



# Code Practices People



Philadelphia, PA · October 6-8, 2025



Find full program  
details on the  
conference website

Wi-Fi (Mon-Wed):  
US-RSE 2025  
Unicorn25



# Welcome!

USRSE 2025 is the third annual US research software engineering conference hosted by the US Research Software Engineer Association (US-RSE). We're so glad you are able to join us in Philadelphia to celebrate and learn about the *Code, Practices, and People* that make research software happen.

This year has challenged our community in many ways, but this hasn't changed the need for quality research software and people who know how to create it. This conference is an opportunity to continue to strengthen our community and the quality of research software by learning new skills, building and renewing relationships, and identifying strategies to improve your software development practices.

We're excited about the program, and we hope you find it just as difficult as we do to pick between the sessions offered. With half of the attendees presenting their work over the three days through papers, notebooks, talks, workshops, birds of a feather sessions, posters, and microtalks spanning a wide range of domains, programming languages, practices, and use cases, we trust that everyone will have a chance to connect with someone who shares their interests.

US-RSE was founded by, and continues to be run by, volunteers. This conference is no different, and it would not be possible without the hard work of dozens of people. As you encounter the conference planning committee members, reviewers, conference volunteers, and US-RSE Steering Committee members, please thank them for their time and efforts. If you're interested in getting more involved with US-RSE, please reach out to the working group chairs or Steering Committee members, all of whom would be happy to help you find opportunities to contribute your talents and experience.

The conference also receives critical support from many sponsors. It is immensely encouraging to see so many organizations recognizing the importance of research software and research software engineers by contributing to the advancement of our community. Please take a moment to talk to the representatives of sponsoring organizations in attendance, many of whom will have tables in the foyer outside the main ballroom. They genuinely want to hear about your work and how their products and services can support what you're doing.

We hope you meet someone new, learn something you can apply to your work, and have fun here in Philly. And we hope that the conference boosts your energy to continue your work and further the research software engineering community for many years to come.

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Curtis Hillegas and Christina Maimone  
General Chairs, USRSE'25

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All conference participants are expected to abide by the Code of Conduct at all times before, during, and after the conference. This includes evening events and continued interactions after the conference. Please report problems or concerns to [coc@us-rse.org](mailto:coc@us-rse.org). <https://us-rse.org/usrse25/about/code-of-conduct/>

Please see the conference website at <https://us-rse.org/usrse25> for full program details and conference policies.

# Schedule Overview

Full session descriptions and presenter/author names are available in the online program.

## Sunday, October 5<sup>th</sup>

6pm–7pm	<b>Welcome Reception, Ballroom Foyer</b> Sponsored in part by Omnidbond ProjectEureka™
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## Monday, October 6<sup>th</sup>

7:30am–8:30am	<b>Breakfast, Hamilton</b>
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8:30am–10am	<b>Plenary Session, Ballroom ABCDE</b>
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### Welcome

**Keynote: Dr. Reed Maxwell**, Accelerating Continental-Scale Groundwater Simulation with a Fusion of Machine Learning, Integrated Hydrologic Models and Community Platforms

10am–10:30am	<b>Break</b>
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10:30am–12pm	<b>RSEs Across Domains, Bromley/Claypoole</b>
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Panel session: Delve into the nuances in research software engineers' experiences across industry, academia, and laboratories, focusing on how each environment shapes funding, benefits, daily work, and career trajectories.

<b>Learning to Talk with Your Users: User Experience Research for RSEs, Ballroom AB</b>
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Workshop: Learn practical skills for user research to uncover unmet needs, design more intuitive tools, and decrease support needs.

<b>Improving Scientific Code, Ballroom C</b>
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- Developing a Machine Learning-Augmented Solver for the Hydrologic Model ParFlow
- SPEL - Software Package for E3SM Land Model: Code Understanding and Functional Unit Testing
- LAMMPS: A Case Study for Applying Modern Software Engineering to an Established Research Software Package
- Idiomatic Correctness-Checking via Julienne in Fortran 2023

<b>Human and Social Data, Ballroom DE</b>
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- surveydown: An Open-Source, Markdown-Based Platform for Programmable and Reproducible Surveys
- Producing High-fidelity Synthetic Population Ensembles at Scale
- SyncFlow: A Scalable Platform for Multimodal Learning Analytics
- Undate: computing with uncertain and partially-known dates

12pm–1:30pm	<b>Lunch, Hamilton</b>
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**Mentorship Lunch** (by invitation): Please meet in Bromley/Claypoole; you will then eat lunch at an assigned, reserved table in the Hamilton room.

