

Communicating Science at a Research Laboratory: Policy, Tools and Services

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COMMUNICATING SCIENCE AT A RESEARCH LABORATORY: POLICY, TOOLS AND SERVICES

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Abstract

The Research Library at Los Alamos National Laboratory spearheads open access, data management and sharing, and researcher impact initiatives across the Lab. From dialog in response to the Office of Science & Technology Policy (OSTP) February 2013 Memo, "Increasing Access to the Results of Federally Funded Scientific Research" to committee formation to implementation plans, the Research Library engages researchers and seeks solutions. Communicating science in terms of scholarship, data and impact involves the creation of Lab policy, author tools and new services. Clear workflow and broad education initiatives are critical to successful implementation, as well as strategic partnerships with authors, leadership and external collaborators.

National mandates and policies influence Laboratory practice. Los Alamos policies must reflect the funding requirements of the United States Department of Energy and a range of other funders. Research Library staff performed an external environmental scan of funder requirements and institutional open access policies, and then adapted text for Lab needs. Input from the Legal and Policy offices together with author input influenced final wording. The policy, which also addresses data management and sharing, is now part of a broader procedure document.

New tools and services were created to facilitate policy and workflow. A publicly available institutional repository was launched that both addressed federal mandates and highlighted Los Alamos' institutional vitality. Impact tools and services such as ORCID and Kudos have been adopted, and Research Library staff work with authors to understand impact and select the most relevant discipline-specific options. Data initiatives flow across the Lab, with the work of the Data Working Group and a visit from Purdue University librarians influencing current and future directions.

An overarching goal of Research Library staff is to make it easier for researchers to do the right thing. This goal is reflected in our approach to education, outreach and workflow. This paper discusses strategies, initiatives and the road ahead for communicating science at Los Alamos National Laboratory.

Keywords: open access, data management, impact, communication, policy, scholarly communications

Los Alamos National Laboratory (LANL) is a United States Department of Energy (DOE) research facility whose mission is to solve national security challenges through scientific excellence. The LANL Research Library (RL) supports the Lab's mission and researchers' scholarly lifecycle through collections, tools and services. A range of mandates and laws govern Lab operations. The RL tracks requirements impacting scholarly communications and adopts local policies and workflows. Recent mandates in the United States require agencies receiving more than \$100 million in research and development expenditures to develop plans to make the direct results of federally funded research available to the public (OSTP, 2013). DOE is LANL's primary funder, but researchers also receive funding from a number of other agencies. DOE published its Public Access Plan (DOE, 2014), and addressed both publications and data. DOE additionally committed to the creation of a web-based portal, Public Access Gateway for Energy & Science (PAGES), to serve as a gateway to DOE research (DOE, 2016).

LANL's RL began to address open access after the publication of the OSTP memo in 2013. In 2014 a committee was formed and an open access implementation plan created. The plan included policy development, the creation of a public repository, changes in researcher workflow and outreach to the community. Outreach included an open access road show, which involved educational presentations to research groups across the Lab as well as to Lab leadership. An important consideration in policy development was the green access approach that DOE and other United States government agencies had adopted, as opposed to the gold open access approach of much of Europe. This approach changed the conversation of "open access" to "public access" as the RL and the Lab adopted the terminology of government agencies.

Before an author's research output can leave the Lab for peer review and to meet government requirements, content must be reviewed. Los Alamos has a procedure document, created by the RL, that provides guidance for the review and release of scientific and technical information. This procedure needed to be updated to reflect the new federal mandates and policies. Policy details of several agencies were considered in the creation of LANL's own language, with wording reflecting all requirements. LANL's procedure was updated, and public access and data portions were extracted to the RL's public web site (LANL RL, 2016). In addition to the procedure document, there is the actual review tool that authors use, Review and Approval System for Scientific and Technical Information, RASSTI. RASSTI was internally programmed by RL staff, and is updated to reflect new demands. In addition to a raw paper or data set and its relevant metadata, RASSTI has fields for descriptors and funder information. An ORCID field will be added later in 2016 (<http://orcid.org>).

