Workshop on AI for Children: Healthcare, Psychology, Education (AI4CHL)

Workshop Summary

Current AI research and applications often prioritize adult-focused solutions, while progress in AI designed specifically for children's development, health, and education has lagged behind. Our workshop aims to spotlight this issue and bring together researchers from diverse fields to discuss the future of AI design and its applications for children. In the era of AI, developing bespoke AI systems for children holds special significance: (i) Advanced AI technologies, such as large language models (LLMs), have the potential to support children's development, education, and mental health, posing a critical new frontier for research. (ii) AI in pediatric healthcare is essential, as early diagnosis of childhood diseases can lead to timely interventions, improving prognoses and reducing infant mortality rates. (iii) AI can also provide valuable tools helping children in low-resource countries, helping bridge gaps in education, healthcare, and other developmental supports. This workshop will invite researchers from the fields of AI, child psychology, education, pediatrics and social good to discuss how AI, particularly new generative models like LLMs, can address the unique challenges in pediatrics, child psychology, and education. We will also explore the potential risks associated with AI applications for children. The insights from the workshop's panel discussions will be summarized in a survey paper and submitted to a top-tier journal or AI conference after the workshop.

Workshop Topics

In our workshop, we advocate for leveraging both traditional machine learning methods and cutting-edge generative AI algorithms, such as Large Language Models (LLMs), Vision Language Models (VLMs), and Diffusion Models, to tackle the unique challenges related to children. This includes exploring their applications in pediatrics, child psychology, and childhood education, as well as addressing the potential risks and concerns these advanced AI systems may pose to children. Prior related workshops have focused on a more limited set of topics and were not able to capture the synergies in AI for children. For example, the Workshop on Child-Centered AI at *ACM CHI 2024* focused more creating and assessing applications in child-computer interaction, while the *NeurIPS 2024* Workshop on Large Foundation Models for Educational Assessment focused more on testing students' development and learning. In contrast, our workshop covers a broader range of topics, spanning healthcare, psychology, education, developmental machine learning and AI for social good, and aims to integrate insights from experts across all of these fields. Some of these challenges are summarized as follows, and we anticipate identifying and focusing on additional challenges during workshop discussion:

· **Challenge 1: AI for Pediatrics.** One of the primary challenges in applying AI models to child health is the lack of sufficient and high-quality data. The challenges are (1) Fewer pediatric records exist compared to adult diseases. (2) Fewer examination tools and medicines are available for children compared to adults. (3) Pediatric diseases are typically more complex due to the rapid development from birth to adolescence, presenting unique challenges at each stage that often require longitudinal data. (4) Children's limited ability to express and describe their symptoms often leads to under-diagnosis of diseases, especially in resource-limited areas.

· **Challenge 2: AI for Supporting Child Psychology and Development.** The development of AI algorithms can, in turn, provide new insights into child development mechanisms and mental health, significantly enhancing our understanding of conditions such as *autism* and *hyperkinetic disorder*. In addition, modern AI with its human-like communication abilities, such as multimodal large language models (MLLMs), have the potential to identify early signs and patterns from children's

gaze, gestures, and dialogue that may provide evidence for developmental issues, enabling earlier intervention. Moreover, research into these AI methods can also aid in understanding the intricate interplay of genetic, environmental, and social factors that influence children's mental development.

· **Challenge 3: AI for Early Childhood Education.** Applying AI to early childhood education presents unique challenges, especially given the specific needs and characteristics of young learners. Due to the rapid cognitive development of children, AI systems that aim to support early childhood education should adapt to varying needs of children quickly. In addition, potential ethical issues, such as bias, fairness and transparency, should be carefully taken into account when designing and implementing AI systems for early childhood education. For instance, AI tutors trained on limited or non-representative data may inadvertently reinforce biases after deployment.

· **Challenge 4: AI for Children in low- and middle-income countries.**

For decades, children in low- and middle-income countries across the global south have faced significant barriers to quality education and healthcare. While children in developed nations benefit from well-resourced systems. For example, many of these regions struggle with critical shortages of teachers, healthcare professionals, and advanced technology. According to UNESCO, 258 million children and youth are out of school, with the majority residing in low- and lower-middle-income countries. Similarly, the WHO reports a global shortage of nearly 12.9 million healthcare workers, especially pediatricians. Can AI bridge these gaps and improve access to education and healthcare for millions of underserved children?

· **Challenge 5: Risk and Opportunity for Child Development and Education in the AI Era.** In the AI era, children and young people are inevitably exposed to powerful AIs, such as large language models (LLMs), which pose new challenges for their mental health, brain development, and cognitive growth. Recent research indicates that methods like in-context learning can make it easier than imagined to construct a "malevolent" AI. Even "positive" AIs may foster excessive dependency in children and potentially slow the development of critical thinking skills. Thus, how to ensure that AI becomes a positive guide for children's mental and brain development is a new and crucial topic.

What will this workshop contribute to ICLR   This workshop is the first to introduce the concept of AI for Children to the ML community. By fostering an active exchange among researchers in machine learning, healthcare, education, and psychology, we aim to bridge gaps and develop innovative solutions with real-world impact. Our topics align with key ICLR interests, including learning in low-resource settings, generative AI, large language models, and critical applications in neuroscience and healthcare that produce societal impact. Most importantly, we hope our workshop promotes interdisciplinary collaboration and expands the scope of ICLR by encouraging greater participation from the education, healthcare, and psychology communities.

