory complex.
- This is the third set of awards in FY 2021.

GAIN Access Agreements Signed with Nuclear Developers

- GAIN Access Cooperative Research and Development Agreement (CRADA) allows participants to access multiple labs through negotiation of a single CRADA, which saves negotiation time and resources and fosters relationships between labs.
- The GAIN Access CRADA consist of two agreements: a CRADA between a lead lab and nuclear technology developer (participant); and an access agreement, which additional labs sign to become parties to the CRADA.
- The GAIN Access CRADA pilot was approved by the U.S. Department of Energy Idaho Operations Office on March 31, 2021.
- The first CRADA is with Kairos Power, INL (lead laboratory), Argonne National Laboratory and Los Alamos National Laboratory.



GAIN works on behalf of the nuclear industry to simplify access to national laboratories.

For information on additional GAIN Access CRADA opportunities, contact Rachel Taow at Rachel.taow@inl.gov.

Multi-Lab Access Agreement

- ❖ *INL signed March 31, 2021*
- ❖ *Kairos Power signed April 1, 2021*
- ❖ *ANL signed June 8, 2021*
- ❖ *LANL will sign in the upcoming weeks*

Nuclear Industry Experts Discussed Their Route to Licensing and Deployment in Final Regulatory Webinar

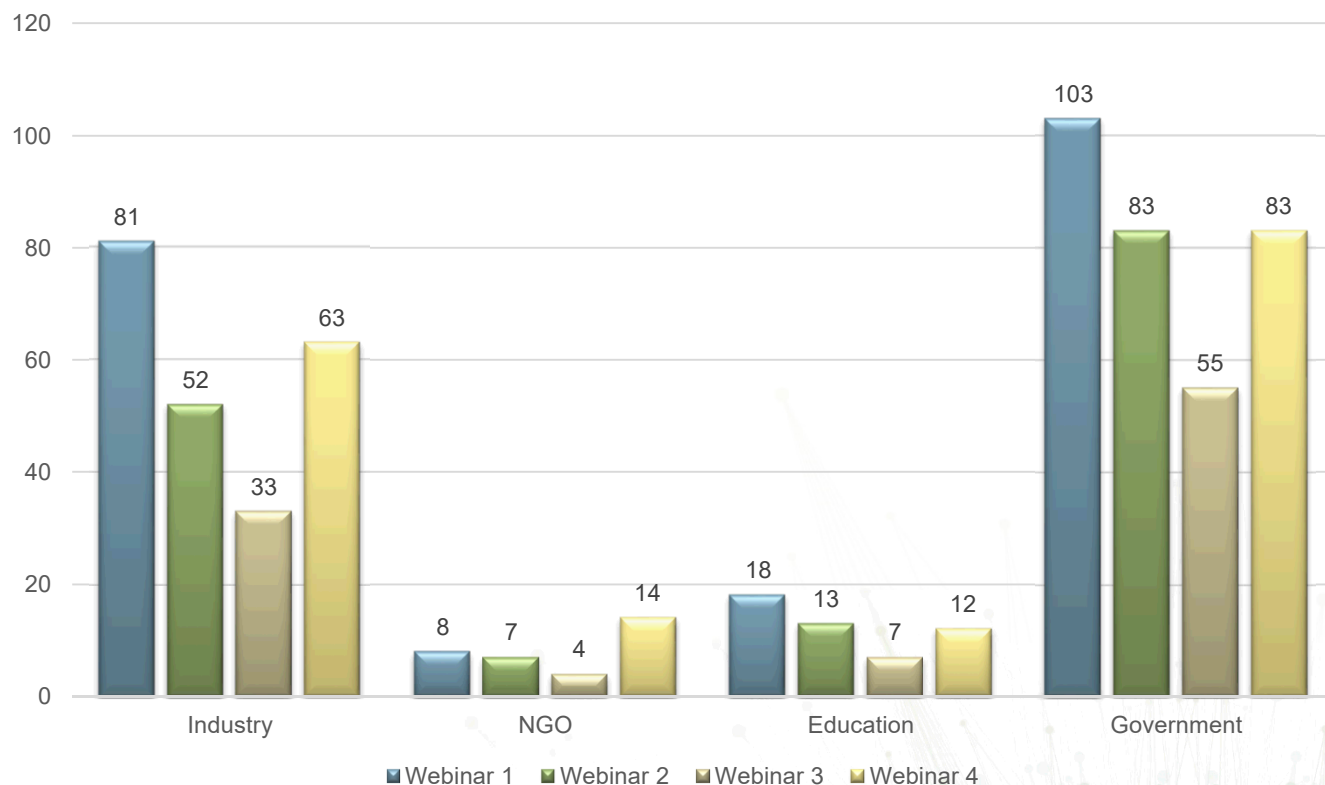
- On June 1, Gateway for Accelerated Innovation in Nuclear (GAIN) hosted the final webinar in the “The Regulatory Route to Commercial Nuclear Deployment” series.
- It featured experts Doug McDonald of GE-Hitachi, Ross Moore of Oklo, Peter Hastings of Kairos Power, and Marc Nichol of Nuclear Energy Institute. Tom Bergman from NuScale Power moderated the panel discussion.
- The GAIN Regulatory Series was created to build familiarity with the current U.S. regulatory framework for commercial reactors. The objective was to engage the nuclear industry to help identify and address regulatory uncertainties and associated risks in their deployment strategies.
- For more information on this series, including materials from these webinars, or to seek assistance in navigating routes through the regulatory process, visit the [GAIN website](https://www.gain.inl.gov).



