The State of XR and Immersive Learning
Executive Summary

Project Leader/Principal Investigator: Mark J. W. Lee
Co-Investigator: Jonathon Richter
Authors of Outlook Report – 2020 Edition:
Mark J. W. Lee, Maya Georgieva, Bryan Alexander,
Emory Craig, and Jonathon Richter

Immersive Learning Research Network
Thank You to Our Sponsors

- HP
- Unity
- zSpace
- Adobe
- springboard VR
- SOLIDWORKS
# Table of Contents

About iLRN ................................................................. 3  
Introducing the State of XR and Immersive Learning Project 4  
The 2020 Outlook Authors ........................................ 4  
Executive Summary .................................................. 5  
Research Questions ................................................... 8  
  Needs and Opportunities ........................................ 8  
  Barriers to Adoption ............................................. 11  
  Catalyzing Technologies and Developments .................. 14  
  Outlook Questions ................................................ 17  
Next Steps ................................................................. 19  
The 2019 - 2020 Expert Panel ..................................... 20
About iLRN

The Immersive Learning Research Network (iLRN) connects educators, developers, and researchers to work together on developing the scientific, technical, and applied potential of immersive learning. New and emerging virtual reality (VR), augmented reality (AR), mixed reality (MR), and other related technologies (collectively known as “XR”) present new opportunities for tackling some of the world’s most capacious and pressing societal, environmental, and economic problems; iLRN seeks to foster a global, interdisciplinary community of scholarship and practice, founded on the principles of open science and open design, aimed at leveraging these opportunities for the good of our planet and its inhabitants.

Central to iLRN’s mission and goals is developing and showcasing a rigorous evidence base of “what works” for facilitating effective and engaging experiences using XR and immersive technologies across the full span of learning—from K-12 through higher education to work-based, informal, and lifelong learning contexts. By offering resources, tools, and forums for experts to meet, share, and collaborate as well as by undertaking its own, strategically targeted research efforts, independently and in partnership with other organizations, iLRN strives to assist and promote the development of knowledge, skills, principles, and practices throughout the multitude of enterprises where the unique affordances of the technology may be powerfully harnessed to support and catalyze human learning and achievement.

Particularly during times of rapid change and social tumult, iLRN’s membership believes the showcasing of effective teaching and learning practices based on rigorous application and evaluation to be highly relevant. This body of knowledge, collaboration amongst cross-disciplinary researchers, and an evidence-base connected across multiple sectors of application are fully emerging. Of course, simply showing off the high-end technologies usually associated with XR and their capabilities to a lucky few is not enough. We must work together to lower the barriers, share, and practice new forms for engagement for meaningful gain across contexts and provide opportunities for all - particularly those most in need. We live in increasingly interconnected, fast-paced, and complex times. We believe that together we can maintain high standards, transform learning engagement, and co-design our future in ways heretofore unimaginable.
Introducing The State of XR and Immersive Learning Project

The Immersive Learning Research Network (iLRN) has partnered with IEEE ICICLE, EDUCAUSE, the Consortium for School Networking, and the eLearning Guild to establish The State of XR and Immersive Learning, a multi-sector, cross-disciplinary initiative aimed at:

- Regularly surveying the XR and immersive learning landscape to identify the technological, pedagogical, and other innovations exhibiting the most promise, along with the major opportunities and challenges related to their uptake, adoption, and implementation; and
- Advancing research and promoting research-grounded practice in the use of XR and immersive technologies for supporting learners across the full span of learning from K-12 through higher education as well as in workplace, community, and lifelong learning.

