

Anthony J. Perritano, Curriculum Vita
Computer Science Ph.D. Candidate

Department of Computer Science
Electronic Visualization Laboratory (EVL)
University of Illinois at Chicago (UIC)
842 W Taylor St #2032, Chicago, IL 60607

Email: aperri3@uic.edu

Web: <https://www.evl.uic.edu/aperritano/>

Education

Ph.D. in Computer Science, 2019 (Defense scheduled Aug 27, 2019)

University of Illinois at Chicago (UIC), Chicago, Illinois

Dissertation Title: *Knowledge Places: Embedding Knowledge in the Space of the Classroom*

Dissertation Committee:

Dr. Tom Moher (advisor) - Computer Science, University of Illinois at Chicago (UIC)

Dr. Andy Johnson – EVL Director of Research, Computer Science, University of Illinois at Chicago (UIC)

Dr. Chris Kanich - Computer Science, University of Illinois at Chicago (UIC)

Dr. Joel Brown - Biological Sciences, University of Illinois at Chicago (UIC)

Dr. James Slotta – Learning Sciences, University of Toronto

Dr. Yvonne Rogers - Director of University College London Interaction Centre (UCLIC)
Computer Science, University College London (UCL)

B.A in Fine Art Painting and Photography, 2006-2008 (2 yrs. completed)

San Francisco State University (SFSU), San Francisco, California

B.S. in Software Engineering, 2003

Rochester Institute of Technology (RIT), Rochester, New York

Awards

2012

Wexler Scholar

University of Illinois at Chicago (UIC), Chicago, Illinois

Awarded the Peter and Deborah Wexler College of Engineering Graduate Student Scholarship

Research and Development Experience

2017 – present. *Research Software Engineer*

Encore Lab, Ontario Institute for Studies in Education (OISE)

University of Toronto, Toronto, Canada

Worked in collaboration with a team of educational researchers and software developers from University of California at Berkeley and University of Toronto to develop a web-based learning environment called Common Knowledge (CK) that investigates collaborative and collective forms of inquiry learning where teachers and students engage as a knowledge community.

- Designed and implemented features using Java and JavaScript-based web technologies (Spring Boot, Angular, MySQL). This work includes Linux-based DevOps activities.

2017 – 2018. *Research Software Engineer*
Lynch School of Education
Boston College, Boston, Massachusetts

Worked as a software engineer in collaboration with École Polytechnique Fédérale De Lausanne (EPFL) to design, develop, and to implement a web-based learning environment called FROG (Fabricating and Running Orchestration Graphs). FROG is an integrated environment for authoring and running collaborative learning scenarios, called Orchestration Graphs.

- Designed, implemented, and deployed features for the web-based environment using JavaScript-based web technologies React and Meteor with their associated library dependencies. Primarily developed with the React-based library called Material-UI.

2018 – present. *Research Assistant*
mHealth Innovation Lab
Biomedical and Health Information Sciences,
University of Illinois at Chicago (UIC), Chicago, Illinois

Work as a software engineer in the mHealth Innovation Lab, which is focused on the development and use of mHealth technologies (IoT health devices such as Fitbit, Withings, Nokia, etc.) and interventions for self-management of chronic disease and other health conditions.

- Architected and implemented the design – Java Spring Boot server framework (Java, Spring Boot 2.0+ REST API's, OAuth2), Angular web framework (JavaScript, TypeScript, CSS, HTML), and MySQL (Database design, stored procedures) database – of new a mHealth portal to support mHealth patient interventions using Internet of Things (IoT) devices such as Fitbit activity trackers and Withings blood pressure monitors for National Institute of Health (NIH) funded research.
- Maintained legacy PHP LAMP stack.
- Maintained operations (DevOps) and administration of the Linux-based (Centos) secure server infrastructure for HIPAA compliant systems. These activities include the design of API's and webhooks to track patient activity and to receive semi-real-time updates from Fitbit and Withings activity streams produced by patients.