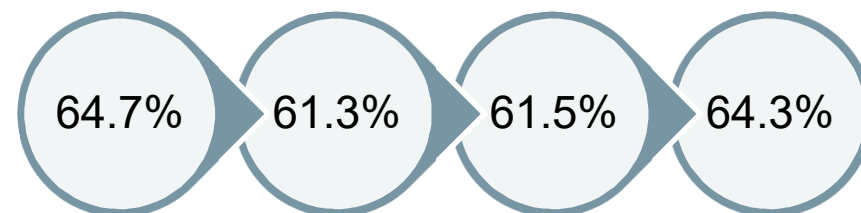
GAIN POC: Jim Kinsey

Regulatory Webinar Series Stats Across 4 Webinars

Attendance Comparison for Webinars 1-4 by Affiliate Type



Average Attendee Engagement Ratios

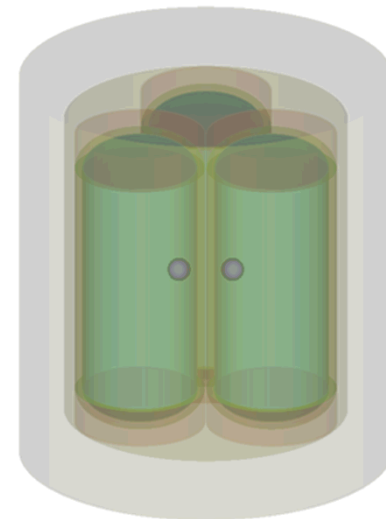
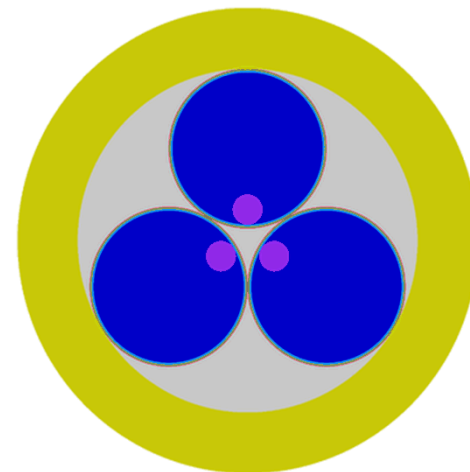


