

# Quantum Leap: A Conversation about the Present and Future of Quantum Literacy

[Illinois Association of College & Research Libraries Forum \(IACRL\)](#)

ICRL Newsletter, Spring 2026, V 49, No 1

**Nestor Osorio, Northern Illinois University, interviewed by Dee Anna Phares, Northern Illinois University**

**Q. What is quantum information science and how is Northern Illinois University (NIU) collaborating with Fermilab in this area of research?**

A. Let me begin by noting that research in quantum physics—and in the applications of quantum science and technology—encompasses multiple and highly interdisciplinary areas. One area that has received significant attention in recent years is quantum computing.

In general terms, traditional computers process information using binary logic, evaluating possibilities one at a time. Quantum computing, by contrast, is based on principles of quantum physics—such as superposition and entanglement—which allow quantum bits, or qubits, to be linked and to process complex combinations simultaneously. This capability enables new approaches to solving problems that are extremely difficult or impractical for classical computers.

Quantum computing is one of several interdisciplinary areas within quantum information science (QIS), which broadly explores how quantum systems can be used to store, process, and transmit information.

Both Fermilab (in Batavia) and Argonne National Laboratory (in Lemont) have active research programs in QIS. According to publicly available information, Fermilab's research areas include quantum electronics and control, quantum communication, quantum computing applications and simulations, and quantum sensing. At Argonne, the Quantum Research Institute focuses on quantum computing and simulations, quantum matter and materials, quantum communications and networking, and quantum sensing and detection.

It is also important to note that several NIU faculty members hold dual appointments or are actively involved in collaborative research projects at these national laboratories, which forms the basis of NIU's engagement in this area of research.

**Q. Tell us a little about the Quantum Literacy Group at NIU Libraries. What is its purpose and who/what will it support?**

A. Under the leadership of President Lisa Freeman, Northern Illinois University has identified collaboration with academic institutions, national research laboratories, and corporate partners in the greater Chicago area involved in quantum research and development as a strategic priority.

Within this context, Northern Illinois University Libraries views quantum literacy (QL) as an area where library and information science professionals can make meaningful contributions. To support this institutional priority, our Dean, Fred Barnhart, established a Quantum Literacy Task Force to explore how the Libraries can contribute to advancing awareness and understanding of quantum science.

Although the group is relatively new, we have already begun developing several potential initiatives. These include the creation of a Quantum Literacy LibGuide, a book display, and a visual exhibit using the Libraries' [Science on a Sphere](#) visualization system. We are also interested in exploring collaborations with public libraries in DeKalb and Sycamore, which have strong programs for children, middle school, and high school students.

In addition, we are considering the development of a short video series that could be incorporated into first-year student library orientations. Overall, the goal of the Quantum Literacy Group is to present foundational concepts in quantum research and applications in accessible ways to audiences who may not have a strong background in science, thereby broadening engagement and understanding across the campus and surrounding community.

**Q. Many academic libraries already offer a wide array of instruction to support student success—information, media, visual, and data literacy to name just a few. Can you talk about the ways that quantum literacy bolsters student learning and engagement? Are there benefits for students outside technology and science fields?**

A. At this point, I have not conducted an extensive survey of academic library programs or resources specifically focused on quantum literacy. Interestingly, I did find a growing body of literature on teaching quantum concepts at the middle school and high school levels; however, much of this work appears outside the library and information science literature. In addition, there are some studies that address introducing quantum research and concepts to non-STEM college students.

Given this emerging landscape, I encourage readers and colleagues to share information about any academic library programs, instructional materials, or resources related to quantum literacy. Identifying and documenting such efforts would be valuable for understanding current practices and for informing future library-based initiatives in this area.

About the second part of your question, I would like to say that quantum literacy can strengthen student learning and engagement by emphasizing conceptual understanding, problem framing, and critical thinking rather than technical mastery alone, which is essential for learning across disciplines (Fox, M. F. et al. 2020).

Quantum literacy can also promote active and inquiry-based learning through visualizations, analogies, and real-world examples. These approaches can increase student curiosity and motivation, particularly when quantum concepts are presented in accessible, non-mathematical ways. Importantly, the benefits extend well beyond technology and science fields. Students in the social sciences, humanities, business, education, and health disciplines gain value from understanding the societal, ethical, economic, and policy implications of quantum technologies.

**Q. Anything else you want other academic library workers to know about quantum?**

A. My most recent encounter with quantum science came several months ago, when I learned that 2025 had been proclaimed by the United Nations as the International Year of Quantum Science and Technology. That announcement became the spark for a book display and a library exhibit to celebrate the occasion. I was fortunate to receive enthusiastic support from my science librarian colleagues, Elizabeth Sterner and Meredith Ayers, as well as from the library administration. The exhibit focused on the historical foundations of quantum research, highlighted some of its current applications and developments, and acknowledged the early and often overlooked contributions of women scientists in the field.

As I worked on this project, a more reflective question emerged: What was the world like in the early twentieth century, when these ideas were first taking shape? That curiosity led me to browse issues of *The New York Times* from that period. I found myself imagining the everyday lives of my ancestors, living in a world with technology that now seems remarkably simple. Yet, from that context of limited tools and understanding, ideas were forming that would later transform modern life.

It became clear to me that, despite the ongoing debates about the benefits and drawbacks of scientific and technological change, quantum research has had a profound and lasting impact on our present. This is not the place to describe its influence on areas such as communications, medicine, banking, or education, but even as a non-scientist, I cannot help but admire the progress that has been achieved.

What resonates most with me is how it all began: with a small group of extraordinarily curious minds willing to explore aspects of reality beyond what could be seen or easily explained. There is something deeply instructive in that story. Scientific and technological advances are not sudden miracles; they are the result of sustained curiosity, patience, and collective effort over time. After all, the microwave oven and the cellphone were not created overnight—they are the quiet descendants of questions first asked more than a century ago.

My final comment is directed at IACRL members: given the growing technological and educational significance of quantum science, its role in our evolving economy, and its impact on future workforce needs, is quantum literacy the next frontier?

References

Fox, M. F., Zwickl, B. M., & Lewandowski, H. J. (2020). Preparing for the quantum revolution: What is the role of higher education?. *Physical Review Physics Education Research*, 16(2), 020131.