

Electronic Research Notebooks

Paper lab notebooks have been essentially unchanged for centuries, but as data gathering is increasingly digital and problems of reproducibility and retracted publications emerge, more researchers are switching to electronic lab notebooks (ELN),¹ also known as electronic research notebooks (ERN). While it has lab in its name, LabArchives is flexible enough for many uses across research disciplines.

LabArchives is an ERN produced by Elsevier and provided by Jefferson at no additional charge to all its staff, students and faculty. Benefits include:²

- Support research staff productivity and efficiency.
- Enable 24/7 real-time feedback & collaboration.
- Automate data collection.
- Manage team progress remotely to provide timely feedback and catch mistakes earlier.
- Support funding agencies data management plan requirements.
- Securely protect labs' intellectual property.

Classroom Edition

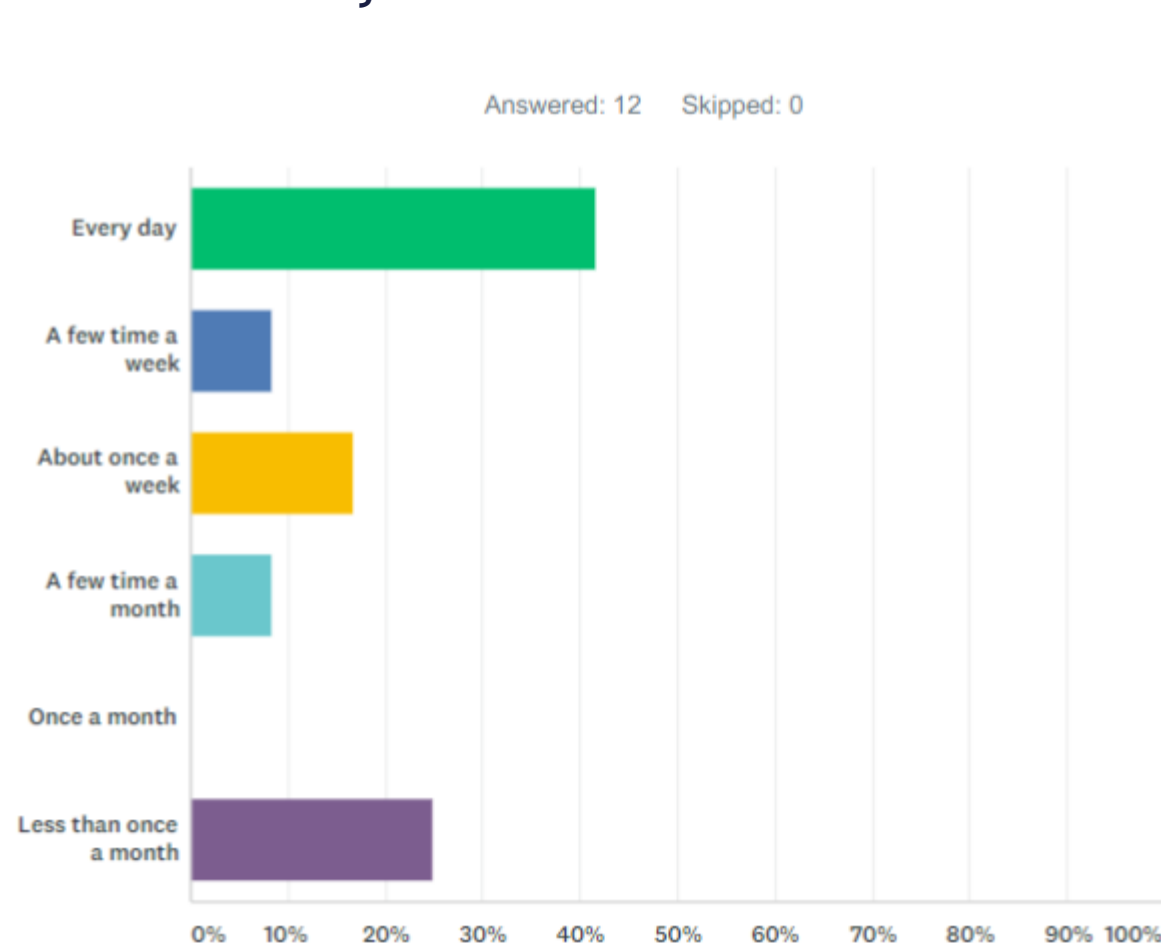
The classroom edition integrates course content, lab manuals and student notebooks in one place.