*Additional seating is available for all in Ballroom AB if needed*

## Monday, October 6<sup>th</sup>, continued

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1:30pm–3pm	<b>Better Scientific Software Fellowship Community, Bromley/Claypoole</b> Birds of a Feather: Connect with those in the Better Scientific Software (BSSw) community and learn about the BSSw Fellowship program; open to all.
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### **People and Networks, Ballroom AB**

- The True Gravity of Research Software
  - Understanding Research Software Engineer (RSE) Roles and Recruiting through the US-RSE Job Board
  - The DataSquad Experiment: Some Lessons for Building RSE Capacity
  - Accessing your networks: Adapting interpersonal connections for robust software development and sustainability
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### **Agile Foundations for RSEs: Building an AI Assistant with Agile, Ballroom C**

Workshop: Learn how the core principles and values of Agile can apply to research software projects; explore common frameworks such as Scrum and Kanban.

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### **AI Workflows with ACCESS Pegasus, Ballroom DE**

Workshop: Learn to use Pegasus, a leading scientific workflow management system, that is integrated into the national ACCESS computing resources.

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3pm–3:15pm	<b>Break</b>
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3:15pm–4:45pm	<b>Sustainable Models of RSE Support: The Prospects of Centralization in Institutional Research, Bromley/Claypoole</b>
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Panel/Discussion: Explore a model of centralized RSE support for the social sciences, including project management workflows and success stories.

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### **AI Tools, Ballroom AB**

- AquiLLM: a RAG Tool for Capturing Tacit Knowledge in Research Groups
  - Knowledge Graphs as Infrastructure: Enabling Generative AI Integration Across Research Software
  - Beyond Copilot: RSE Team Lessons Learned in AI-First Development
  - LLMaven: Large Language Model based Agentic Verification and Exploration of Natural Inquiry
  - Multilingual Research Software Translation using AI: Breaking the Communication Barriers
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### **Introduction to Multi-Animal Pose Tracking with SLEAP, Ballroom C**

Workshop: Learn how to use SLEAP (Social LEAP Estimates Animal Poses), an open-source deep learning framework for pose estimation and tracking; covers the full workflow.

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### **Publishing and Finding Research Software, Ballroom DE**

- Notebooks as the Published Paper, How Ready are Scientific Communities?
  - Making Research Software Findable, Accessible, Interoperable, Reusable (FAIR) with Codefair
  - Presenting the Actionable Guidelines for FAIR Research Software Task Force
  - An Empirical Survey of GitHub Repositories at U.S. R2 and Doctoral/Professional Universities
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4:45pm–5:30pm	<b>Break</b>
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**Poster Setup, Hamilton**

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5:30pm–7pm	<b>Poster Session and Reception, Hamilton</b>
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Tuesday, October 7<sup>th</sup>

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7:30am–8:30am **Breakfast**, Ballroom

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8:30am–10am **Plenary Session**, Ballroom ABCDE

**Keynote: Dr. Myra Cohen**, Building Confidence in What We Build: Correctness in Research Software in the Age of AI

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10am–10:30am **Break**

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10:30am–12pm **The Journal of Open Source Software: Live demonstration and discussion**,  
*Bromley/Claypoole*

Learn about publishing research software and the JOSS peer review and publication process; talk with JOSS editors and hear about trends in JOSS publishing.

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**Biology and Health Applications**, Ballroom AB

- A Reproducible and Scalable Pipeline for Processing Admin. Health Claims Data
  - The Hubverse: Streamlining Collaborative Infectious Disease Modeling for Public Health Impact
  - ToolsyBio: A retrieval-augmented generation system for navigating the bioinformatics software landscape
  - Open Free Energy: An Open Source Ecosystem for Calculating Free Energies
  - Combining TIFF, HDF5, and Zarr into a Single Image File Format
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**Resilient Data Futures - How Do We Save, Share, and Fund Critical Data Stores Outside Traditional Systems?**, Ballroom C

Workshop: Work with other participants to identify solutions for storing and sustaining large datasets, identifying the barriers to use, and supporting sustainable data infrastructure.

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**Scientific Data Management**, Ballroom DE

- Heterogeneous Distributed Data Management in Academia
  - Increasing the Accessibility of Quarto-Based NOAA Fisheries Reports
  - Beyond Specialization: Navigating the Post-Hadoop Database World
  - dbverse: scalable scientific analytics with embedded analytical databases
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12pm-1:30pm **Lunch**, Hamilton

**US-RSE Group Fair**, Ballroom AB: Bring your lunch and learn about getting involved with US-RSE working groups and affinity groups.

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1:30pm–3pm **AI in Practice: Managing Research Projects Incorporating AI**, *Bromley/Claypoole*

Hear from fellow RSEs about their experiences integrating AI into recent projects and share your perspectives on how AI can be used responsibly and effectively in RSE work.

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**Hands-on scalable cloud automation and platform services for AI using CyVerse**,  
Ballroom AB

This hands-on workshop provides RSEs with the skills to build and support your own bespoke, secure AI/ML infrastructure using the powerful resources of CyVerse.