2012 – present. *Research Assistant*
Electronic Visualization Laboratory (EVL)
Computer Science
University of Illinois at Chicago (UIC), Chicago, Illinois

Research centered at the intersection of Human-Centered Computing (HCC) (ubiquitous computing, proxemic interaction, tangible computing, and ambient visualization) and Learning Science (whole-class participatory science simulations and knowledge Communities). This research is part of a broader (5-year NSF Funded) research program called EPIC (Embedded Phenomena for Inquiry Communities). Under this research program, I worked in a cohort on several projects (see below) performing in several roles from research to software development.

- Designed, implemented, and deployed experiments in primary school classroom-based Computer Science and Learning Science research. This includes interaction design (i.e., interfaces for student and teacher interaction), and programming situated in real classroom environments using a diverse set of programming languages and interaction paradigms (e.g., iOS, iBeacon, RFID, Bluetooth LE, Android, JavaScript, Swift, Java, multi-touch interaction, ubiquitous computing, etc.) and environments (e.g., tablets, web, desktop, client and server side) for students, teachers, and researchers running in real classroom environments.
- Planned, organized, wrote, and presented research; collecting research data and performing qualitative-quantitative (i.e., Python, Jupyter Notebooks, Atlas.ti – Video Coding) analysis, implementation, facilitation, and management of the fieldwork in classrooms, teacher support, co-designing enactments and interventions with teachers.
- Designed, implemented, and deployed my dissertation work, *Knowledge Places*, over an eight-month period with teachers, researchers, and domain scientists before the classroom enactment – replacing students’ regular classroom semester-long 6th grade Life Sciences (Ecology) unit. The technology infrastructure consisted of a large deployment of iPads (15+) and BLE iBeacons (10+). Activity centered around the design and development of Swift-based iOS applications for student activities and server-side asynchronous messaging mechanisms to support those applications.

Specific Project Work:

1. *HelioRoom Classroom Study, Spring 2013*

University of Toronto Laboratory School, Toronto, Canada

The *HelioRoom* Embedded Phenomena (EP) digitally maps an orbital planetary system onto four walls of a classroom (Moher, CHI Proceedings, 2006). Students adopt a heliocentric perspective and observe dynamic representations of the planets (equally sized, colored circles) through four “windows” (i.e., monitors) during intermittent periods of the day. As the *HelioRoom* simulation runs, students’ work collectively to observe planet occlusion relationships from the phenomena while adding their *Reasons* (observations and theories) to a collective set using an Android tablet application.

- Designed, implemented, and deployed the *HelioRoom Student Observation Application*, a highly performant low latency Android-based tablet application which synchronized student’s data (asynchronously, using XMPP) across the collective set of tablets in the classroom (20+ devices) in real-time during the simulation.
- Front-end UI/UX design, prototyping, and implementation. Including DevOps activities of backend server-side services.
- Field work in the classroom consisted of technology deployment, data collection (handheld cameras), and teacher support during the entire duration of the enactment at the school.

2. *Hunger Games Classroom Study, Fall 2013*

Chicago Partner School, Chicago, Illinois

Hunger Games centered on development of learner understandings of animal foraging behavior. Inspired by traditional teaching practices employing physical simulations, within the unit students engage in an embodied enactment of foraging using stuffed plush toys (with embedded RFID tags) as tangible avatars to represent their foraging among food patches (with camouflaged

RFID readers) distributed around a classroom. Displays situated near the food patches provide students with information regarding the energy gain as they forage in the environment.

- Designed, implemented, and deployed an iOS-based tablet application which synchronized student's foraging scores (asynchronously, a publication-subscription communication protocol called XMPP (eXtensible Messaging and Presence Protocol)) across the collective set of tablets in the classroom in real-time during the student foraging activity.
- Developed a visualization (D3.js) that displayed real-time updates of each student's progress.