458
Attendees
Representing 119
Affiliations

**GAIN**Gateway for Accelerated
Innovation in Nuclear

GAIN Enables Uranium Hexafluoride Transportation Analysis

- The development of advanced reactor fuel requires High Assay Low-Enriched Uranium (HALEU). One of the challenges with HALEU is transportation, specifically for the uranium hexafluoride (UF_6) in the existing 30B cylinders.
- Through GAIN, in conjunction with the U.S. Nuclear Regulatory Commission and the Nuclear Energy Institute, ORNL expanded the existing criticality safety analysis (increasing the ^{235}U enrichment of the UF_6 from low enrichment ($<5 \text{ wt.}\% \text{ } ^{235}\text{U}$) to low-enriched uranium+ (LEU+) ($10 \text{ wt.}\% > ^{235}\text{U} > 5 \text{ wt.}\%$) and HALEU ($20 \text{ wt.}\% > ^{235}\text{U} > 10 \text{ wt.}\%$).
- The analysis indicates that enrichments up to $10 \text{ wt.}\% \text{ } ^{235}\text{U}$ or slightly higher ($\sim 12 \text{ wt.}\%$) may be feasible in 30B cylinders in small arrays; but use of the 30B cylinder for the entire LEU+ and HALEU enrichment range at industrial scale appears difficult at best.
- Remaining analysis challenges involve the distribution of hydrogenated uranium residues, appropriate credit for the cylinder overpack, and benchmark experiment selection for validation.




3 × 1 array with axially centered hydrogenated uranium residue spheres.

ORNL/TM-2021/2043

GAIN POC: Andrew Worrall

GAIN Social Media – June 2021

 **1,245** Facebook Followers

950 Facebook Reach


Facebook Reach in May: 593

 **2,740** ⁺¹¹ Twitter Followers

13.3K ^{-10.7} Twitter Impressions

Twitter Impressions in May: 20.4K

 **1,011** ⁺⁶² Instagram Followers

 **304** ⁺²⁰ LinkedIn Followers



Top Tweet earned 5,408 impressions
GAIN an understanding of how [@oklo](#),
[@gehnnuclear](#), [@KairosPower](#) &
[@NuScale Power](#) navigated their way to [#nuclear](#)
licensing.