The requirement to make authors' accepted manuscripts publicly available through DOE and other funding agencies led the RL to consider building its own publicly facing repository. An internal repository had existed for years. New filters, workflows and interfaces were programmed to display open research. A year of work with the existing internal system led to a successful implementation of the public repository, Los Alamos Research Online, or LARO (<http://research-online.lanl.gov/>). The long-term programming direction of LARO will ground the repository in the Hydra environment (<https://projecthydra.org/>). This environment will have the advantage of a broadly supported platform within a strong community.

LARO currently offers a basic and advanced search, with access to accepted manuscripts when available, and links to the publisher version. RL staff members follow publisher policies, confirming release dates for either accepted manuscripts or publisher versions by using SHERPA/RoMEO (<http://www.sherpa.ac.uk/romeo/index.php>). Basic social media sharing tools are present for Facebook, Twitter, Google+ and LinkedIn. The Altmetric doughnut is present for relevant content. See the screenshot below for examples of a publisher link with the accepted manuscript and the Altmetric doughnut.

A publicly facing repository provides the Lab a tool to highlight its institutional vitality and communicate its research. Future developments will include links to data sets and supplementary content. Feeds will be created for groups and researchers, allowing content to automatically populate internal and external web pages for the LANL research community. These features collectively provide incentives, in addition to the requirements, for authors to participate in the system and provide copies of their accepted manuscripts.

Los Alamos Research Online Beta Help | Contact Us
 Los Alamos National Laboratory's public institutional repository

Basic Search | Fielded Search | Special Collections |

Tools

My marked records:
 Export marked records
 Search History: 9

[+] Tools
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Record View

Full record reached through search for: (timestamp:[NOW/DAY-30DAY TO NOW] AND pubDate:[2015 TO *]) AND afv_flag:true [Return to results](#)

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Authors: Baker, D. N. (University of Colorado) ; Henderson, Michael Gerard (LANL) (mghenderson@lanl.gov) ; Friedel, Reinhard Hans Walter (LANL) (rfriedel@lanl.gov) ; Reeves, Geoffrey D. (LANL) (reeves@lanl.gov)
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Dataset: RASSTI
Repository ID: info:lanl-repo/lareport/LA-UR-15-20091

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Figure 1: Repository with publisher version, accepted manuscript and Altmetric doughnut

Moving beyond public access, in 2014 the RL began a Lab-wide discussion on data management, sharing and preservation. The library, taking the institutional lead, gathered stakeholders into a high level group. Members included big science, small science, classified and open research, facilities, the RL, information technology (IT) and other key data constituencies. The collective team became the Data Working Group (DWG), and considered Lab-wide data issues. The DWG was chaired by the RL Director and co-chaired by a Lab scientist and RL data librarian. The first meeting included a brainstorming session that led to the creation of six sub-groups that ultimately led to four active sub-groups: Current State, Requirements, Pilots, and Classified.

The Current State Subgroup (CSS) looked across and beyond the Lab, gathering norms and considering external benchmarking data. Survey questions were created, and then entered into an online tool. This online survey was tested within a research group. Results suggested a general lack of awareness regarding data management as well as multiple perceptions of term definitions. The CSS considered the test results, and decided that a mechanical tool would not work for the diversity of Lab researchers. The work of the CSS has been continued by the RL's own data team. RL staff have received training in interviewing and surveying from a Lab social scientist. A set of broad questions has been created, and a focus group approach to interviewing will take place during the summer and fall of 2016.