The 2020 Outlook Authors

Mark J. W. Lee  
Executive Vice President and Chief Research Officer  
General Co-Chair, iLRN 2020 Virtual Conference  
Immersive Learning Research Network (iLRN)

Maya Georgieva  
Director, Education Futures / XReality Center  
The New School

Bryan Alexander  
CEO, Bryan Alexander Consulting  
Senior Scholar, Georgetown University

Emory Craig  
CEO, DigitalBodies

Jonathon Richter  
President/CEO, Immersive Learning Research Network (iLRN)
Executive Summary

The Immersive Learning Network (iLRN) partnered with IEEE ICICLE, EDUCAUSE, and the Consortium for School Networking (CoSN) to create iLRN’s inaugural State of XR and Immersive Learning Report, which combines a systematic review and synthesis of the scholarly evidence and knowledge base on XR and immersive learning with a Delphi-inspired environmental scanning and forecasting exercise in the vein of the well-known Horizon Project. From July 2019 through November 2020, an esteemed global expert panel of educators, researchers, technologists, education leaders, and others leveraged this workspace to openly discuss their perspectives and research on applications of immersive learning technologies across all learning sectors. In March 2020, the expert panel voted on a list of categories drawn from this work and crystalized the results into distinct categories under each research question by the authors’ team. Work is well underway on the full report—which is slated for official release later this summer 2020.

We asked three major questions: What are the greatest educational needs, along with the most promising opportunities in learning, that XR and immersive technologies can help fulfill? What are the most salient barriers facing institutions and organizations seeking to adopt XR and immersive learning technologies? Which XR, immersive, or other related/complementary technologies, tools, and digital developments have the potential to help transform learning and teaching/training practices?

What are the greatest needs and the most promising opportunities in learning that XR and immersive technologies can help fulfill?

When the expert panel convened online in 2019, the future of XR looked promising yet somewhat distant. Educators from K-12 to higher education, industry, and government experts explored the greatest needs and the most promising opportunities in learning that XR and immersive technologies can help fulfill. Opportunities were steadily being built out by industry partnerships and technological advances as we collectively worked to improve our understanding of what we can do with XR in Learning. Many of us looked into research - developing the right links and pedagogical frameworks - to clarify and understand the affordances for the educational use of XR.

The opportunity and urgency to move faster came unexpectedly as the COVID-19 pandemic overtook the world in the early months of 2020. Many schools and organizations continue to look for ways to provide basic access to these technologies. At the same time, we are discovering new opportunities in virtual and social spaces for collaboration and learning for our students. Little did the expert panel realize how relevant and current their work would become in addressing the question of the greatest needs and most promising opportunities in learning that XR and immersive technologies can help fulfill.
The future of learning is immersive. We are on the continuum of exploring and understanding the use and impact of extended reality over business, society, and learning. As we continue, there is little doubt that XR will profoundly reshape learning and, ultimately, human experience. Our best gains so far have been by empowering Learners as Creative Designers and Makers. Examples from across the globe point to students being the driver for institutions and schools to engage with immersive technologies.

For schools and educators, that path to creating authentic learning experiences is in reshaping the traditional models of instructor-led classrooms and letting students lead the way. As we continue to make advances in STEM and medical simulations that increase productivity, efficiency, and efficacy of learning, it is the arts and design that allow for new concepts and narratives to shift the paradigm and human behavior. Immersive narrative-driven experiences present compelling examples of the potential of XR in learning. While social VR is extending and allowing us to inhabit new virtual space and worlds, it is the narratives we create inside these worlds that will compel us to re-imagine learning.

What are the greatest barriers for institutions and organizations adopting XR and immersive learning technologies?

Respondents identified six leading barriers to adoption. Several addressed basic problems of access to XR technologies, in two ways: hardware cost and access for those with various disabilities. Unless those barriers are surmounted, educational XR implementations will fail to reach all learners. At the same time schools may not be well suited for XR requirements in terms of their physical environments, institutional infrastructure, and especially bandwidth.

XR content presents additional barriers. Schools that consider investing in XR devices may have a hard time finding good pedagogical content; at the same time, they often cannot afford to develop their own materials. On a related note, hardware and software interoperability between XR platforms is scant right now, which raises support challenges, including being locked into one vertical or having to duplicate work across competing platforms.

On a human level, academic organizations may not have the required support capacity. This can mean direct tech support as well as helping to identify, develop, or deploy educationally appropriate XR content. In a broader sense, educational institutions find themselves having to catch up with labor market XR needs, which are diverse and sometimes rapidly changing.

