# STS SIGNAL

Association of College & Research Libraries
Science & Technology Section

Volume 40, Issue 2
Fall 2025

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# Letter From the Chair

Rebecca Hill Renirie, STS Vice-Chair
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Dear STS members,

Hello and welcome to all of you! I am delighted to serve as your STS Chair. I have been a member of the Science and Technology Section for 13 years, and am currently research and instruction librarian for STEM and medicine at Central Michigan University Libraries. The professional development programming, conference presentation opportunities, and most of all the support from and networking with my STS peers have been invaluable to both my career and my professional identity development. I am eager to give back, and hope I can continue the great work of our past Chairs in the months ahead. Though we continue to research, teach, and support our patrons in uncertain and challenging times, I look forward to taking on this work together.

As our committees begin their work for the year, don't forget to keep everyone informed! As a reminder, unless confidential information is being discussed, all STS committee meetings are both virtual and open to all STS members. When a committee plans to hold a meeting, we ask that they please alert the STS email list via ALA Connect as far in advance as they can, so that everyone who is interested can attend. If you're new to the section or considering joining one of our committees, there is a wealth of information about them online. We have a dedicated STS Google Drive for working documents, Connect for archiving finished documents, and STS LibGuides for every committee to work with. If you have questions about how to get more involved with STS, please contact any member of the STS Executive Committee including myself!

Speaking of committee work, over the summer STS Past-Chair Sam Putnam and I have appointed the STS Structure and Responsibilities Implementation Task Force! This group will build on the findings of the previous Taskforce on Section Structure and Responsibilities and move forward with implementing changes. The new Implementation Task Force members are:

Kimberly Bailey
Kristina Bloch
Theresa Burress
Jeff Corrigan
Kathy Dejnowski
Melissa Gold
Nicole Helregel
Katie Kohn
Laurie Neuerburg
Jennifer Simms
Sarah Weiss

I am excited for the very important work this Task Force is undertaking, which will ultimately help streamline how our section functions and ensure that all members have an opportunity to serve with their peers.

STS is here, above all, to support, encourage, and celebrate our members. Please don't hesitate to reach out to me with any ideas, questions, concerns, or accomplishments! I am looking forward to working with all of you, and I know we will have an amazing year.

Thank you,
Rebecca Renirie,
STS Chair 2025-2026

# Letter From the Vice-Chair

Hello STS members!

It is an honor to write to you as the STS Vice-Chair. I am currently the Associate Dean for the University of Arizona Libraries and previously served as the Head of the DeLaMare Science & Engineering Library at the University of Nevada, Reno. The support from my STS colleagues over the years has helped me broaden not only my subject expertise but also exposed me to new perspectives, opportunities, and ways of supporting our STEM communities. This space has always been a kind and generous one, and I am so excited to work with Rebecca, Sam, and the entire STS leadership team.

Tara Marie Radnieki, STS Vice-Chair
radniecki@arizona.edu

Our committees are gearing up and working on some great initiatives. The STS Structure and Responsibilities Implementation Task Force's work will enable us to better harness our collective expertise and engagement, reduce confusion, and meet the evolving needs of the STS community. The STS STEMM Librarianship Resources Committee is focusing its work on AI for the year and has already shared great posts on Scopus AI and Semantic Scholar. And I just borrowed *A Natural History of Empty Lots: Field Notes from urban Edgelands, Back Alleys, and Other Wild Places* (Brown, 2024) from my public library, so I can join in the November STS Book Club discussion. You can find more information about these initiatives and programs, as well as all the exciting STS work happening, via our ALA Connect site.

I want to acknowledge that many of us are facing unprecedented uncertainty as we grapple with quickly changing federal and local landscapes, shrinking budgets, technological opportunities and challenges, and more. Despite this, the impact we make is real, meaningful, and deeply important. The work we do not only supports teaching, learning, and research within our immediate communities, but it also creates ripples that extend far into society. When the burdens start to feel heavy, I hope you can lean into your chosen communities and safe spaces for support and respite.

Please don't hesitate to reach out to me with any concerns or ideas, and I look forward to working with you.