The Requirements Subgroup (RS) considered the needs of the researcher, initially creating personas and then mapping these personas to data workflow. This approach was suggested and led by a Lab researcher. When creating personas, the RS brainstormed broad dimensions of stakeholders, contrasting big and small data, U.S. citizens and foreign nationals, permanent

employees and temporary staff (such as guest researchers, students and postdocs), Primary Investigators (PIs) of small and large projects and non-PIs. Public stakeholders were also considered, as well support staff such as librarians and information technology staff. To categorize the personas, each stakeholder was considered as either primary, secondary, tertiary or redundant. The primary personas were the focus of the RS, and services and tools would be targeted toward these stakeholders. The RS would analyze proposed services and tools against secondary personas to ensure that undo work was not being added, but their needs were not the subgroup focus. Tertiary personas had ties to data management and sharing, but their work was minimally impacted. Redundant personas had needs already defined by existing personas. When each persona was considered, the RS decided to have all primary personas be internal Lab categories. To provide gender- and ethnic-neutral names for personas, the World Meteorological Organization's 2012 list of Atlantic tropical storm names was used (<http://geology.com/hurricanes/hurricane-names.shtml>).

For each primary persona, the following areas were defined:

- Organization: Where at the Lab does this group work?
- Clearance: U.S. citizen or foreign national? Cleared to work with classified content?
- Goals: What motivates this group in terms of research and work?
- Worried about: What are the main research and work concerns?
- Problems: What issues slow success?
- Technical data skill: Low, medium, high? Dependent on others?
- Conceptual data/metadata skill: Low, medium, high? Dependent on others?
- Understanding of the rules: Low, medium, high?
- Attitude toward sharing: Strongly for to strongly against.

By considering each area for each persona, the RS was able to gain a sense of the needs of various researchers. A member of the RL's data team created a visual data management workflow for each persona, with their activities indicated by heat circles on the workflow diagram. The visual data management workflow was based on the visual scholarly communication workflow created by another RL staff member.

The goal of the Pilots Subgroup (PS) was to understand the work of the Current State and Requirements subgroups and to attempt small, scalable service and tool solutions. The Lab has a robust research sandbox known as Lab Directed Research & Development (LDRD). LDRD research projects often lead to major new research directions for Los Alamos. LDRD teams were targeted by the PS for service and tool development. An initial invitation for interviews was sent to PIs of current LDRD projects. RL Director Magnoni met with three of these teams, gaining an understanding of each team's research as well as their data-related processes and work. The interviews were valuable in understanding the broad range of needs within even a small sample. For example, one team did field research in an African clinic where electricity was not always reliable. At the end of each day, data that had been recorded by hand was entered into a computer. The use of manual recording was due to the unreliable electricity. However, this led to handwriting and consistency issues. This team wondered if the PS could help with a reliable data-collection tool that was not electricity-dependent. This specific request was clearly beyond the scope of the PS. The RL's data team is continuing these interviews, and the focus is to define the set of services and tools most needed by teams that the RL can build, implement and support. Data Management Plans (DMPs) are now required by most funding agencies, and the RL has connected to the California Digital Library's Data Management Plan Tool (DMPTool) (<https://dmptool.org/>). This is an example of a tool shared with researchers, and the companion service is to have librarians guide researchers through the DMP process. Other services and tools that will be explored through interviews and library capability reviews are data storage, sync and share technology for collaboration such as Dropbox or Box, software and versioning collaboration tools such as GitHub, the Open Science Framework (<https://osf.io/>), and a range of online and in-person educational opportunities.

The final DWG subgroup, classified, was formed to replicate the goals of each of the other three subgroups, with a focus on the classified research of the Lab. The work of all of these subgroups began in 2015. As their work continued, the decision was made to make the main DWG an advisory group. The high level expertise of group members augmented the task-oriented work of the subgroups. A next step was to gain an external perspective. In November 2015 LANL invited Purdue University data experts, Paul Bracke and Michael Witt, to share their experiences, listen to DWG leader report-outs, and engage in conversations with researchers, librarians, and leadership. The result was a day and a half of talks, the creation of a full report and the drafting of potential next steps.