What XR and immersive or other related/complementary technologies, tools, and digital developments have the potential to help transform learning and teaching/training practices?

The final research question in the expert panel’s activities focused on XR and the related developments that have the potential to transform learning. The question directly acknowledged that XR does not exist as a standalone field, but is interconnected to a broad range of technologies. Some of the areas under this question - such as haptics and motion capture - are building blocks for virtual experiences. Others, such as artificial intelligence (AI),
are developments in their own right that hold tremendous potential in their convergence with XR. AI will find applications in the development of interactive avatars, learning analytics, and the creation of personalized learning experiences in virtual environments.

The topics in RQ3 are best understood not as predictions or speculations about the future, but as catalyzing technologies that will spur the development and implementation of XR for teaching/training in industry and the educational community. Over the past decade, XR has made remarkable strides in industry and research universities and finally entered the broader consumer market. Standalone headsets, hand-tracking, new modes of haptic feedback, and easy-to-use development platforms are rapidly transforming the XR landscape. These catalyzing developments hold the potential to create deeply immersive worlds and may ultimately erase the boundaries between the real and the virtual. Throughout the work on RQ3, and in the entire State of XR and Immersive Learning Initiative, there was a recognition that we are standing at the dawn of a new frontier, one that will profoundly reshape our current understanding of teaching and learning.
Research Questions

Research Question 1: Needs and Opportunities

What are the greatest needs and the most promising opportunities in learning that XR and immersive technologies can help fulfill?
In Research Question 1 (RQ1), the expert panel explored the greatest needs and the most promising opportunities in learning that XR and immersive technologies can help fulfill. A wide range of topics was proposed, from 360 video to XR Story-Based Learning. Many of the topics - including Biometric data and Interfaces in XR - underwent a more thorough analysis in the Research Questions that followed RQ1.

In the end, the panel selected the following six topics as the most critical issues for this section:

- Cultivating Immersive and Blended-Reality Learning Spaces and Laboratories
- Developing the Capabilities of the Future Workforce
- Empowering Learners as Creative Designers and Makers
- Facilitating Authentic Learning Experiences
- Fostering Collaboration with Social VR and Other XR technologies
- Integrating Immersive Storytelling in Learning

Numerous opportunities were identified where XR will play a critical role in developing the workforce of the future. While these initiatives are already underway in professional fields, there is a clear need to expand it to all areas of onboarding, including the development of soft skills and diversity training. The panel also saw that immersive experiences would provide new opportunities for career guidance, especially for younger students who are not fully aware of their own talents or unlikely to be exposed to new career paths.

Our best gains so far have been by empowering learners as creative designers and makers. Examples from across the globe point to students being the drivers for institutions and schools to engage with immersive technologies. While college students have engaged in clubs, hackathons, and classes to learn about the potential of XR, it is often the younger middle school students who are entering into this field with the curiosity and capacity to create new opportunities that are both refreshing and promising.

For schools and educators, that path to creating authentic learning experiences is in reshaping the traditional models of instructor-led classrooms and letting students lead the way. As we continue to make advances in STEM and medical simulations that increase productivity, efficiency, and efficacy of learning, it is the arts and design that allow for new concepts and narratives to shift the paradigm and human behavior. Immersive narrative-driven experiences present compelling examples of the potential of XR in learning. While social VR is extending and allowing us to inhabit new virtual space and worlds, it is the narratives we create inside these worlds that will compel us to re-imagine learning.

At the end of the last decade, we saw a rapidly increasing interest in building out learning spaces on campus grounds to ensure access to XR and leverage newly developed immersive content. There has been a parallel faculty interest in undertaking applied research in XR developments. The expert panel repeatedly grappled with the questions of identifying a clear pedagogical framework and understanding how the affordances of AR, VR, and MR address specific educational needs. As this research matures, we need to remember that XR is not only
a single technology, but a collection of multiple developments. In this respect, XR remains an organic phenomenon, an area of deep exploration and experimentation. The developments here transcend our traditional academic disciplines and open spaces for new learning experiences to emerge. In the future, learning may look vastly different than it does today, taking the shape of a story, a play, or a game, an interplay of immersive experiences, data-rich environments, and virtual social platforms.

