John William Lynch | PhD in Engineering and Computing Education
BS, MS in Computer Science

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PERSONAL SUMMARY

Discipline based educational researcher and instructor with experience in engineering and computer science education. Experienced in scientific grant proposal writing and full-lifecycle research projects from planning to dissemination. Created and delivered computer science curricula and courses for computer science majors and non-traditional students. Ideated, created, and maintained full-stack educational applications distributed to learners and educators in Chicago and Ireland. Experienced with quantitative, qualitative, and mixed-methodology research in engineering and educational contexts. Taught computer science coursework at middle-school, high school, undergraduate, and graduate levels. Deep understanding of object oriented design principles, data structures, database systems, fullstack application development, and core computer science concepts. Very familiar with dynamic and static programming languages (e.g. Java, C#/C++, Python, Swift, Scala, LISP, Koltin, SQL), and very adaptable to new languages. Excellent interpersonal skills that allow communication of complex topics in a concise and easily understood form. Extremely driven to form new methods of teaching and learning computer science, and passionate to help reduce the exclusivity and barriers present in learning and practicing computer science.

EDUCATION

Ph.D. (2026) in Engineering and Computing Education from the University of Cincinnati.
Dissertation: *An Exploratory Analysis of Technical Communication and Spatial Skills Among Engineering Students,* Advisor: Dr. Sheryl Sorby.

B.S. (2019), M.S. (2020) in Computer Science and Software Development from DePaul University.

RESEARCH PUBLICATIONS (accessible on website)

Lynch, J. W. (2021). Using Notional Machines to reinforce student comprehension of Lists in Introductory Programming. *John William Lynch Personal Website*. https://lynchjohn98.com/wp-content/uploads/2025/06/lynchNotionalMachines.pdf

Lynch, J. W., Agarwal, J., & Imbrie, P. (2023). *Work in Progress: Engineering together-Applying remote collaborative technology to an in-person undergraduate engineering course*. 2023 ASEE Annual Conference & Exposition.

Lynch, J. W., Aller, B. M., Sorby, S. A., & Murphy, T. J. (2024). *Developing a Writing Rubric to Answer Research Questions (not for Grading!)*. 2024 ASEE North Central Section Conference.

Lynch, J., & Raju, G. (2023). *A systematic literature review of educational spatial visualization software and implementations for computing education*. 1–8.

Lynch, J. W., & Raju, G. (2026). *The Effectiveness of AI Language Models as Tutors for Spatial Visualization Training*. 2026 ASEE Annual Conference & Exposition.

Lynch, J. W., & Sorby, S. (2026). The relationship between spatial visualization skills and sketching. *Engineering Design Graphics Journal, 89*, 1–13. https://doi.org/10.18260/edgj.v89i

Lynch, J. W., Sorby, S. A., Murphy, T. J., & Aller, B. M. (2024). *Initial Investigations into the link between spatial and technical communication skills*. 2024 ASEE Annual Conference & Exposition.

Lynch, J. W., Sorby, S. A., Murphy, T. J., & Aller, B. M. (2025). *Further investigations into the link between spatial and technical communication*. 2025 ASEE Annual Conference & Exposition.

Lynch, J. W., Vinnakota, M., Sorby, S., Murphy, T., & Shannon, K. (2023). *Exploring The Link Between Spatial And Communication Skills In Engineering Students*.

Shandliya, S., & Lynch, J. (2025). *From Passive Learning to Interactive Learning: Using AI Personas to Simulate Classroom Experiences in LinkedIn Learning.* 8th Annual Learning & Teaching at UC Conference, Cincinnati, Ohio.

Sorby, S., Duffy, G., Parkinson, J., Raju, G., Lynch, J., & Asghar, M. (2026). Educating the Next Generation of Engineers: Spatial Thinking Is Key to Their Success. *Education Sciences*, *16*(6), 847.