3. *Neighborhood Safari Study, Spring 2014*
Chicago Partner School, Chicago, Illinois
University of Toronto Laboratory School, Toronto, Canada

In *Neighborhood Safari*, students make use of motion-detecting field cameras ("camera traps") to investigate the behavior of animals in their own back yards or school grounds. In our study, students investigated self-generated questions related to food preferences, the presence of scarecrows, the presence of pets, differences between day and night foraging patterns, and others.

- Designed, implemented, and deployed the iOS iPad *Neighborhood Safari Application* which allowed students to import, filter, sort, and tag camera trap photo sets during student's inquiry investigations into animal behaviors. As part of these investigations the application allowed students to create note contributions that accumulated in a common knowledge base.
- Created a visualization which aggregated the common knowledge base as a public class wide representation.

4. *Solar Classroom Study, Spring 2015*
University of Toronto Laboratory School, Toronto, Canada

This instance of *HelioRoom* ran in Toronto classroom along with a "digital poster;" a large vertical multi-touch application in which students were able to create poster-sized representations of their contributions and ideas.

- Designed, implemented, and deployed the poster multi-touch application and accompanying server-side components used for students' digital posters activities.

5. *Wallcology Classroom Study, Fall 2015*
Chicago Partner School, Chicago, Illinois

In *WallCology* (Moher, CHI Proceedings, 2008), mounted "WallScopes" allow students to virtually view inside the walls of the classroom into a controlled ecosystem. Students take on the role of scientists to track "creature" population levels they discover, observe their movement behaviors, classify species, and construct habitat food web.

- Designed, implemented, and deployed web-based visualizations to support students use within inquiry investigations. Rendered graphs using streamed data from a MQTT (a machine-to-machine (M2M) 'Internet of Things' connectivity protocol).

6. *Wallcology and Knowledge Places (Dissertation) Classroom Study, Fall 2016*
Chicago Partner School, Chicago, Illinois

An instance of the Wallcology enactment used for my dissertation study – *Knowledge Places: Embedding Knowledge in the Space of the Classroom*. See Research Experience section for project description, development, design, and research activities.

2009 – 2012. *Senior Scientific Software Engineer*
Intermedia Research Group, Forskningsparken (Innovation Centre)
University of Oslo, Oslo, Norway

Project Lead, UIX/Interaction Designer, Software Engineer and Programmer for interdisciplinary research, design, and development center with a focus on developing interactive multi-media based mixed-reality and hybrid (physical-digital) spaces and immersive experiences that went beyond traditional screen-based interaction. Focusing on educational research for K-12 classrooms and museum settings.

- Researched and new technologies (e.g., tabletop computers, tangible computing frameworks), selecting software platforms, languages, frameworks, SDK's, processes, designs for projects.
- Designed, implemented, and deployed technology for a diverse set of projects, e.g., iOS applications, design, and development of multi-touch table/wall applications and hardware, design and implementation of smart classroom/smart room technologies (awareness and proximity mechanisms, agents, tangible technologies), design and implementation of server infrastructure and web services.
- Communicated plans, technical designs, and presentations among a range of stakeholders including researchers and other technologists (for some of whom English is not their first language).
- Supported technology deployments at Norwegian secondary classrooms and science and art museums. Including partner research institutions in continental Europe.
- Contributed to publications and traveled extensively to international universities and conference settings to attend meetings, workshops, and to collaborate on projects.
- Facilitated several project-based workshops with researchers, project partners, and technologists.

Specific Project Work:

1. *Science Created by You (SCY), 2009 – 2012*
University of Toronto Laboratory School, Toronto, Canada

SCY is an integrated project financed by the 7th framework program in the European Commission with 12 partners from 7 European countries. In the SCY learning environment students work individually or collaboratively on “SCY missions” in topics related to mathematics, science and technology. While completing missions, students are engaged in constructive and productive learning activities (experiment, game, share, explain, design, etc.).

- Co-designed, implemented, and deployed a key component of the SCY server infrastructure called the SCYHub – an XMPP-based component – which mediated communication between the SCY JavaFX learning environment client and the SCY server (Hibernate and Tomcat).
- Design, implemented, and deployed JavaFX learning tools for the SCY student client interface.
- Work also consisted of fieldwork and data collection during the studies in Norwegian high school.