By providing educators with adequate support for planning, deploying, managing, tracking, and assessing XR activities, we are in effect enabling their widespread use and application, beyond the confines of experimentation or fireworks.

- Leonel Morgado
Board Member, iLRN; Assistant Professor with Habilitation / Senior Researcher, Universidade Aberta & INESC TEC

With Virtual and Augmented Reality, all the world's a stage and we are merely players and learners. The new global learning sphere connects people on virtual platforms that transcend borders and open spaces for new learning experiences to emerge. In the future, learning will take the shape of a story, a play, a game, with many quests, involving many platforms and players, driven by conversations and augmented with technology, an interplay of immersive experiences, data, and highly social virtual worlds.

- Maya Georgieva
Director, Education Futures
XReality Center, The New School
Research Question 2: Barriers to Adoption

What are the greatest barriers for institutions and organizations adopting XR and immersive learning technologies?
Respondents surfaced a wide range of barriers to adoption, from cumbersome equipment and the ethics of data gathering to parental fears and the challenge of retrofitting pre-existing learning spaces. Six obstacles emerged as the most meaningful.

- Access
- Affordability
- Inadequate XR Teacher Training Programs
- Interoperability
- Lack of Content
- Lack of Infrastructure and Tech Support

Respondents surfaced a wide range of barriers to adoption, from cumbersome equipment and the ethics of data gathering to parental fears and the challenge of retrofitting pre-existing learning spaces. Six obstacles emerged as the most meaningful. Some addressed basic problems of access to XR technologies. Access was a problem in two senses: hardware cost, especially for more powerful devices; access for those with various disabilities, especially when XR content is not crafted according to universal design for learning (UDL) principles. Unless those barriers are surmounted, educational XR implementations will fail to reach all learners. On a related note, schools may not be well suited for XR requirements. Their physical environments were not necessarily designed with the possibilities of learners gesturing, jumping, and otherwise moving around. Institutional infrastructure - notably bandwidth - might not be capable of handling the large file sizes XR can use.

That very XR content presents additional obstacles. We know that developing good VR / AR content for education is expensive, requiring great expertise in both multimedia and learning principles. Schools that consider investing in devices may have a hard time finding good pedagogical content and often cannot afford to develop their own materials. Furthermore, interoperability between XR platforms is scant right now. Many hardware and software systems are strongly siloed, making it difficult or impossible to move between them. This raises support challenges, including being locked into one vertical or having to duplicate work across competing platforms.

On a human level, academic organizations may not have the required support capacity. This can mean direct support, such as troubleshooting and handling glitches. More significantly, it also entails helping to identify, develop, or deploy appropriate XR content for a given educational audience. That is, the pedagogical capacity needs to be there for good teaching, in addition to the tech support function. At a broader level, educational institutions find themselves having to catch up with labor market XR needs, which are diverse and sometimes rapidly changing.
...although there is a lack of educational content created by teachers for teachers, there is also a lack of educational content created by students for students. Until that occurs, students will lack agency in the use of XR technologies in education.

- Dennis Beck, Board Member, iLRN;
  Associate Professor of Educational Technology, University of Arkansas

In 2017 I was engaged with the School of Physics, University of Sydney. My job was to coordinate the transfer of all School of Physics unit content from Blackboard to Canvas LMS. On my way of transfer all content from all 4 years of Physics and Astrophysics, I saw an opportunity to engage with the use of Virtual Reality on a basic content of Astrophysics, "Stellar Evolution". With some skills in VR Development, I create an engaging project designed to teach students about Stellar Evolution, using real simulation of star evolution. Students were building stars and analysing the evolution of the stars during the simulation timeline. Students were using critical thinking and creating their hypothesis about the relationship of the star mass and their evolution lifetime. Despite this project have been accepted by many students that "played" with it, gain support of the teachers from the School of Physics was almost impossible. Their response to innovation was “I’ve been teaching physics for 30 years using the blackboard, why do I need to make any changes?”