RESEARCH INTERESTS

- Impact of spatial visualization skills on typically unassociated domains: written, oral, and graphical technical communication skills; team based engineering design ideation, problem-solving, and communication; and comprehension / visualization of core computer science topics (data structures, database design, algorithm design).
- Impact of spatial visualization skills on gesture production in engineering communication contexts, and non-linear relationships between spatial skills, gesture production, and various communication skills.
- Synthesis of literature and research methodologies from cognitive science, psychology, educational theory, and engineering fields to design novel solutions to improve learner and educator experiences in engineering and computer science courses.
- Ideation, development, and sustainable deployment of educational software applications with embedded data analysis capabilities. Creation of applications intentionally developed to provide real-time feedback on the progress and experiences of learners and educators to allow timely modifications to applications to improve experiences.
- UI/UX research for educational software, including the deployment, analysis, and qualitative evaluation of Computer Supported Collaborative Learning (CSCL) applications for computer science learners and educators; goal to improve aspects of existing applications or inform new designs.
- Notional machines (i.e. complex analogies) and unplugged computer science learning to provide unique educational experiences for computer science learners.
- Application of artificial intelligence systems as personalized tutors to improve learner experiences via pair-programming and scaffolded lessons to improve programming comprehension and success.
- Reduction of attrition in engineering and computer science through unique computer science curricula, courses, and educational software developed via discipline-based educational research.

RESEARCH EXPERIENCE

University of Cincinnati : Graduate Student (Fall 2022 - Summer 2026)

- Lead graduate student researcher in an exploratory analysis of spatial visualization skills and technical community skills in engineering students; findings used doctoral dissertation. Mixed-methodology research project that examined aspects of sketching, writing, and oral communication skills in engineering undergraduates when explaining a first-year engineering robotic project. Assisted in development of reliable and validated rubrics to grade sketches, written, and oral reports; synthesized research across the domains of cognitive science, gesture production, educational theory, and engineering literature to develop a theoretical framework for the project. Individually analyzed all generated sketches, written reports, oral reports, and gesture production in n=90 participants via video and audio for thematic coding and related findings via quantitative and qualitative methods for future inferences.
- Assisted in development of artificial intelligence personas for simulation classroom peers for online learning.
- Developed and submitted an Office of Naval Research (ONR) white paper scientific grant proposal with faculty advisor Dr. Sheryl Sorby. Aimed to create a community of practice for Military and Naval computer science students; focused on sustainment of the community through events / mentorship programs, and support provided until degree completion; was not funded, however experienced scientific grant writing and exposure to unique computer science learners.

- Assisted in the deployment of live research sessions in U.S. classrooms for Irish educational researchers to enable student comparison of student engineering design solutions.
- Systematic literature review of mixed-methodology research in computing education to analyze transferability of inferences to higher-education contexts; results indicated computing education research has multiple definitions of mixed-methods, and relies more on empirical / quantitative analysis rather than qualitative feedback to improve learner experience.
- Conducted a qualitative Narrative Research study examining students' motivations for majoring in computer science and their subsequent experiences to explore CS attrition. Results revealed a reliance on peer and outside academic support, persistent isolation, and "big brother" mentorship dynamics; these results suggest a homogenous, male-centered culture that may contribute to both attrition and demographic disparities in the field. Future research directions were discussed.
- Introduced Parsec, a synchronous collaborative coding tool, to an introductory engineering course taken by all engineering majors. This tool enabled team members to write code simultaneously while sharing control of a single screen and viewing code creation in real time. Exposed students to collaborative error-solving, pair-programming, team-based coding strategies, and scaffolded learning for all participants regardless of major. End-of-semester experiences were collected via a survey scale developed through exploratory factor analysis grounded in Bandura's self-efficacy theory; results indicated positive impacts on students' learning and programming skills, with implications for the future use of collaborative coding tools in engineering education.

DePaul University : Graduate Student & Research Collaborator (Spring 2019 - Summer 2021)

- Primary graduate student lead for a Computer Supported Collaborative Learning (CSCL) research group composed of multiple graduate students and faculty members advised by Dr. Craig Miller. Examined how computers science students utilized Zoom features during live-coding sessions. Applied Jeong & Hmelo-Silver CSCL affordances to student interview transcriptions to thematically code student responses; results informed future improvements to systems of annotations, screen share, and resource sharing.