Tara Radniecki
Vice-Chair 2025-2026

# Member Articles

## Five Drops Per Prompt? Rethinking AI's Real-World Environmental Impact

Michelle Mussuto
Interim Head of Acquisitions, Collection Management, and Evaluation Unit
Subject Liaison Librarian for: College of Agriculture, College of Natural Sciences, Geography & Environmental Studies
California State University, Chico

### AI's Environmental Footprint—Connect it to Information Literacy

Generative AI feels weightless: you type a prompt, and an answer appears. Behind the scenes, though, the systems that train and run these models sit in energy-hungry data centers that also draw significant amounts of water for cooling and depend on complex global supply chains. Understanding the complete footprint helps students think critically about when and how to use AI and can be taught through an information literacy lens.

### Where the energy goes

Training and running AI models happens in data centers, which already account for a growing slice of global electricity use. The International Energy Agency (IEA) projects electricity demand from data centers could roughly double by 2030 to 945 TWh, with AI as a major driver (Franke, 2025). In the United States, the IEA notes power demand growth in 2025–2026 is running more than twice the average of the last decade in part due to data centers (International Energy Agency, 2025, p. 6).

Not all AI operations are equal. Training a new model absorbs large, one-time energy bursts; everyday "inference" (answering queries) consumes smaller amounts but happens at a massive scale. Recent corporate disclosures illustrate this; according to Google a single text prompt to its Gemini assistant now emits approximately 0.03 g of carbon dioxide and uses "about five drops" of water (Hudson, 2025). However, these numbers exclude model training and richer multimedia tasks like video or image generation. Journalists and researchers caution that per-prompt metrics risk minimizing total impact when usage increases (German, 2025).

## The hidden water footprint

Cooling turns electricity into a water story. Classic evaporative cooling can withdraw or consume large volumes of water; some big facilities can use millions of gallons per day depending on design and climate. Scholarly work by Li, et al. (2023) estimated training GPT-3 at a state-of-the-art U.S. site could directly consume approximately 700,000 liters of clean fresh water. OpenAI recently launched ChatGPT 5, so it could be that this number has or will increase. These findings have helped spark broader scrutiny of AI's water cost. (Wells, 2025).

Providers are experimenting with alternatives such as air-cooling, recycled or non-potable water, or siting in cooler climates, and some have announced "zero-water for cooling" designs for next-gen data centers, but as AI demand rises, local water stress and infrastructure choices matter (Solomon, 2024).

## Upstream impacts: chips and manufacturing

At the center of AI functionality are advanced semiconductors. Fabricating silicon chips for semiconductors requires ultra-pure water to rinse them and this process can consume 2–10 million gallons per day (Environmental Protection Agency, 2025; National Institute of Standards and Technology, 2025). Additionally, semiconductor manufacturing facilities use fluorinated gases with high global-warming potential if they are not abated. U.S. agencies, like the Environmental Protection Agency, summarize both the water intensity and fluorinated gas emissions (for example, perfluorocarbons and nitrogen trifluoride) challenges, while academic literature assesses broader environmental indicators across the globalized industrial supply chains. Ruberti (2023), discusses the link between chip fabrication and the eco-performance of the chip manufacturing sector. He notes that, among other factors, the higher technological capacity of a company does not always mean that there's a corresponding reduction in water, energy, and greenhouse gas emissions.

## The grid mix—and siting choices—matter

AI's footprint isn't fixed; it depends on when and where computation happens. The carbon intensity of the local grid (gas vs. wind or solar or hydro or nuclear), and whether the new capacity is clean or fossil, shapes real-world emissions. The politics are playing out in public: Louisiana regulators just approved multiple new gas plants to power Meta's planned AI data

center, even as the company commits to buy solar (Tesfaye, 2025). Cases like this reveal tensions between rapid AI build-out, reliability, and decarbonization.