- Cyntia Franco, Educational Program Lead,
  The University of Sydney, School of Medicine & Health
Research Questions 3: Catalyzing Technologies and Developments

What XR and immersive or other related/complementary technologies, tools, and digital developments have the potential to help transform learning and teaching/training practices?
The expert panel members raised fifty-four different topics in addressing RQ3, which were distilled down to six major categories through the voting process.

- Artificial Intelligence and Machine Learning in XR
- Evidence-based XR Learning and Program Design
- Flexible and Open XR Resources
- Haptic Feedback and Sensory Interfaces
- Volumetric Capture and Motion Sensing
- XR and Games

One of the main topics, *Flexible and Open Resources*, has been a long-running concern since the dawn of the Digital Revolution. The expert panel saw that XR would find both challenges and opportunities in sharing content resources and software developments. Both industry training and the entire education community would benefit from open repositories for full XR environments and VR/AR assets that are modular, reusable, and scalable.

Other topics under RQ3, such as *Haptic Feedback and Sensory Interfaces*, reside more directly within the XR domain. Members of the expert panel analyzed how these developments will enhance the sense of immersion and presence in virtual experiences. Oculus VR and other companies are making rapid advances to incorporate eye-tracking and facial expressions in XR, which would lead to deeply realistic avatars. This would revolutionize our social VR spaces, and support the creation of virtual learning environments that would redefine what we mean by face-to-face learning. The research on full sensory interfaces is also critical in addressing the current accessibility challenges that XR faces.

With the extensive research in artificial intelligence, there was a strong recognition that the convergence of AI and XR may be the most significant catalyst for XR and learning. AI will serve as the foundation for the development of interactive virtual avatars that will far exceed our current experiences with screen-based chatbots and machine learning. The data-intensive environments created in XR will also see other applications for AI, including learning analytics and applications built on adaptive and personalized virtual learning experiences.

Over the past decade, gaming has been one of the primary drivers of XR developments. Valve’s *Half-Life: Alyx* and innovative projects from Oculus Studio have created compelling XR experiences. There is already extensive research on game dynamics and learning, and the expert panel investigated how this work can be leveraged for the unique affordances of XR.

*Evidence-based XR Learning and Program Design* was a topic on its own and one that surfaced throughout every area of the panel’s work on RQ3. Panelists noted how cognitive psychology and neuroscience developments needed to be incorporated into the use of XR in learning environments. They focused on the need to develop new modes of learning analytics for virtual environments that have the potential to track user movements and attention and the ethical challenges this could raise. This area, as with all of the areas covered under RQ3, highlighted
the need for more extensive research and standardization if XR is to have a transformative impact on teaching and learning.

Chatbots are already supporting higher education classrooms as teaching assistants for thousands of students in need of immediate help that instructors do not have the time or capacity to give. In the future, teaching and learning in XR environments may become personalized to the point where highly customized instruction is accessible to students in ways that adjust for their prior learning, their optimal learning style, and any disability they might have.

- Cindy Ziker
  Principal Researcher, SRI International

One of the things I’m really excited about is VR allows us also to do a better job of assessing learners with more objective assessments, instead of subjective measurements. We now have some very powerful tools, for example, to measure how users move in an experience, even to understand their moods and behavior in ways that we really didn’t have tools for before.

- Craig Vezina
  Executive Director, Z School
Outlook Questions

What event do you see as most likely to dramatically propel XR forward in education?

- Governmental policy
- University/School policy
- A major business released a popular tool (either hardware or software)
- A major social or cultural shift
- Other

When do you envision at least half of instructors having taught with XR at least once?
When do you see XR passing a tipping point, so that at least half of educators, staff, and students have had some hands-on experience in formal and/or informal educational contexts? (1 - 10 years)
Next Steps

Following the release of this Executive Summary, the iLRN State of XR & Immersive Learning author team looks forward to publishing the full report in mid-summer 2020. That document will provide results from the iLRN Expert Panel investigation in more detail, featuring analysis, examples, and relevant research related to each category outlined in this Executive Summary.