2. *Snøkult (translated from Norwegian as snowball), 2010 – 2011*
Collaboration with the Norwegian architectural firm Snøhetta

Snøkult is an InterMedia design of a multitouch application and pedagogical activities developed in collaboration with the National Museum and Snøhetta - an architecture firm based in Oslo - with the aim of fostering young people's deeper understanding of architectural design processes.

- Co-designed, implemented, and deployed the multi-touch application that enabled students to design linked representations (e.g. concept maps) with digital media they captured and imported into the application.
- Work involved implementing the application with an OpenGL-based Java multi-touch toolkit.

3. *(Edward) Munch, Multimodality, and “The Scream”, 2011*
Norwegian National Museum of Art (Norsk Nasjonalmuseet)

A collaboration with the Norwegian National Museum of Art (Norsk Nasjonalmuseet), an immersive digital project room, embedded in the Victorian architectonics of the museum, to engage young people with the work and life of the artist Edward Munch – famously known for “The Scream.”

- Co-designed, implemented, and deployed a data collection application for the study and a multi-touch application that guided users through narratives of Munch’s life.

4. *MIRACLE (Mixed Reality Interactions Across Contexts of Learning), 2010 – 2012*
Oslo Science Museum, Oslo, Norway

Mixed Reality Interactions across Contexts of Learning (MIRACLE) is a project funded by the Research Council of Norway and the University of Oslo. Collaboration with Norwegian Museum of Science and Technology (Norsk Teknisk Museet). MIRACLE delivers models of learning spaces where a mixed reality set up creates a learning experience that seamlessly ties together different settings: the school, the web, and the museum.

- Co-designed, implemented, and deployed a museum and classroom science mix-reality experience with educational researchers, museum curators (Oslo Science Museum), exhibition architects, and interaction designers.

2003 – 2009. *Research Software Engineer*
Technology Enhanced Learning in Science (TELS) Research Group
Graduate School of Education
University of California at Berkeley (UCB), Berkeley, California

Worked as a software engineer with TELS researchers to design, develop, and to implement the next generation of the WISE (Web Inquiry Science Environment) platform for secondary school science learning.

- Architected, designed, implemented, and deployed open source learning systems used in secondary school classrooms. Developed applications with Java technologies in the areas of Portals, Messaging, Peer-to-Peer Networking, Web Services, Content Repositories, Rich Clients. Used toolkits such as Java Swing, Spring-MVC, AJAX, and ActiveMQ. Mentored junior

programmers. Designed and developed the learning environment with Java Swing and JNLP deployment mechanisms.

- Supported technology deployments at San Francisco Bay Area secondary classrooms – including support for data collection efforts. Supported WISE partner teachers and researchers during professional development workshops. Traveled internationally to universities and conference settings to attend meetings, workshops, and to collaborate on projects

Other Professional Software Development Experience

3/2001 - 8/2001, Software Engineer

3/2002 - 8/2002. International Business Machines (IBM)
Eclipse Enterprise Java Tooling Team
Research Triangle Park (RTP), Durham, North Carolina

- Software and QA engineer on the WebSphere enterprise java tooling team.
- Developed eclipsed-based tools to support end-to-end J2EE applications.
- Tested tooling to support high capacity end-to-end J2EE customer instances (i.e., Chase Bank and eBay).

8/1996 - 3/1999. Software Engineer

Booz Allen Hamilton
Griffiss Air Force base / Rome Research Laboratory
Rome, New York.

- Software engineer for a government-funded multi-directorate military-based project called Project Broadsword.
- Held classified information authorization Department of Defense (DOD) security clearance level SECRET.

Teaching Experience

2018.