## Can AI be made more efficient?

Yes, AI can be made more efficient in several ways. Pruning, distillation, quantization, batching, and better scheduling can cut energy per task; UNESCO spotlights work showing small design choices can yield large efficiency gains, often crucial in low-resource settings (Verdadero, et al., 2025). Workloads can be paired with carbon-free energy (e.g., smart siting, 24/7 clean power procurement, and demand shifting). The IEA notes electricity supply from renewables and nuclear is rising, which can reduce operational emissions if workloads align (International Energy Agency, 2025, p. 7). Recycled water, non-evaporative cooling, and transparent water metrics are emerging; Microsoft and others are publishing efficiency measures and piloting approaches to lower water use. Not every task needs a giant model. Smaller or local models often meet the need with a fraction of the footprint, and fewer, clearer prompts cut energy use. (Singh, et al., 2024)

## Teaching this to university students: practical ideas

So, as librarians what can we do to teach students about how their use of AI impacts the environment? Here are a few ideas that you might incorporate into an information literacy class where you are either teaching an AI tool or just discussing how AI can be used in course assignments.

- Practice source evaluation by presenting students with two sources: (1) a tech company's sustainability disclosure (like the Google report referenced in this article); and (2) either a peer-reviewed study (like Li, et al.) or critical news article. Then have the students evaluate the sources for authorship, purpose, and methodology to determine, in part, who produced the information (is there bias?) and discuss what was included or left out of the sources. This is one way to show students how a source frames the perceptions of AI's environmental footprint.
- To help students learn to identify, evaluate, and synthesize information from a variety of source types, have them track information on one aspect of the AI supply chain (e.g., chip manufacturing, water use, energy sources for data centers). Ask students to find two different types of sources like a scholarly article, government publication, or

company blog post. Have them discuss how the sources either complement or contradict one another and how they'd go about verifying the sources' claims.

While AI may appear weightless, its environmental footprint—measured in water use, greenhouse gas emissions, and resource-intensive hardware—is very real. For students, learning about these environmental impacts can be done through the practice of information literacy. By questioning sources, evaluating evidence, comparing claims, and recognizing how data is framed, students can make more informed choices about when and how they use AI tools.

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### Accessible references (shareable with students)

- **International Energy Agency (IEA)**—Energy & AI; Electricity Mid-Year Update 2025 (clear overviews of data center demand trends). IEA+1
- **AP News explainer**—Hidden climate costs of AI (plain-language primer with concrete examples). AP News
- **Google disclosures & coverage**—WSJ/Axios on per-prompt energy, $CO_2$, and water; useful for discussing scope and transparency. The Wall Street Journal, Axios
- **Peer-reviewed preprint**—Li et al., "Making AI Less 'Thirsty'" (methods for estimating AI water use; widely cited). arXiv
- **U.S. agencies**—NIST on semiconductor water demand; EPA on fluorinated-gas emissions in chip manufacturing. NISTUS EPA
- **Case study reporting**—WWNO on Meta's Louisiana power decision (policy and trade-offs in real time). WWNO

# STS Committee & Discussion Group News

## Awards Committee

The STS Awards Committee will be working on getting three awards through the new ACRL award approval process this year.

Submitted by Marianne Bracke and Chapel Crowden
Awards Committee Co-chairs 2025-2026
Fall 2025

## Hot Topics Committee

The Hot Topics committee is reconvening to start planning for 2025-2026. We are once again hoping to host one program in the fall and one in the spring.

Submitted by Jason Burton and Danielle Skaggs
Hot Topics Committee Co-chairs, 2025-2026
Fall 2025

## Section Structure and Responsibilities Implementation Task Force

The task force was formed in summer 2025 and our work commences in the fall. We are tasked with implementing structural changes to the section that were proposed by the previous task force, and offering mechanisms and support for the changes. We will be in touch soon (if we haven't been already), and look forward to working across the many STS groups and positions!

Submitted by Nicole Helregel
Section Structure and Responsibilities Co-chair 2025-2026
Fall 2025

## STEMM Librarianship Resources Committee

The STS STEMM Librarianship Resources Committee welcomes Sarah Weiss (STEM and Open Science Librarian at the University of Maryland, College Park) as the incoming co-chair for 2025-26, joining the returning co-chair Elliott Smith (Biology & Bioinformatics Librarian, UC Berkeley). The co-chairs thank the new and continuing committee members for their service.