ACADEMIC & TEACHING EXPERIENCE

University of Cincinnati

- **Developer & Adjunct Instructor for CS2024C: Data Structures and Algorithms in Python for Non-CS Majors (Spring 2024, Fall 2024)**
    - Introduced covered core data structures, algorithm implementation strategies, and performance metrics, with an emphasis on real-world applications. Delivered in Python to non Computer Science majors for certification completion.
- **Adjunct Instructor for CS4092: Database Design and Systems (Summer 2024, 2026)**
    - Introduced database design core principles, including relational algebra, entity relationship models, SQL language, physical storage techniques, normalization of databases, efficient indexing, reliability, recovery, and concurrency. Final project involved development of a functioning application designed in teams of four. Delivered to upper-level computer science students through hybrid sessions.
    - Teaching assistant for this course in Summer 2026.
- **Graduate Teaching Assistance for ENED 1100/1120: Foundations of Engineering Design Thinking (Fall 2022 - Summer 2023)**
    - Oversaw multiple sections (~70 students each) of the first-year engineering course and manage teams of 3 to 4 undergraduate teaching assistants. Duties included managerial

roles, lecturing for coding sessions (Python, MATLAB, LabVIEW), student-instructor liaison, and coordinating TA-led professional development. Served as impromptu lead for the Fall 2022 end of semester demonstration (~1,000 students), managing the check-in application for station assignments, task completion, and grading.

DePaul University

- **Adjunct Instructor for CSC300: Data Structures I (Fall 2021)**
    - Java-based course where students are introduced to fundamental data-structures in Computer Science. Introduces asymptotic notation, focuses on linear data structures and structures that support disjoint-set operations. Ran course in-person format, created assignments, midterm, final, and supported students via asynchronous and synchronous formats.
- **Adjunct Instructor for CSC242: Introduction to Computer Science II (Winter - Spring 2022)**
    - Intermediate course in problem solving, algorithms and programming using Python. Ran class in synchronous online format. Created labs, assignments, quizzes, and final examinations for the course. Students were prepared for advanced computer science programming and data structures after completion.
- **Adjunct Instructor for CSC281: Workshop: Java for Programmers (Spring 2022)**
    - Workshop course that introduces students to the Java programming language and eclipse development environment. Developed lectures, tutorial videos, assignments, quizzes, and final examinations. Students emerge aptly prepared for CSC300 upon successful completion of this course.
- **Graduate Teaching Assistant for CSC241/242: Introduction to Computer Science I/II (Fall 2019 - Spring 2020)**
    - Tasked with leading multiple bi-weekly in-person and online labs for multiple professors through each quarter. Worked with 15-20 students per lab and balanced time, expectations, and examples of code to ensure each student understood and succeeded in their lab. Monitored each student's comprehension and reported to the professors students' progress and areas of strengths / weakness to help inform regular class sessions. Assisted professors with reworking and planning course lessons differently based on lab reports.
- **Tutor at College of Computing and Digital Media (Fall 2019 - Spring 2020)**
    - Tutored both undergraduate and graduate students in all course work provided by DePaul's Computer Science curriculum. This included but was not limited to Object Oriented Programming, Distributed Systems, Data Structures, Web Development, WordPress Development, SQL (statistical analysis tools), recursion in Scala/Python/Java, and all introductory coding courses. Tutoring sessions were half an hour per student and required a shift in the complexity and speed of explanations based on each student's ability.

Northwestern University

- **Developer & Adjunct Instructor for Application Development with Swift Playgrounds (Fall 2021 - Winter 2022)**
    - Created a course that used Playgrounds on iPads that introduced adult-learners from various backgrounds who had little exposure to computer science to the Swift

programming language. Topics covered included algorithms, logic flow, coding paradigms, problem-solving using computer science, competitive analysis, UX design. The course lasted six weeks and students developed an app to solve a problem they had in their community or personal life. Students presented a showcase of their app that was created with Swift code snippets that had four screens and used algorithms to solve their selected problem. This introductory course helped to promote more understanding of CS and STEM related issues and promote the CECSE mission.

- **Computer Science Curriculum Specialist (Fall 2021 - Winter 2022)**
    - Tasked with providing support for Chicagoland educators teaching the fundamentals of Computer Science through the Swift programming language. Consistently available for help with creation and implementation of lectures, labs, quizzes, and assignments. Tasked to complete work under tight time-constraints and to be available to provide for a diverse group of educators with various schedules and students.

Illinois Institute of Technology

- **Adjunct Instructor for ITMD511: Application Development Methodologies (Summer 2021)**
    - Asynchronous course for students that attended Beacon Education in China, a satellite school through IIT. The course introduced object oriented programming design paradigms, and application development, implementation, and maintenance in the C / Java programming language. Developed syllabus, assignments, quizzes, and exams.