Teaching Assistant
Computer Science
University of Illinois at Chicago (UIC)

Worked as a teaching assistant in an in-class implementation of the MIT open courseware course, *User Interface Design and Implementation*, with a class population of 70 students: 12 graduate students (4 Ph.D. and 8 MS) and 58 undergraduates from diverse backgrounds and computer science skill levels.

- Supported the professor in the delivery of course curriculum.
- Taught recitations on general OO/functional programming, web programming, algorithms, HCI concepts, and research methods.
- Advised students on research assignments and semester-long group projects.
- Graded and created rubrics for written and programming assignments.
- Tutored students individually and in groups.

Skill Sets

<i>Programming Languages.</i>	Java, JavaScript, TypeScript, HTML, CSS, Swift, Objective-C, Python, C/C++, SQL
<i>Platforms,</i>	iOS, Android, Web, Linux, XCode, IntelliJ, Android Studio, PyCharm, PHPStorm, WebStorm, VSCode, JDK,
<i>Libraries, Tools.</i>	iBeacon, Bluetooth Low Energy (BLE), Internet of Things (IoT), iOS SDK (Tablet and Phone), Android SDK (Tablet and Phone development), OAuth2, Node.js, Meteor, React.js, D3.js, Material-UI (React), git, json, NumPy, D3.js, WebRTC (Real, XMPP (eXtensible Messaging and Presence Protocol)), Matplotlib, PHP, LAMP stack, Apache, Linux, SQL (MySQL) and Non-SQL databases (e.g., RealmDB, MongoDB, PostGRES), Docker, Sketch app for design mockups, iOS Application distribution and crash reporting with HockeyApp and Apple iOS Distribution.
<i>Development Skills.</i>	Object Oriented Design, Software Engineering, Design Patterns, Web Services, User Interface Design, Architecture Design, Algorithms Design, Agile Methods, Managing Junior Developers, Peer-coding, Opensource Community Stewardship.
<i>Research Skills.</i>	Data analysis (Python-based Jupyter), Visualization Techniques (D3.js), Statistical Methods, Literature Review (Computer Science and Education Research), Video Coding, Study Design, Planning, Organization, and Management (with teachers and researchers), Study Field Work.

Notable Graduate Coursework

- Introduction to Artificial Intelligence: Introduction to the theoretical foundations of Artificial Intelligence (AI) and Machine Learning (ML). Including the practice in building AI components and rational agents. Work included learning the theoretical underpinnings of AI/ML, developing Java-based AI agents to navigate mazes, and using ML to make predictions on a large dataset.
- Multimedia Systems: Interaction Design and Children: Interdisciplinary Computer Science course with Design and Learning Science graduate students to explore, design, develop, and implement prototypes of interactive spaces for children (grades K-12). Work included a literature review of mix-reality research in classroom and museum spaces, the development of a semester long project – prototype of a participatory simulation.
- Data Visualization and Analytics: Researching the cutting edge of data visualization techniques and methods. Reviewed the evolution of data visualization techniques from past to present.
- Computational Ecology: Interdisciplinary course in which Computer Science graduate students and faculty from UIC collaborate with Ecology graduate students and faculty from Princeton University on joint research projects that combine Ecology research with computational methods. Course included conducting field work at the Mpala Research Centre, Kenya, Africa.

Publications

- Perritano, A. (2018). Knowledge Places: Embedding Knowledge in the Space of the Classroom. In *Proceedings of the 13th International Conference on Computer Supported Collaborative Learning*, London, England, June 2018
- Perritano, A., & Moher, T., (2019). Knowledge Places: Embedding Knowledge in the Space of the Classroom. In *Proceedings of the 19th International Conference on Interaction Design and Children*. ACM.