- Utilize Learning Management System (LMS) enrollment and grading.
- Facilitate 24/7 instructor, TA and student interaction.
- Enable individual or group work.
- Log all student course activities.

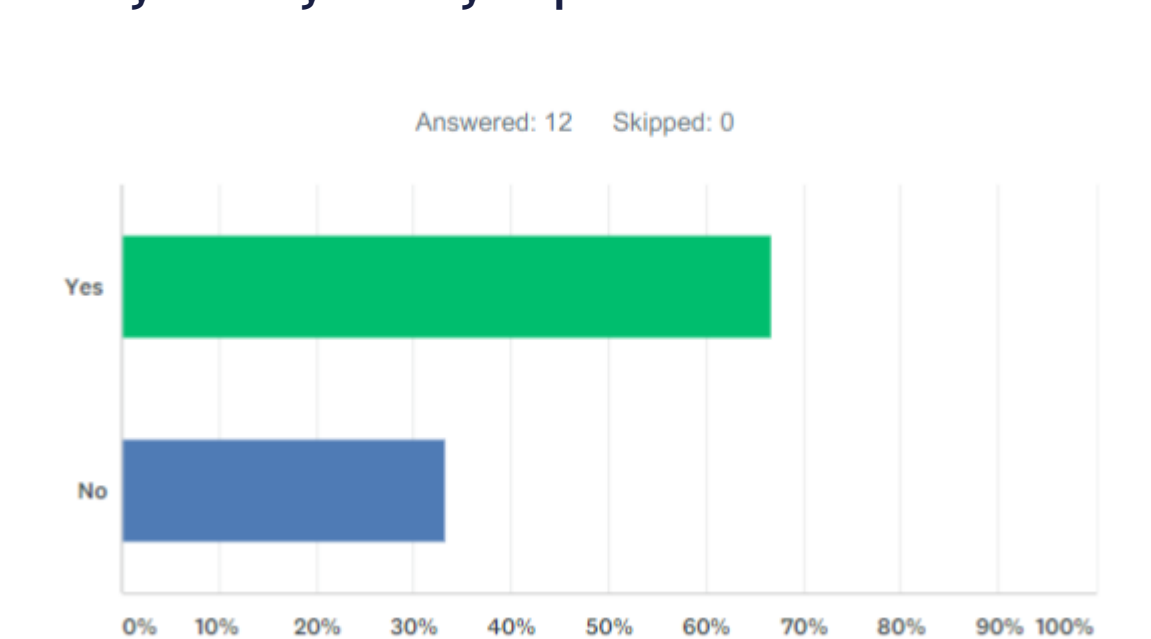
Beta Tester Survey

We surveyed the 60 beta testers after four months. Twelve completed the survey, of which 8 (66%) made entries about once a week or more. Eight (66%) responded that LabArchives helped to plan and organize day-to-day experiments and results. Comments showed that communicating expectations and policy is important in transitioning to an ERN: "Not sure [we] had to record daily notes in LabArchives, therefore still a separate lab notebook. Also not sure when paper lab notebook will phase out." Researchers will need to consider what technical upgrades would be required to transition: "Lab equipment is not internet connected." Others addressed changing habits: "Still learning to use it-no obstacles in particular."