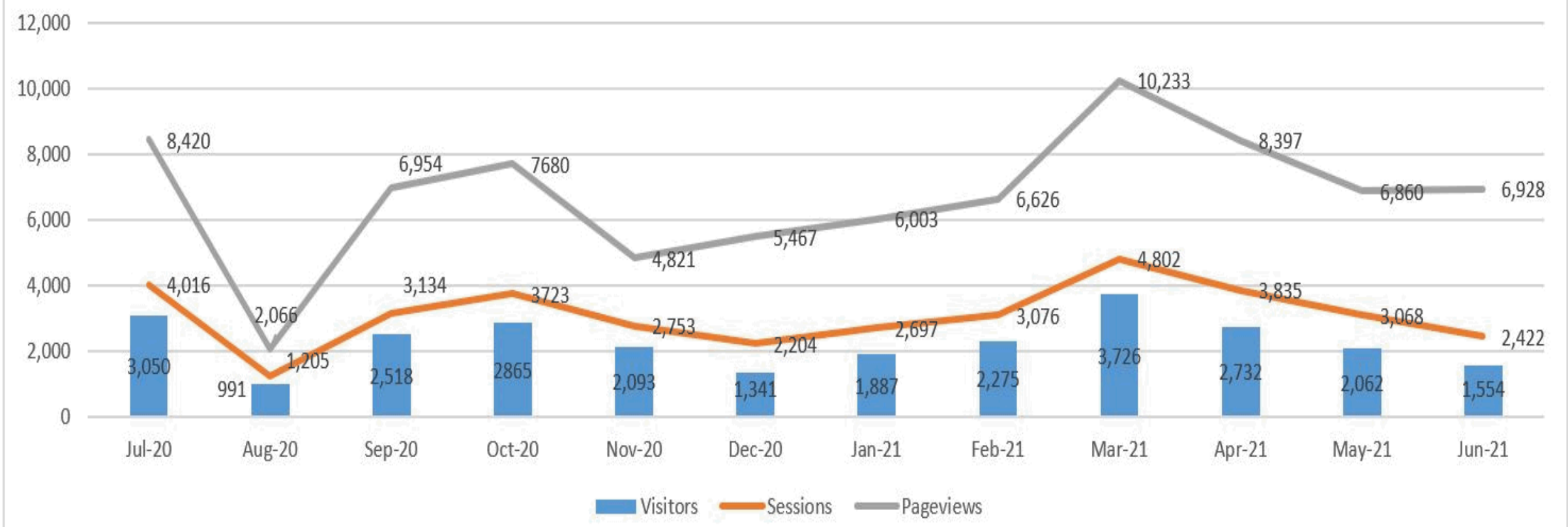


Top mention: 8 engagements; 287 reach
Happening today: learn from nuclear energy experts
about the regulatory process to [#nuclear](#) licensing.
The webinar will begin at noon MST.
Register to join: <https://fal.cn/3fMdm>
[#Road2nuclear](#) [#webinar](#) [#IndustryEngagement](#) [#regulation](#)