San Diego Global Knowledge University

- **Adjunct Instructor for MDI117-120: Mobile Development Immersion Program: (Summer 2026 - Current)**
    - Full-stack mobile application development program in Android Studio geared towards non-traditional student populations and United States veterans. Oversee final set of courses in the program which introduce automated testing, jUnit test development, UI/UX testing, API testing, and mock online services for applications. Assist students in development and deployment of their final capstone projects.

Computer Systems Institute

- **Adjunct Instructor for AD110: User Interface Design (Spring 2022)**
    - Introduced core User Interface concepts and design using HTML, CSS and JavaScript. Provided overview of modern HTML components and their attributes, explores layout techniques and styling methodologies. Students created responsive Web pages for desktop screens and mobile devices using material design guidelines, and enhanced the UI with animations and user events processing. Modern elements of HTML5 and CSS3 are presented to replace deprecated Flash components for complex animations and embedded objects.
- **Adjunct Instructor for DM130: Webpage Styling (Winter 2022)**
    - Introduced webpage styling through cascading style sheets (CSS) for websites. Explored sheet orientation, text formats, property styles, and in-depth information about how to properly style webpages. Adobe Dreamweaver utilized by students.
- **Adjunct Instructor for DM140: Image Processing I (Winter 2021)**
    - Introduced the manipulation and the creation of images using Adobe Photoshop or a compatible photo/graphics editor. Topics covered include Photoshop Basics, layers,

selections, color techniques, text and image functions, painting tools, and special layer functions.

- **Adjunct Instructor for DM141: Image Processing II (Winter 2021)**
    - Introduced the manipulation and the creation of images using Adobe Photoshop or a compatible photo/graphics editor. Topics covered include special effects and filters, selections, color adjustments, clipping masks, paths, and shapes, as well as annotation and automation of images
- **Adjunct Instructor for DM150: Web Content Management (Spring 2021)**
    - Introduced students to the creation of content for the web. The content covered includes text for websites, as well as blogs, webinars, videos, podcasts, and photographs. Through analysis of successful strategies as well as a look at real-world case studies, students will be able to create successful content for the web.
- **Adjunct Instructor for DM160: SEO & SMO (Summer 2021)**
    - Introduced Search Engine Optimization and Social Media Optimization. Students learned about SEO methodologies related to on-page and off-page optimization, user experience, SEO web design, content ranking factors, best practices, and common mistakes in webpage architecture. Provided students with the knowledge on how to increase sales, and brand awareness and run promotion campaigns online through the use of popular social networks.

idTech Online

- **Personal Online Tutor (Summer 2020 - Winter 2020)**
    - Tutor for one-on-one sessions with young adults and children. Taught students various course-work including game design, web design, and algorithm design using Java, Python, and C/C++. Would provide timely feedback with parents of children and explore personalized lessons based on interests of students.

INDUSTRY EXPERIENCE

Spatial Visualization Online Learning Management System (Spring 2023 - Current):

- Sole developer of a scalable, fullstack spatial visualization learning management system. The system included teacher and student account creation, interactive spatial visualization educational content, timed / auto-graded quizzes, course creation for teachers to allow the addition of students to track progress, and survey distribution to gather real-time user feedback for improvements. Administrative backend that tracks all teacher and student progress and autogenerates interactive reports for quantitative and qualitative data analysis
    - (Live Demo | Live Site)

Covert Nine Web Developer Internship (Summer 2019):

- Internship in Client-Side web development using WordPress from Spring 2019 to Fall 2019. Tasked with back-end coding for various client websites (Wells-Lamont, RiotFest) using JavaScript, JQuery, and HTML/CSS. Sat in on client meetings with supervisors and understood how to transfer client requests towards code. Monitored and maintained previously created websites and was tasked with creating a full test report for Covert Nine's new block system they were deploying that summer.

NorthEastern University Gear UP Assistant(Spring - Summer 2019):

- Assistant Tutor for SENN High School in Chicago, IL. Tutored for introductory high school MIT SCRATCH programs, tutored in mathematics and natural sciences, and aided with college enrichment programs for senior high school students.

DePaul University College Connect Peer Guide (Summer 2018):

- Peer Guide for Introductory Website Development Course using WordPress. Tutored Sophomore, Junior, and Senior high school students in creating personal blogs using WordPress. Also tutored students in introductory PHP coding and introduced variables, basic control loops and for-loop iteration methods.Worked under supervision of Professor Michael Chase.