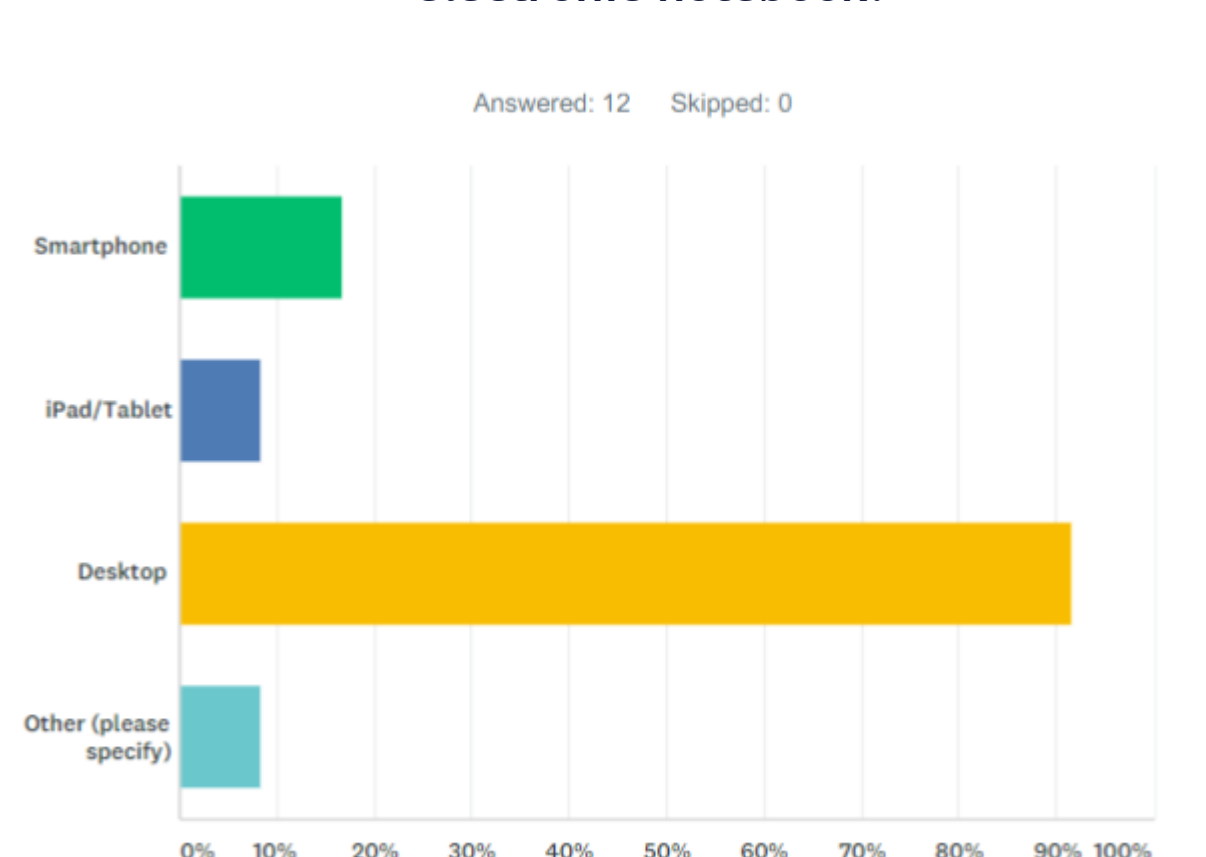
How often do you make entries into LabArchives?