The committee publishes posts every month on the Inside Science Resources blog (ISR). The posts highlight resources relevant to STEMM librarianship, including (but not limited to) platforms, databases, tools, pedagogy, equity, and scholarly communication. We've adopted artificial intelligence as our guiding theme for the year, so look for it in many of our recently published and upcoming posts. The September post by Dr. Melanie Gainey (STEM Librarian and

Director of the Open Science Program at Carnegie Mellon University Libraries) is Preprint Publishing: Benefits and Emerging Issues.

Since March 2025, posts on ISR have been viewed over 4,000 times. Among the most-viewed new posts are Publishing Wisely: Supporting Graduate Students Entering the Scholarly Conversation by Helene Gold (June 13) and AI assisted research: Scopus AI by Sarah Weiss (August 15).

If there is a STEMM librarianship resource that you would like to see covered on ISR, please contact us. And if you are interested in STEMM topics from a librarian perspective, please consider subscribing to ISR to be automatically notified of every new post.

Submitted by Elliott Smith & Sarah Weiss
STS STEMM Librarianship Resources co-chairs, 2025-2026
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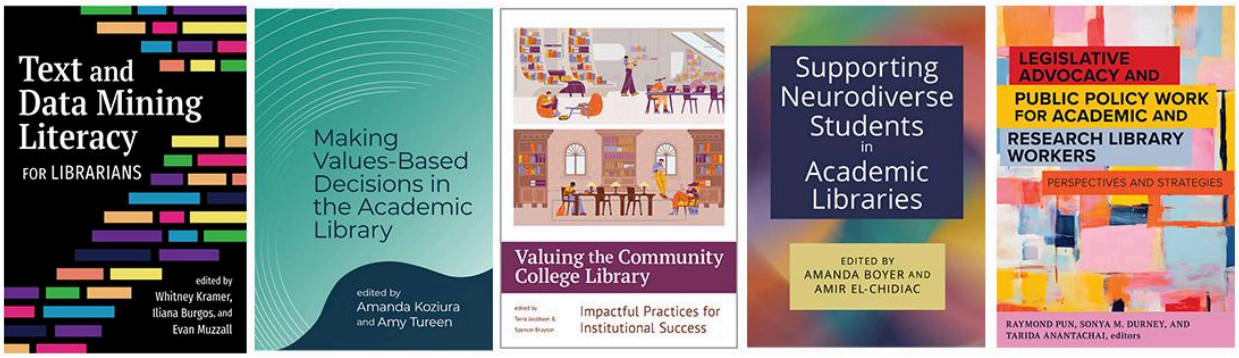
# ACRL Updates

## ACRL Books




ACRL books provide timely and practical advice and thought-provoking research for academic library workers worldwide. Some recent titles:

- Text and Data Mining Literacy for Librarians
- Making Values-Based Decisions in the Academic Library
- Valuing the Community College Library: Impactful Practices for Institutional Success

- Supporting Neurodiverse Students in Academic Libraries
- Legislative Advocacy and Public Policy Work for Academic and Research Library Workers
- The Small to Mid-Size Academic Library: Collaborations and Outreach

Explore ACRL's online catalog for more great books, and visit our site to learn more about publishing your own. ACRL is the only not-for-profit publisher specifically for academic and research libraries and library workers. Purchases of ACRL books help fund advocacy, research, and continuing education programs for the academic library community worldwide.

## Professional Development RoadShows


Maximize your professional development budget with ACRL's RoadShows: affordable, high-quality workshops brought directly to your campus, chapter, or consortium. We offer in-person or virtual experiences on curated topics like strategic assessment, open educational resources, implementing the *Standards for Libraries in Higher Education*, and more. These interactive workshops are designed to enrich skillsets and strengthen competencies. Led by expert academic librarians and researchers, RoadShows can help you and your colleagues tackle the greatest challenges facing our profession today. Organizational Members of ACRL and ACRL Chapters receive a 10% workshop fee discount. See https://www.ala.org/acrl/roadshows

## Consulting Services


ACRL is now accepting new clients for our comprehensive Consulting Services. Our team of experienced consultants will work with you to develop plans, reports, and trainings intentionally tailored for your academic library's unique needs. Our specialties include strategic planning, external reviews, stakeholder input, dean or director searches, and beyond. Our collaborative approach gives you custom recommendations and insights designed to help your library thrive. Organizational Members of ACRL receive a 10% discount on Consulting Services fees; returning clients also receive a 5% discount on Consulting Services fees from September 2025 to August 2026. Visit our website to learn about our sample projects or reach out to us to design a custom project. From accreditation to strategic planning, we're here to help you grow. See https://www.ala.org/acrl/consulting.