- De Jong, T., Van Joolingen, W. R., Giemza, A., Girault, I., Hoppe, U., Perritano, A., ... & Weinbrenner, S. (2010). Learning by creating and exchanging objects: The SCY experience. *British Journal of Educational Technology*, 41(6), 909-921.
- Gnoli, A., Perritano, A., Guerra, P., Lopez, B., Brown, J., & Moher, T. (2014, February). Back to the future: embodied classroom simulations of animal foraging. In *Proceedings of the 8th International Conference on Tangible, Embedded and Embodied Interaction* (pp. 275-282). ACM.
- Moher, T., Ching, C.C., Schaefer, S., Lee, V.R., Enyedy, N., Danish, J.A., Guerra, P., Gnoli, G., Pazmino, P.J., López Silva, B.A., Lyons, L., Perritano, A., Slattery, B., Tissenbaum, M., Slotta, J.D., Cober, R., Fong, C., Rubin, A. (2014). Becoming Reflective: Designing for Reflection on Physical Performances. *Proceedings of the 11th International Conference of the Learning Sciences*. Volume 3. 12731282. International Society of the Learning Sciences (ISLS).
- Moher, T., Slotta, J.D., Acosta, A., Cober, R., Dasgupta, C., Fong, C., Gnoli, A., Silva, A., Lopez Silva, B., and Perritano, A. (2015). Knowledge Construction in the Instrumented Classroom: Supporting Student Investigations of Their Physical Learning Environment. In *Proceedings of the 11th International Conference on Computer Supported Collaborative Learning*, Gothenburg, Sweden, June 2015, 631-638
- Smørdal, O., Perritano, A., & Sem, I. (2010). Multi context, multi representation, multi touch. In Luyten, K., Vanacken, D., Weiss, M., Borchers, J., Izadi, S., & Wigdor, D. (2010, June). Engineering patterns for multi-touch interfaces. In *Proceedings of the 2nd ACM SIGCHI symposium on Engineering interactive computing systems* (pp. 365-366). ACM.

Posters

- Perritano, A., & Moher, T., (2019). Knowledge Places: Embedding Knowledge in the Space of the Classroom. Poster presented to the *19th International Conference on Interaction Design and Children*. ACM.
- Perritano, A (2018). Knowledge Places: Embedding Knowledge in the Space of the Classroom. Poster presented at UIC Research Forum, April 2018, University of Illinois at Chicago, Chicago, Illinois
- Perritano, A., Moher, T. (2015). Hunger Games: Expanding the Pedagogical Design Space with Indoor Spatial Technologies. Poster presented to the 11th International Conference Computer-Supported Collaborative Learning Conference (CSCL), June 7-11, Gothenburg, Sweden.

Colloquia and Invited Talks

- Perritano, A (2016) *Knowledge Places: Embedding Knowledge in the Space of the Classroom*.
Invited presentation to the Collaborative Learning Lab (CoLearnLab), University of Illinois at Urbana-Champaign, Dec. 1, Urbana-Champaign, Illinois
- Perritano, A (2015) *Hunger Games: Expanding the pedagogical design space with indoor spatial technologies*, The 11th International Conference on Computer-Supported Collaborative Learning (CSCL), June 7-11, Gothenburg, Sweden.

Workshops

- Perritano, A (2015) Participated in the research-driven "Tracing Learning Across Time and Space" Workshop at the New York Hall of Science (NYSCI), June 2015, NYSCI, Queens, New York

Service Activities

- 2018 Program Committee: Interactive Posters and Demos CSCW

2012 – present. Peer Review (ACM Conferences: 50+ papers): Human Factors in Computing Systems (CHI), CHI PLAY, CSCW, Virtual Reality Software and Technology (VRST), Interaction Design and Children (IDC), Tangible Embedded and Embodied Interactions (TEI), Spatial User Interaction (SUI), User Interface Software and Technology (UIST), Interactive Surfaces and Spaces (ISS), Mobile HCI, AutomotiveUI, Interactive Experiences for Television and Online Video (TVX), Intelligent Tutoring Systems (ITS)

2016 Journal Peer Review: IEEE Transactions on Learning Technologies

Professional Affiliations

- Association for Computing Machinery (ACM)
- Institute of Electrical and Electronics Engineers (IEEE)
- International Society of the Learning Sciences (ICLS)
- American Educational Research Association (AERA)