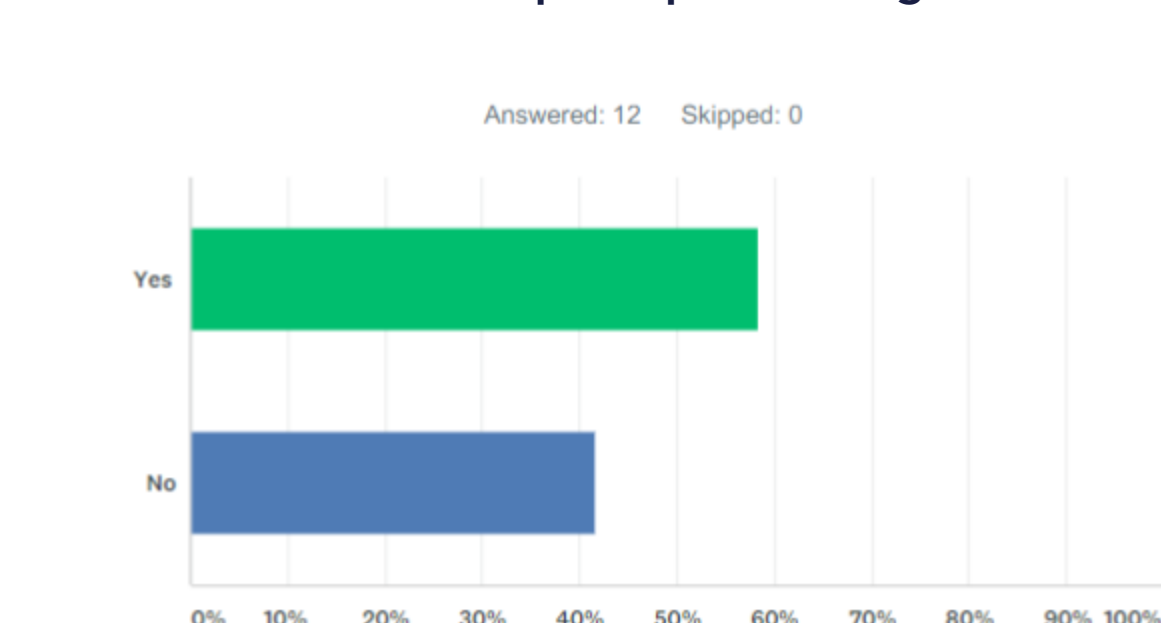
Has LabArchives helped you to plan and organize your day-to-day experiments and results?



What are some ways you interact with your electronic notebook?