Additionally, iLRN is now seeking new talented members to join our expert panel for a 2nd round of the State of XR Outlook Project. This will include improvements to our inaugural round of environmental scanning, analyses, community building, and reporting phases. iLRN seeks to meaningfully engage active iLRN members through the emerging "Houses of Application", including iLRN Houses of K-12 STEM Education (KSE); Language, Culture, & Heritage (LCH); Inclusion, Diversity, Equity, Access, & Social Justice (IDEAS); Nature & Environmental Sciences (NES); Workforce Development & Industry Training (WDIT); Assessment & Evaluation (A&E); Medical & Healthcare Education (MHE); Place-based Learning (PLACE); Early Childhood Development & Learning (ECDL); and Galleries, Libraries, Archives, and Museums (GLAM). In addition, we will engage iLRN geographic Chapters worldwide. By situating our diverse community of experts into dialogue and practice, collaborating on a shared framework of evidence and identifying emerging new technologies, challenges, and opportunities, we look to lower the barriers, showcase dependable evidence-based use cases, and create capacity for everyone to participate in the amazing power of XR-for-learning.
2019–20 Expert Panel Members

Sun Joo (Grace) Ahn University of Georgia, USA
Karen Alexander XRconnectED, USA
Dan Ayoub Microsoft, USA
Jorge Bacca Konrad Lorenz University Foundation, Colombia
Cindy Ball Oculus / Facebook, USA
Steven Bambury Independent Consultant, UAE
Justin Berry Yale University, USA
Ayora Berry PTC, USA
Lucia Binotti The University of North Carolina at Chapel Hill, USA
James Birt Bond University, Australia
Lucas Blair RTI International, USA
Elizabeth Boyle University of the West of Scotland, UK
Aileen Chai Ministry of Education, Singapore
Emory Craig Digital Bodies – Immersive Learning, USA
Jesse Damiani Southern New Hampshire University, USA
Linda Daniela University of Latvia, Latvia
Drew Davidson Carnegie Mellon University, USA
Lisa Dawley University of San Diego, USA
Koos de Beer University of Pretoria, South Africa
Sara de Freitas, Birkbeck, University of London, UK
Chris Dede Harvard University, USA
Johannes DeYoung Carnegie Mellon University, USA
Heather Dodds Independent Scholar, USA
Jaime Donally ARVRinEDU, USA
Lana Franceska Dreimane Ministry of Education and Science, Latvia
Asha Easton ImmerseUK, UK
Sana Farid Munifarid Consulting, UAE
Helen Farley Department of Corrections, New Zealand
Sarah Fielding University of Southampton, UK
Cynthia Franco The University of Sydney, Australia
Michael Fricano Iolani School, USA
Maya Georgieva The New School, USA
Alex Haber Magic Leap, USA
Stella Hadjistassou University of Cyprus, Cyprus
Rhona Hamada Google, USA
Sean Hauze San Diego State University, USA
Eric Hawkson Kyoto University of Foreign Studies, Japan
Debbie Holley Bournemouth University, UK
Toshi Hoo Institute for the Future, USA
Maria Blanca Ibáñez Universidad Carlos III de Madrid, Spain
Sheila Jagannathan The World Bank, USA
Jason Jerald NextGen Interactions, USA
Mina Johnson-Glenberg Arizona State University, USA
Amy Kaufman University of California San Diego, USA
Fengfeng Ke Florida State University, USA
Roland Kemke Technical University of Cologne, Germany
Alexander Klippel The Pennsylvania State University, USA
Eric Kloper Massachusetts Institute of Technology, USA
Richard Lamb East Carolina University, USA
Fabrizio Lamberti Politecnico di Torino, Italy
Becky Lane Ithaca College, USA
Belinda Lange Flinders University, Australia
Chad Lewis Tampa Preparatory School, USA
Daniel Livingstone The Glasgow School of Art, UK