Bracke and Witt shared Purdue's data management evolution, development of core services as well as PURR, its institutional data repository (<https://purr.purdue.edu/>). Marketing and outreach were critical success factors, as well as organizational governance. Unlike the RS, Purdue mapped data by discipline rather than roles. This additional dimension could enrich LANL's current personas. After engaging with subgroup leads, Bracke and Witt suggested that LANL clearly scope its data needs and data definitions. The importance of institution-wide support and a broad governance structure was stressed in the Lab leadership session. Surveying the entire Lab research community is too complex a task, and interviewers must begin with targeted groups and work inward.

Data management at the Lab has taken several new directions since the Purdue visit. The DWG has been retired as a formal body, with members agreeing to be on call to share expertise. Within the RL, data management had been part of the Public Access Team. A focused group was brought together to form the RL's Data Team, and initiatives, referenced above, have already begun. The work of the Requirements Subgroup continues with increased participation from the RL. Surveying and piloting, which had been core to the Current State and Pilots Subgroups, has been taken over by the RL Data Team. The CSS and PS have become dormant, with former members on hand as advisors. The Classified Subgroup will continue its work, though major activities will pick up once again later in 2016. A LANL Executive Data Committee has been formed. This is a small group of Lab leaders that includes the RL Director (chair), Chief Information Officer, head of Technology Transfer, head of the Lab's Theoretical Division, liaison to the DOE's Office of Science, and the head of LDRD. Initial conversations have worked toward defining objectives, identifying a champion, and mapping a course of action. A core group of prior DWG members will become a Lab-wide steering committee that can coordinate Lab-wide data activities.

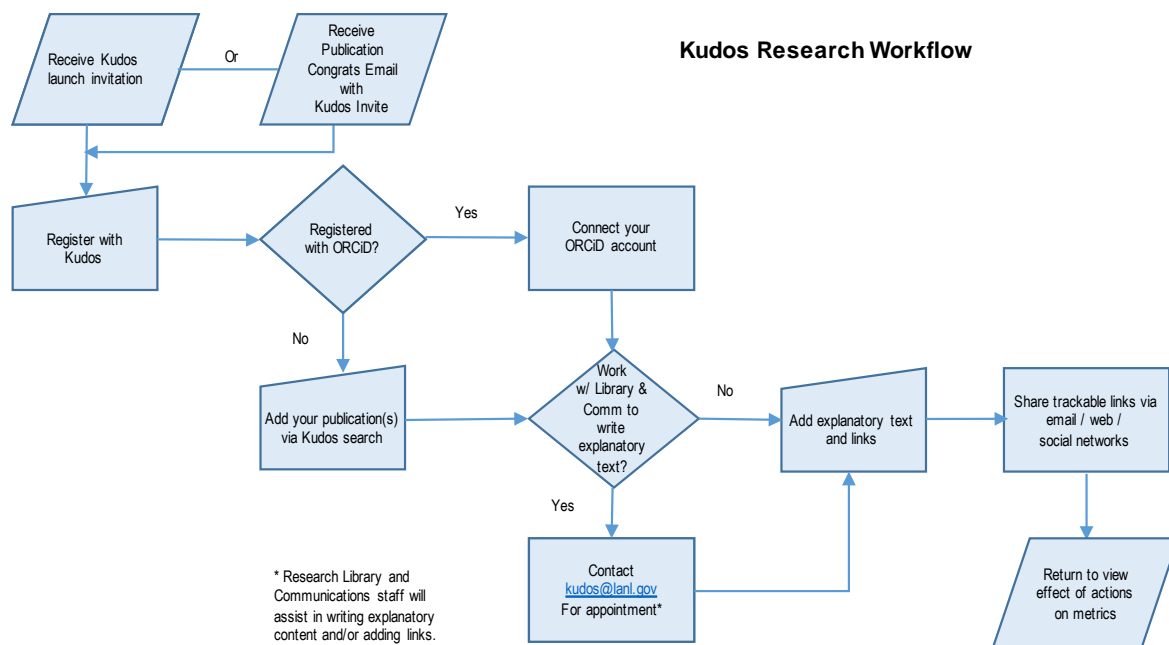
Turning from data management, understanding the impact of Lab research is an important LANL objective. In addition to primary and secondary content tools, the RL provides services through citation support, ORCID implementation, and an emerging institutional service, Kudos (<http://www.growdudos.com>). Library staff members work across the Lab to partner on impact initiatives, from individual scientific productivity and capability reviews to DOE, national, and international measures.