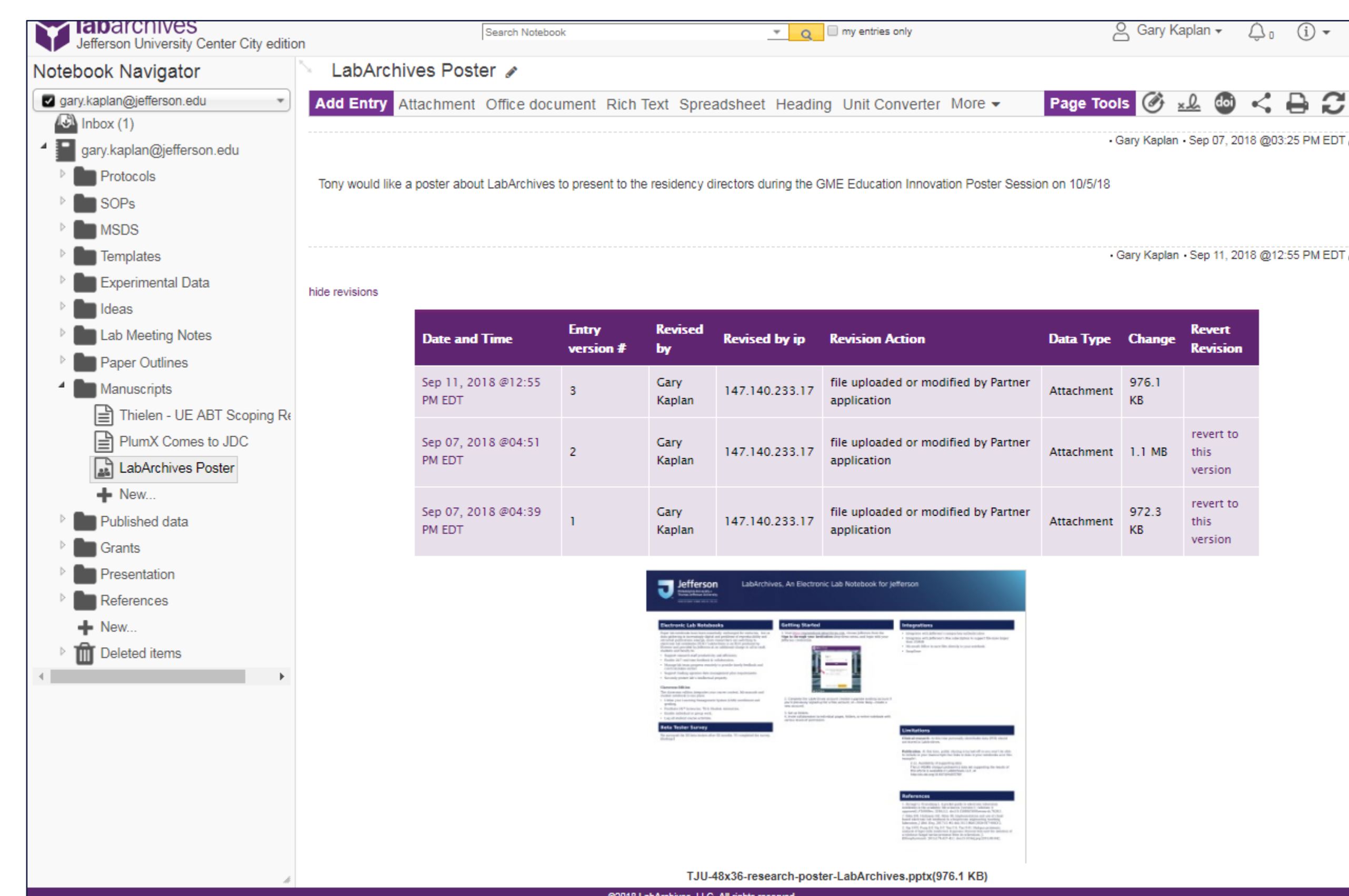
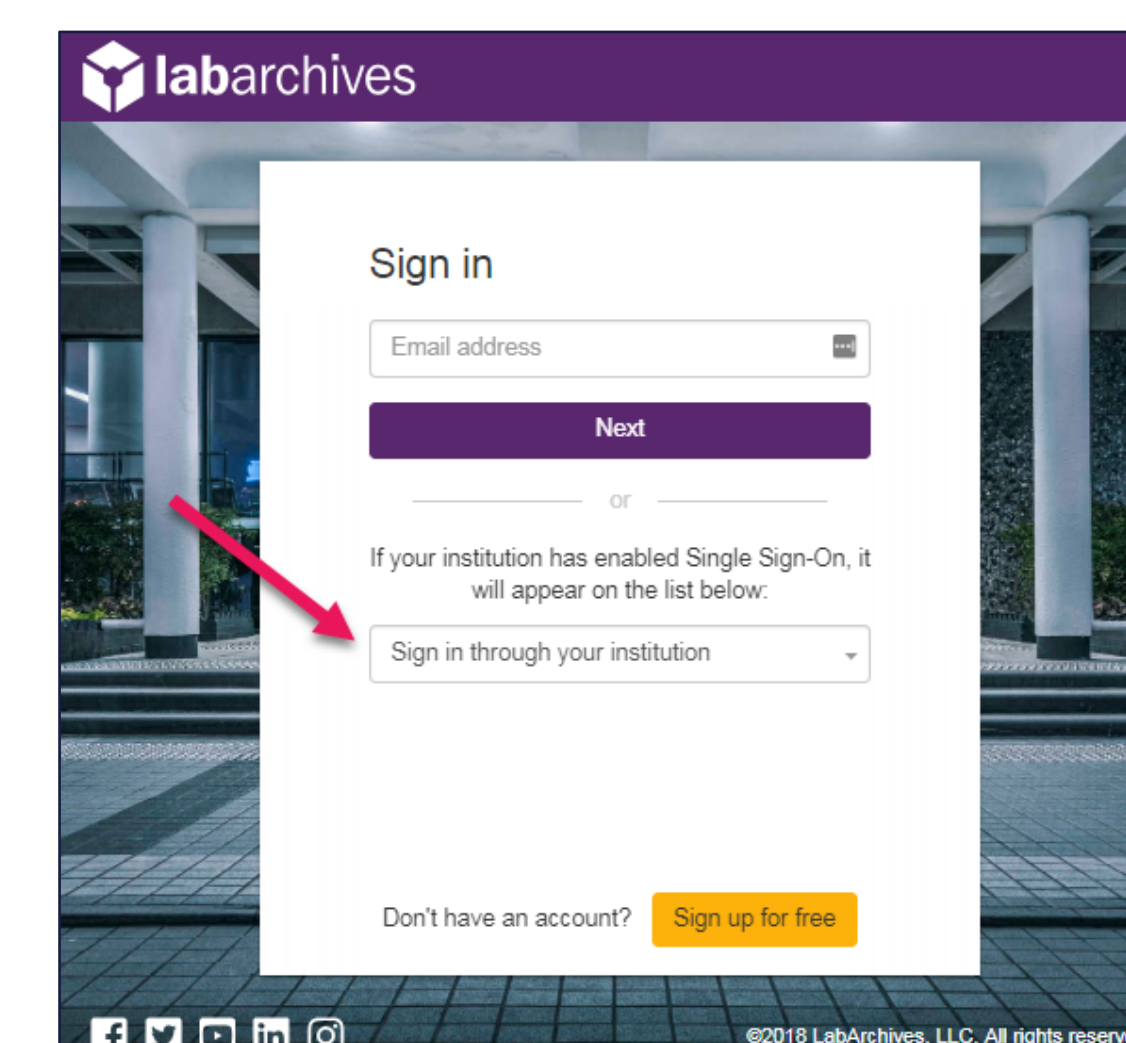