Maja Manojlovic University of California, Los Angeles, USA
Serio Martin National Distance Education University (UNED), Spain
Kevin Merges Rutgers Preparatory School, USA
Diane Michaud Victoria College within the University of Toronto, Canada
Shailey Minocha The Open University, UK
Barbara Mones University of Washington, USA
Jacki Morie All These Worlds, LLC, USA
Brooke Morrill Schell Games, USA
Anna Carolina Muller Queiroz Stanford University, USA
Susanna Nocchi Dublin Institute of Technology, Ireland
Carlos J. Ochoa Fernandez ONE Digital Consulting, Spain
Jessica Ochoa Hendrix Killer Snails, USA
Amy Peck HTC, USA
Andrew Phelps American University and University of Canterbury, USA and New Zealand
Johanna Pirker Graz University of Technology, Austria
Jan Plass New York University, USA
Lance Powell VR First, Turkey
Ekaterina Prasolova-Førland Norwegian University of Science and Technology, Norway
Iulian Radu Harvard University, USA
Matthew Ramirez Jisc, UK
Deborah Richards Macquarie University, Australia
Nicola Rosa Accenture, USA
Dan Roy Massachusetts Institute of Technology, USA
Donna Russell Walden University, USA
Norma Patricia Salinas Martinez Tecnológico de Monterrey, Mexico
Steven Sato Rolling Hills Country Day School, USA
Philippos Savvides Arizona State University, USA
Kathy Schrock Wilkes University, USA
Claire Seldon NSW Department of Educaion, Australia
Carl Smith Ravensbourne University London, United Kingdom
Erica Southgate University of Newcastle, Australia
Marcus Specht Delf University of Technology, Netherlands
Bryne Stothard Frankfurt International School, Germany
Simon Su U.S. Army – Combat Capabilities Development Command Army Research Laboratory, United States
Kenji Tanaka Sony Electronics, United States
Heather Thomson University of Toronto, Canada
Romero Tori Polytechnic School of the University of São Paulo, Brazil

Jolanda Tromp Duy Tan University, Viet Nam
Barbara Truman University of Central Florida, USA
Jordan Tynes Wellesley College, USA
David Varela The Manufacturing Technology Centre, UK
Craig Vezina Z School, France
Fridolin Wild Oxford Brookes University, UK
Hla Hla Win 360ed, Myanmar
Michał Wróblewski Learn Teach Explore, Poland
Nabil Zary Mohamed Bin Rashid University of Medicine and Health Sciences, UAE
Amy Ziker SRI International, USA
Partner Representatives
Malcolm Brown *EDUCAUSE, USA*
Norton Gusky (CoSN Representative) *NLG Consulting, USA*
David Kelly *The eLearning Guild, USA*
Jane Bozarth *The eLearning Guild, USA*

Sponsor Representatives
Ellen Flaherty *Unity Technologies, USA*
Craig Frehlich (SpringboardVR Representative) *Stamford American International School, Singapore*
Jessica Lindl *Unity Technologies, USA*
Paul Martin *HP, Inc., USA*
Joseph Parlier *zSpace, USA*

iLRN Board of Directors Representatives
Dennis Beck *University of Arkansas, USA*
Michael Gardner *University of Essex, UK*
Christian Guetl *Graz University of Technology, Austria*
Mark J. W. Lee *Charles Sturt University, Australia*
Leonel Morgado *Universidade Aberta & INESC TEC, Portugal*
Patrick O’Shea *Appalachian State University, USA*
Jonathon Richter *Salish Kootenai College, USA*
Anasol Peña Rios *British Telecom Research Labs, UK*
Minjuan Wang *San Diego State University, USA*

For More Information
Inquiries about The State of XR and Immersive Learning may be directed to stateofxr@immersivelrn.org.
If you would like to receive updates about this project and other relevant information pertaining to XR and immersive learning research, please consider joining iLRN to be added to our network and mailing list.

Illustrations and layout design by Karina Branson | [ConverSketch.com](https://www.conversketch.com)