For citation support, RL staff members use traditional tools such as Thomson's Web of Science (<https://webofknowledge.com>) and Elsevier's Scopus (<http://www.scopus.com/>). More recently the RL has explored the use of altmetrics, and has worked with Altmetric on social media and other emerging impact options (<http://www.altmetric.com>). The RL joined ORCID to have the ability to provide researcher identification (ID) services directly to our authors. RL staff members created an internal landing page for ORCID. Authors who want to create an ORCID can come to the page, enter their employee ID number, and have their basic biographical information as well as six years of LANL citation information automatically upload. Authors who have already created an ORCID can use the page to register at the Lab and confirm LANL content. The RL's approach to ORCID is an opt-in approach. No IDs will be created without direct action from an author. Authors may elect to allow RL staff to update and refresh content.

A relatively new impact service is Kudos. The goal of Kudos is to grow research impact through making content understandable and accessible across disciplines and to the public. This goal is achieved in a few basic steps:

1. Provide a short, relevant title to your paper. Explain your research in clear language, as well as why it's important.
2. Add links to additional resources such as news clips, tweets, and supplementary information.
3. Share your work through social media channels.

Kudos provides author and institutional dashboards to measure the impact of this process. Specific elements such as downloads and citations are tracked individually and are illustrated within both dashboards. At LANL, a key challenge to a successful Kudos launch is the creation of the text that explained research. This not only represents additional time and effort, but also the added ability to translate research from an expert level to a general level. Recognizing this challenge, the RL has partnered with the Lab's Communications department to offer writing consultation services. The Kudos launch is still in its Beta phase, with the post-doc community and targeted researchers representing early adopters. A diagram was created to illustrate the Kudos workflow. See below for details.



Education and outreach initiatives are underway to support the full scholarly communications lifecycle. A public access education dashboard is in place. Invitations for research group presentations have been sent, and groups may choose topics from the dashboard to create a customized presentation. Topics include:

- RASSTI and Accepted Manuscripts
- Public Access
- Copyright
- Impact

- Data
- Library Tools and Features
- Host's choice.

Other outreach initiatives include brown bag lunches, learning guides, consultations and video tutorials. The RL publishes updates in the Lab newsletter and highlights current initiatives on the RL home page. Additional outreach is critical for RL success in communicating with the LANL community, and new channels will continue to be explored.

The RL could not be successful without investment in the highest quality staff and their continued development. Conference attendance and professional memberships are supported, and webinars are frequently offered on site to the full staff. A competencies approach to assessment and development is underway. A strategic planning process that includes all staff as well as customers and stakeholders is also underway. The competency tool and strategic plan will provide a firm foundation for future RL directions.

An over-arching goal of the RL is to make it easier for the researcher to do the right thing. Amidst multiple requirements, systems and practices, how can the RL make the scholarly communications lifecycle as transparent as possible? What rewards can we create to build the research carrot rather than wield the requirements stick? Currently the tools are useful, and satisfy requirements. LARO and impact services represent the RL's chief carrots. The researcher must still devote significant portions of time outside actual research and paper production to navigate the scholarly lifecycle. Looking ahead, the RL will work with Lab groups, the research library community, and industry partners to improve tools and processes. Can the lifecycle become transparent? Can information be scraped, processed and reported as the natural research process occurs? Will changes in publishing business models radically change processes as well as library budget allocations? Innovation, strengthened partnerships and investment in staff will be cornerstones of the road ahead as the RL continues to strengthen scientific communication at the Lab.

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