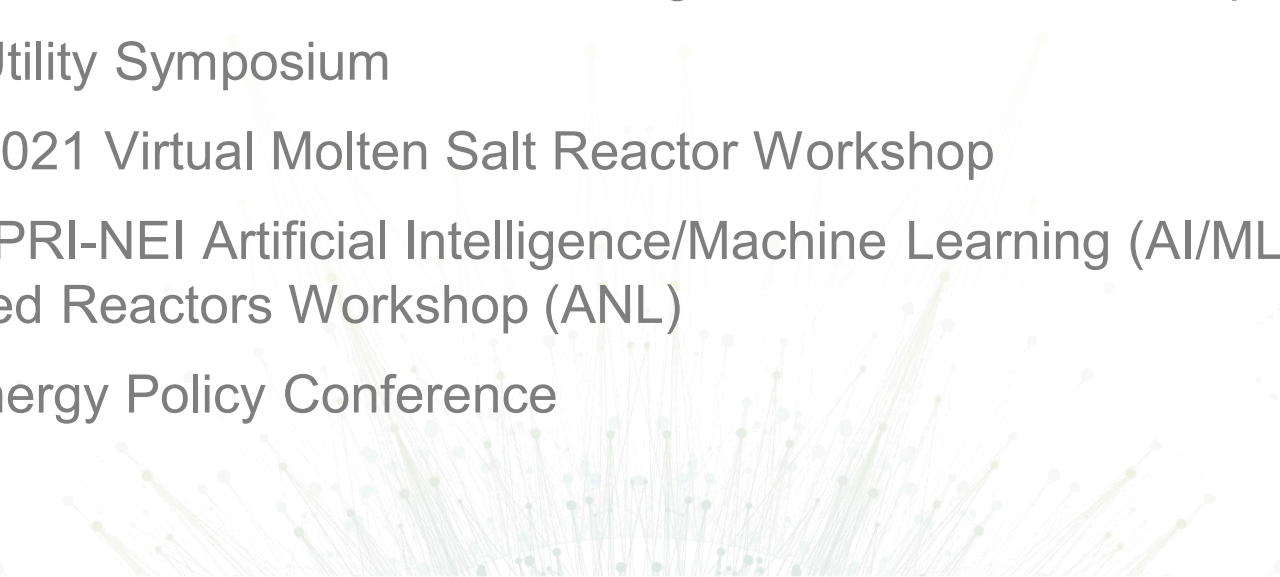
GAIN POC: Donna Kemp Spangler

Website Statistics – June 2021

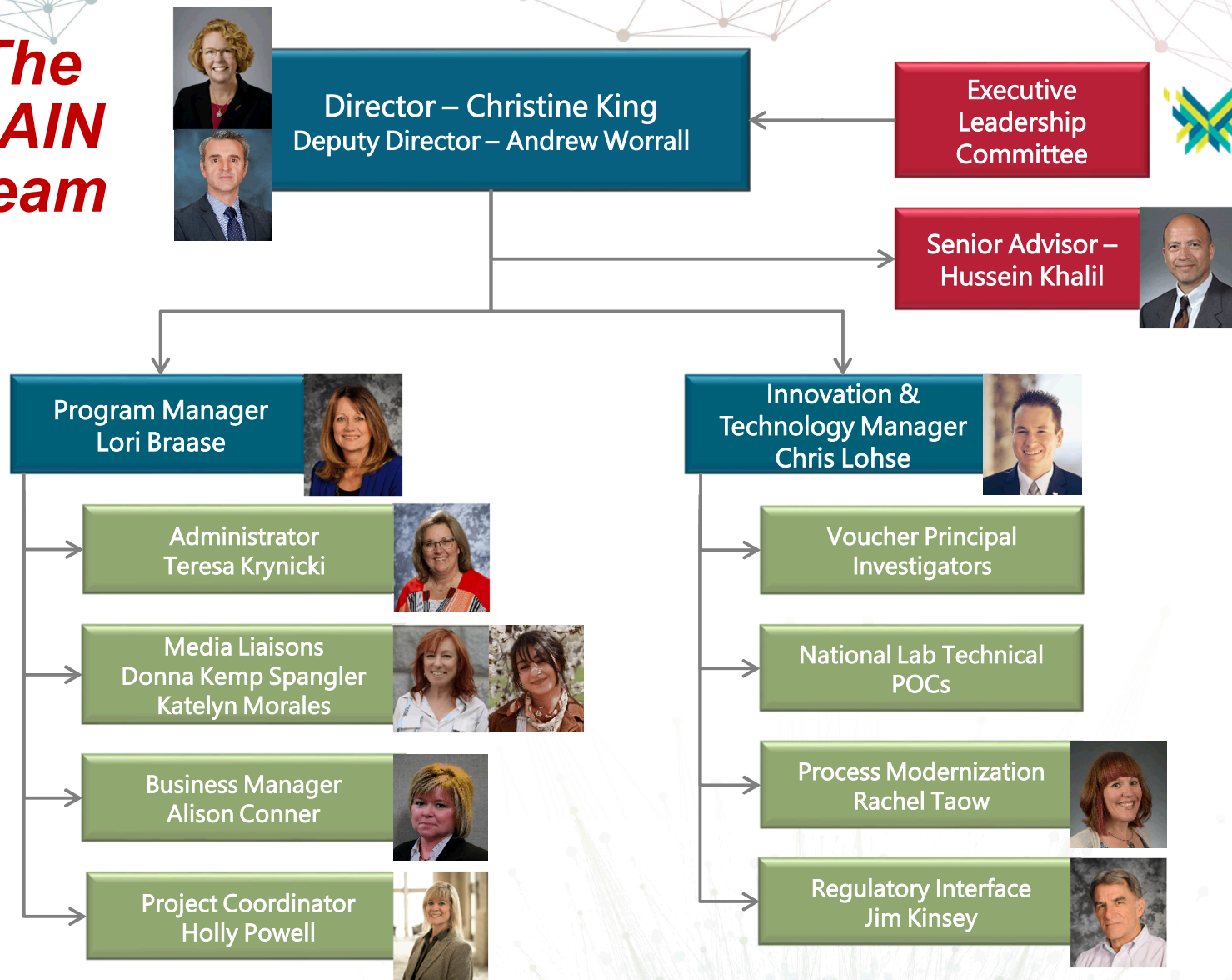
Web Analytics: Visitors/Sessions/Pageviews 12-Month Rolling Total



Upcoming Events

- July 1: National Association of Regulatory Utility Commissioners (NARUC) Nuclear Energy Partnership
 - July 19-30: 12th Annual MeV School
 - July 21: High Temperature Reactor (HTR) Technology Working Group (TWG) Meeting
 - Aug 5: Nuclear Innovation Boot Camp
 - Aug 24-25: GAIN Electric Power Energy Institute (EPRI) Nuclear Energy Institute (NEI) Advanced Methods for Manufacturing Qualification Workshop
 - Sept 22: Public Utility Symposium
 - Oct 12-13: ORNL 2021 Virtual Molten Salt Reactor Workshop
 - Oct 13-14: GAIN-EPRI-NEI Artificial Intelligence/Machine Learning (AI/ML) Technology for Advanced Reactors Workshop (ANL)
 - Oct 14-15: 2021 Energy Policy Conference
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The GAIN Team





GAIN

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Innovation in Nuclear



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@GAINnuclear

gain.inl.gov

<https://www.linkedin.com/groups/13946583/>