Have you shared data with others members of the lab and/or the principal investigator?



Getting Started

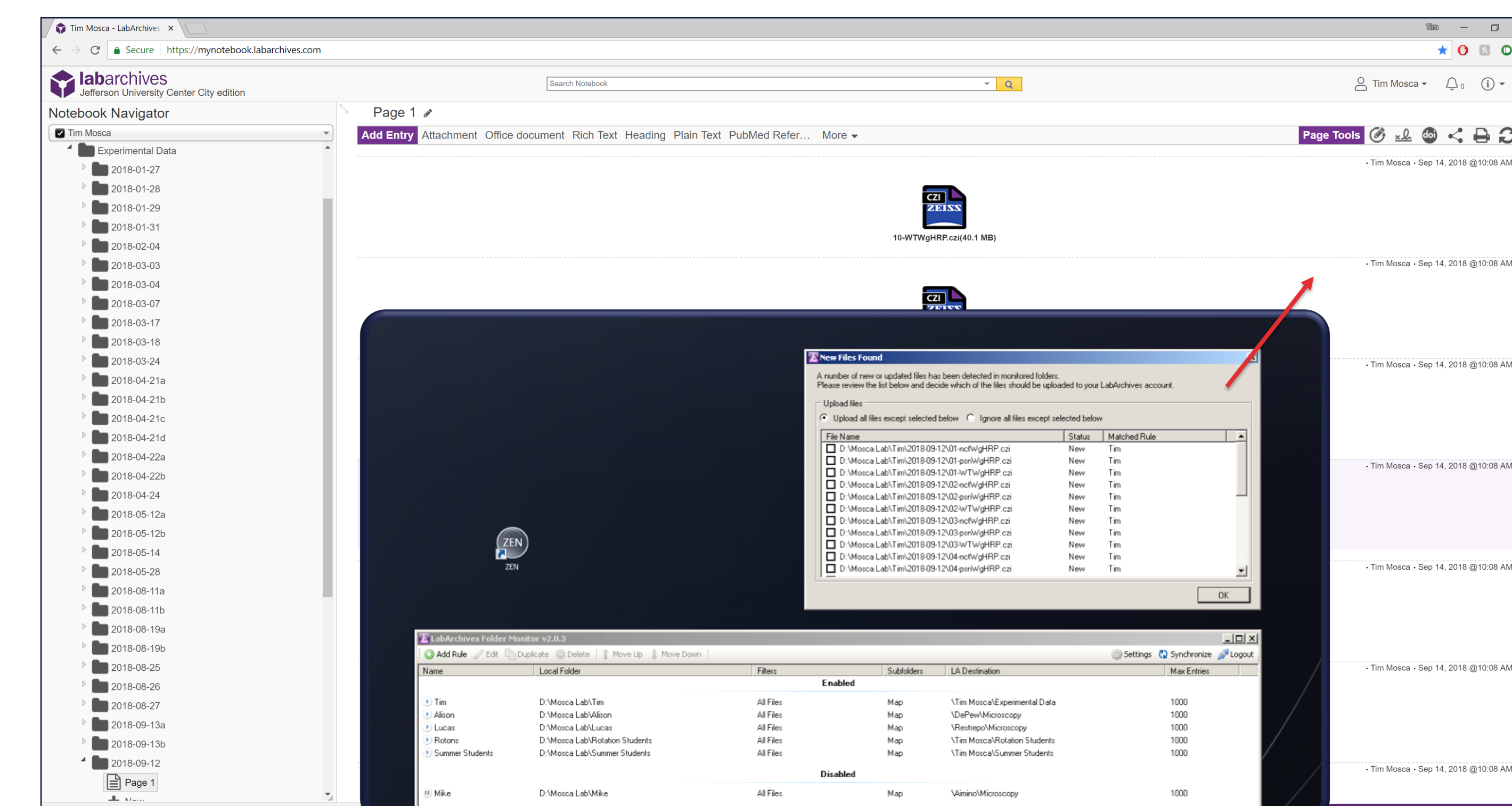
1. Visit <https://mynotebook.labarchives.com>, choose Jefferson from the **Sign in through your institution** drop-down menu, and login with your Jefferson credentials.
2. Complete the LabArchives account creation (upgrade existing account if you'd previously signed up for a free account, or—more likely—create a new account).
3. Set up folders and tagging conventions. Get input and consensus from group members.
4. Invite collaborators to individual pages, folders, or entire notebook with various levels of permission. The PI should own or have access to all notebooks.
5. Add content through the web interface, mobile app or other software integrations.
6. Leaving Jefferson? Save a copy of your notebook and transfer ownership of the original to your PI, department head or Jefferson's compliance officer.
7. For more information, consultations and upcoming training visit <https://www.jefferson.edu/university/research/resources/notebook.html>