## RBMS 2026, Advocacy: Finding Your Voice, June 23 – 26, 2026

Hyatt Regency, Milwaukee, WI

Special collections and archives are evolving fast—new technologies, new audiences, new challenges. How do we make our voices heard, tell our stories, and secure the support we need? This year's conference explores advocacy at every career stage, from speaking up as a newcomer to driving change as a leader. Join us to find inspiration, share strategies, and leave ready to amplify your impact. The call for proposals will be announced in October, and registration will open in March. Watch rbms.info for details.

## Benchmark for Planning and Advocacy in Academic Libraries

Benchmark is ACRL's tool for data-driven planning and advocacy in academic libraries. With Benchmark, you can illustrate ongoing activities and usage in a compelling fashion for different audiences, as well as generate key metrics for strategic planning, budget justifications, annual reports, fundraising, and more! Benchmark is also where you can contribute your library's data to national surveys to further research and advocacy. Login to you free account today to complete the 2025 Academic Library Trends and Statistics Survey, which includes trends questions on AI in libraries.

## Project Outcome

project | OUTCOME
MEASURING THE TRUE IMPACT OF LIBRARIES

Project Outcome is a FREE online toolkit designed to help libraries understand and share the impact of essential library programs and services by providing simple surveys and an easy-to-use process for measuring and analyzing outcomes. Participating libraries are also provided with the resources and training support needed to apply their results and confidently advocate for their library's future. Project Outcome's standardized surveys allow libraries to aggregate their outcome data and analyze trends by service topic, program type, and over time. Sign up today at https://acrl.projectoutcome.org/, and check out our new book, *Assessment and Advocacy: Using Project Outcome for Academic Libraries*, for more ways to use the toolkit.

## ACRL Online Learning

Online Learning from ACRL

ACRL's live webcasts and multi-week online courses are designed to meet the demands of your location, schedule, and budget. Learn more about these events on the ACRL website.

- November 6, 13, and 20 – Supporting Neurodiverse Students in Libraries: A Three-Part Series
- November 12 - Engage, Enhance, and Empower through AI Pedagogy: Fostering Classroom Engagement and Innovative Library Services with Generative AI
- January 12-February 6 - Exploring AI with Critical Information Literacy

## The Return of the ACRL Awards Program

The ACRL Awards Coordinating Committee is pleased to announce that the ACRL Awards Program will restart in 2025-26. To streamline the awards process, a centralized nominations portal has been created for use by all ACRL awards committees. The portal is currently in its final beta testing phase and will launch later in October when calls for nominations are issued. Additionally, keep an eye out for the redesigned ACRL Awards Program website, which is also expected to be completed by October. The site will feature updated eligibility and nomination details for each ACRL division and section award.

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Association of College & Research Libraries
Science & Technology Section



STS Signal is published twice annually in May and November and made available to all section members at no charge on the STS website.

ISSN: 0888-6563

Issues in Science and Technology Librarianship is also available to all section members on the ISTL website.

STS SIGNAL is a biannual publication of the Science and Technology Section of the Association of College & Research Libraries, a division of the American Library Association, 225 N. Michigan Avenue, Suite 1300, Chicago IL 60601, (800) 545-2433, ext. 2523, www.acrl.org. It is designed as a communication vehicle to the members of the Section and other interested parties. Electronic transmission of materials is preferred, and instructions for transmission are available on request. Inquiries should be made to the editor: Sarah Pine (sfpine@uw.edu), University of Washington Libraries Box 352900 Seattle, WA 98195-2100. (206) 543-4985.