DePaul University Senior Capstone (Summer 2018):

- Worked with four other senior computer science students to implement a mock LinkedIn website *Skillmatic* that maps current course work to respective jobs. Used a combination of Ruby on Rails, Jquery, Javascript, HTML/CSS.

SERVICE & LEADERSHIP EXPERIENCE

University of Cincinnati

- **Department of Engineering & Computing Education Graduate Student Association President (Fall 2024 - Summer 2026)**
    - Organized weekly meetings with faculty advisors and other members to explore opportunities and take notes of current department climate and student/faculty needs.
    - Tasked with attendance and voting at bi-monthly meetings with the larger graduate student body at the University of Cincinnati. Discussed, deliberated, and voted on issues impacting the graduate student body, including research funding, travel funding, accessibility of resources, public safety, and opportunities to collaborate across multiple departments and majors across the university. Advocated for the needs of the Department of Engineering and Computing Education and voiced concerns of graduate students.
    - Oversaw the creation, submission, approval, and post-submission process of group grant budget awards for the department. Awards allowed the department to host external speakers and provide activities, food, and opportunities for the speaker to meet with students and faculty.
    - Assisted and approved multiple graduate students in the department with research travel and research funding awards to allow them to travel to conferences and explore unique research opportunities.
    - Assisted in the creation of events and opportunities for faculty and students in the department to meet with other departments at the University of Cincinnati, including the College of Engineering and Applied Sciences, College of Education, and College of Medicine.
    - Assisted in the organization of the seminar exchange program for graduate students in the department; this program selected graduate students to attend other colleges with departments of engineering education and allowed them to present their research to new faculty and students. Aimed at improving cohesion between schools, providing networking opportunities for students, and improving the validity of engineering education across colleges in the United States.
- **American Society of Engineering Education (ASEE) Student Chapter President (Fall 2024 - Summer 2026)**

- Organized and led weekly meetings with faculty and chapter members to explore opportunities for expanding engineering education to undergraduate populations.
- Organized calls for votes and nominations to grow student chapter membership and ensure continuity for future cohorts.
- Attended yearly student chapter meetings at ASEE conferences across the United States to track trends and future directions in engineering education, maintaining consistent communication and collaboration across student chapters.
- Organized table events at career and student fairs to introduce engineering education to groups not typically associated with the field, primarily K-12 students and undergraduates.

Stanford University

- **Section lead for CodeInPlace (April 2021 - May 2021):**
  - Volunteer section lead for Stanford's Department of Engineering. Instructed students on advanced programming concepts using Python in association with Karel IDE. Ensured students were up-to-date on each lesson and hosted supplementary office hours for students to explore new avenues and related code in C and Java.

Persevere Now

- **Code Mentor (April 2021 - May 2021):**
  - Volunteer tutor for this non-profit which focused on the education of incarcerated individuals to train them to become full-stack web developers. Provided one-on-one guidance with incarcerated individuals and led one-hour meetings; provided groups of incarcerated individuals examples of programming projects and what they can accomplish with their education. Efforts dedicated to reduce recidivism and ensure better opportunities for disenfranchised populations.

CERTIFICATIONS, FELLOWSHIPS, MEMBERSHIPS & HONORS:

University of Cincinnati

- Graduate Community Award, 2026

Northwestern University

- Fellow, Center for Excellence in Computer Science Education, 2021

DePaul University

- DePaul Admission Partnership Program (DAPP) Scholar, 2017-2019
- Computer Science Society (CSS) Member, 2017-2019

Wilbur Wright Community College

- Phi Theta Kappa Theta Omega Member, January 31, 2017
- Environmental Club Member and Presentation Organizer, 2017

Notre Dame College Prep

- National Society of High School Scholars Member, 2016

Education Week

- Certificate of Completion, A Holistic Approach to Social-Emotional Learning, 2021

CITI Program

- Responsible Conduct of Research, Basic Course, 2022

COABE (Coalition on Adult Basic Education)

- Attendee, Protecting Your Program and Students Webinar, National Conference, 2020

Learners Edge

- Certificate of Completion, Students and Anxiety (1.0 CEU), 2021
- Certificate of Completion, Teachers and Anxiety (1.0 CEU), 2021