This shows the LabArchives page for this poster's development including timestamped entries about the project and revisions to the PowerPoint file saved directly using the Microsoft Office plugin.

Integrations

- Integrates with Jefferson's Campus Key for authentication and Jefferson's Box subscription to support individual file sizes larger than 250MB up to 15GB.
- Partner applications with built-in integrations include SnapGene, FlowJo, GraphPad Prism, Vernier Pro and Typeset.
- Install the Microsoft Office plugin to open files from and save files directly to your notebook.
- Install the Folder Monitor for Mac or PC to save files directly from your computer to notebook. In this screenshot, it's running on the microscope's computer. No more flash drives!



Limitations

Clinical research: At this time protected health information (PHI) should not be stored in LabArchives.

Publication: At this time public sharing is turned off so you won't be able to include in your manuscripts live links to data in your notebooks as in this example:⁴

2.11. Availability of supporting data

The LC-MS/MS shotgun proteomics data set supporting the results of this article is available in LabArchives, LLC, at <http://dx.doi.org/10.6070/H4SF2T6F>.

Compliance

LabArchives is compliant with: Federal funding agency data management policy; Amazon Web Services (AWS); FDA - 21 CFR Part 11; HIPAA (Health Insurance Portability and Accountability Act); FERPA (Family Educational Rights and Privacy Act); Section 508 of the American Rehabilitation Act; the Americans With Disabilities Act; Level A and AA of the WAI Web Content Accessibility Guidelines 2.0.; NIST 800-171; and Shibboleth single sign-on integration.³

References

1. Dirnagl U, Przesdzin I. A pocket guide to electronic laboratory notebooks in the academic life sciences. [version 1; referees: 4 approved]. *FoodRes*. 2016;5:2. doi:10.12688/fooresearch.7628.1.
2. LabArchives Professional Edition [Flyer]. Carlsbad, CA: LabArchives, LLC; 2015.
3. Clark H. LabArchives is Compliant with.... *LabArchives Knowledgebase* 2018. Available at: <https://labarchives.kayako.com/Knowledgebase/Article/View/346/277/103-is-labarchives-compliant-with>. Accessed October 1, 2018.
4. Yap H-YY, Fung S-Y, Ng S-T, Tan C-S, Tan N-H. Shotgun proteomic analysis of tiger milk mushroom (*Lignosus rhinocerotis*) and the isolation of a cytotoxic fungal serine protease from its sclerotium. *J. Ethnopharmacol*. 2015;174:437-451. doi:10.1016/j.jep.2015.08.042.