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**Software Engineering Practices**, Ballroom CDE

- Efficient Documentation: Best Practices, Tools, and Opportunities
  - Three Foundational Ideas That Shaped Software Engineering
  - Technical Debt and Code Migration
  - From Hot Dogs to Human-Centered Design: Empathy in Software Development
  - User-facing tutorials as code: reproducible and reliable tutorials with CI/CD
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3pm–3:15pm **Break**

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## Tuesday, October 7<sup>th</sup>, continued

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3:15pm–4:45pm	<b>Accelerating Research: Strategies from the Field, Bromley/Claypoole</b> Panel/Discussion: Explore how RSE and computational tools are being utilized to enhance research capacity and impact across various institutions and disciplines.
	<b>From First Commit to First Offer: What I Wish I'd Known, Ballroom AB</b> Panel: RSEs share the insights they wish they'd had on day one. Designed with students and early-career RSEs in mind, the session is open to all.
	<b>Real-world Impacts of Generative AI in the Research Software Engineering and Data Science Workplace, Ballroom CDE</b> Discussion: Identify critical areas where we engage with AI and what it means for our profession; help inform the development of guidance and resources for the community.
4:45pm–6:30pm	<b>Break</b>
6:30pm–9:30pm	<b>Food, Drinks, and DJ at the Moshulu, 401 S. Columbus Blvd.</b> Sponsored by Dell Technologies and SHI Please make your own way to the Moshulu; it's a half-mile walk from the conference hotel. Please bring your conference badge. If this walk is inaccessible for you, please let the conference registration desk know before 3pm and transportation will be arranged.

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## Wednesday, October 8<sup>th</sup>

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7:30am–8:30am	<b>Breakfast, Hamilton</b>
8:30am–10am	<b>Plenary Session, Ballroom ABCDE</b> US-RSE Updates; US-RSE Community Awards; USRSE 2026 Announcement; Better Scientific Software Fellowship Awards
10am–10:15am	<b>Break</b>
10:15am–12:15pm	<b>Plenary Session continued, Ballroom ABCDE</b> <b>Sponsor Talks:</b> Short presentations from some of our sponsors: Dell Technologies, SHI, Schmidt Sciences, University of Illinois Urbana-Champaign, Princeton University, Globus, Los Alamos National Laboratory, IBM <b>Rapid Access Microtalks (RAM):</b> 5-minute presentations from attendees on a wide range of topics, chosen by vote.
12:15pm–1:30pm	<b>Lunch, Hamilton</b>
1:30pm–3pm	<b>Supporting and Managing RSE Projects, Bromley/Claypoole</b> <ul style="list-style-type: none"><li>• Everything, All at Once, Yesterday: Creating Research Software with Humanities Faculty</li><li>• Program and Technical Management on a Product-Driven Research Project</li><li>• MIT Lincoln Laboratory: A Case Study on Improving Software Support for Research Projects</li><li>• Principles for developing a personal project management workflow as a Research Software Engineer in an autonomous or highly independent context</li></ul>
	<b>An Experimentalist Approach to Software Testing, Ballroom AB</b> Workshop: Learn and try implementing a scientist-friendly approach to software tests, where tests are controlled experiments run on the implementation code.

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## Wednesday, October 8<sup>th</sup>, continued

1:30pm–3pm <i>continued</i>	<p><b>Reproducibility and Sustainability, Ballroom C</b></p> <ul style="list-style-type: none"><li>• Sustaining Growth of Scientific Software with the Software Gardening Almanack</li><li>• Design Thinking for Implementation: Leveraging Design Systems for Sustainable and Reproducible Research Software</li><li>• Empirical Evaluation of Container Security and Reproducibility in Research Software Engineering</li><li>• TRAIL: Audit Trails for Enhanced Reproducibility and Observability of Research Computing</li></ul>
	<p><b>High-Performance Computing (HPC), Ballroom DE</b></p> <ul style="list-style-type: none"><li>• Optimizing Nextflow-based Software on Shared HPC Resources: A Case Study with make_lastz_chains</li><li>• HPC Carpentry and Community at NIST</li><li>• Realizing a Project-Based Resource API at the OLCF</li><li>• A Hands-On Curriculum for Training in HPC Cluster Deployment and Management</li><li>• Integrating ATR Software with University HPC Infrastructure: balancing diverse compute needs</li></ul>

# Organizing Committee

## General Chairs

Curtis Hillegas, Princeton University

Christina Maimone, Northwestern University

## Technical Program

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Pengyin (Wendy) Shan, NCSA, University of Illinois

- Workshops: Priya DCosta, Julie Barnum, Tajudeen Akinosho
- Papers: Angela Herring, Keith Beattie, Ronald Rahaman
- Talks: Drew Paine, Yuxi (Ethan) Cui
- BoFs: Vijay Mahadevan, Anjali Badlani
- Notebooks: Sajith Sasidharan, Fan Li, Christopher Heller
- Publication: Patrick Diehl, Chen Zhang
- Posters: Somasundaram Muthukrishnan, Kapil Jadhav

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