Call for Papers

The Workshop on AI for Children invites submissions presenting innovative AI research addressing key challenges in child education, child psychology, pediatrics, child development, social impact, and ethics. We also welcome broader research that explores the intersection of AI and children. Submissions may introduce new models, datasets, benchmarks, or applications. Topics of interest include, but are not limited to: Developmental machine learning, AI for healthcare, Social robotics, AI for education, AI for social impact, AI for good. Accepted papers will be non-archival, and each submission will undergo a rigorous double-blind review by at least three reviewers. Conflicts of interest will be managed through the OpenReview platform. We will solicit submissions via the aforementioned two tracks:

- *Long Paper Track*: We invite research papers that apply AI algorithms to challenges in pediatrics, child education, child psychology, and child development. Submissions should be between 6 and 9 pages in length for the main text, formatted according to the ICLR guidelines. There is no page limit for references or appendices. Selected papers will be presented in the oral session.

- *Tiny Paper Track*: In alignment with the ICLR 2025 Tiny Paper Track, we also welcome short papers, limited to 2 pages in length. Selected short papers will be presented during the poster session. These papers are not restricted to traditional research but can also include observations or prospective studies.

Funding

Upon acceptance, we plan to seek sponsorship from organizations such as Apple, Meta GenAI, Google Health, and Harvard Medical School to enhance the accessibility and inclusivity of our event. Specifically, we will use these funds to **cover registration fees for participants who otherwise would not be able to attend, with a focus on supporting individuals from underrepresented groups**.

Keynote Speakers

- **Dr. Aidong Zhang** (*Confirmed*) is Thomas M. Linville Professor of Computer Science, with a joint appointment in the Department of Biomedical Engineering and School of Data Science at University of Virginia. Her research focuses on developing machine learning approaches to interpretable and fair learning, concept-based learning, federated learning, and generative AI. She also works on large language models for hypothesis generations for scientific discovery. She is also a fellow of the IEEE, ACM, and AIMBE.

- **Dr. Daniel Rückert** (*Confirmed*) is an expert in AI and Machine Learning, focusing on their applications in medicine and healthcare. Since 2020, he has been the Alexander von Humboldt Professor for AI in Medicine and Healthcare at the Technical University of Munich and is also a Professor at Imperial College London. He is also a fellow of the Academy of Medical Sciences, Royal Academy of Engineering, IEEE, and MICCAI.

- **Dr. Zhen Wu** (*Confirmed*) is a tenured Associate Professor at Tsinghua University, where she also serves as the Vice Chair of the Department of Psychology. She earned her BS degree from Peking University and her PhD from the University of Iowa. Dr. Wu's research focuses on the psychological development and education of children and adolescents.

- **Dr. Alhassan Abdul-Mumin MD** (*Confirmed*) is a senior lecturer in the School of Medicine and Health Sciences, University for Development Studies and a Consultant Pediatrician with the Tamale Teaching Hospital in Tamale, Ghana. He is the Head of the Department of Pediatrics and Child Health for both institutions. His current interests include research into general child health problems, child nutrition, congenital anomalies, and neonatology with the hope to improve care and outcomes.

- **Dr. Adam Cross MD** (*Invited*) is a pediatric hospitalist and clinical research informaticist at the University of Illinois College of Medicine Peoria and directs the Children's Innovation Lab at the OSF Healthcare JUMP Trading Simulation and Education Center. His research focuses on two areas: creating digital models of pediatric clinical knowledge for AI, and improving real-time clinical decision-making for pediatric healthcare providers through innovative data use.

• **Dr. Diyi Yang** (*Invited*) is an assistant professor in the Computer Science Department at Stanford, affiliated with the Stanford NLP Group, Stanford HCI Group, Stanford AI Lab (SAIL), and Stanford Human-Centered Artificial Intelligence (HAI). She is interested in Socially Aware Natural Language Processing. Her research goal is to better understand human communication in social context and build socially aware language technologies to support human-human and human-computer interaction.

Panelists 1: Topic on AI for Children's Development and Education

In addition to the keynote speakers, we have also invited other panelists to participate in the discussion.

• **Dr. Wenming Zheng** (*Confirmed*) is currently a professor of Southeast University with the School of Biological Science and Medical Engineering and the Key Laboratory of Child Development and Learning Science of the Ministry of Education. His current research interests include affective computing, pattern recognition, machine learning, and computer vision.

• **Dr. Bria Long** (*Confirmed*) is an Assistant Professor in the Department of Psychology at the University of California, San Diego, specializing in how we learn to derive meaning from visual information. Her research explores the development of visual concepts across different age groups, using behavioral and computational methods, with an ecological approach that considers real-world interactions.

Panelists 2: Topic on AI for Pediatrics

In addition to the keynote speakers, we have also invited other panelists to participate in the discussion.

• **Dr. Bernhard Kainz** (*Confirmed*) is a Professor at Friedrich-Alexander-University Erlangen-Nuremberg where he head the Image Data Exploration and Analysis Lab (IDEA Lab) and in the Department of Computing at Imperial College London where he lead the human-in-the-loop computing group and co-lead the biomedical image analysis research group (BioMedIA).

• **Dr. Danny Z. Chen** (*Confirmed*) is a Full Professor in the Department of Computer Science and Engineering at the University of Notre Dame. His research focuses on machine learning for biomedicine and biomedical imaging. He is also a fellow of IEEE and a distinguished scientist of ACM.

• **Dr. Jianguo Cao MD** (*Confirmed*) is a professor / chief physician at Shenzhen Children's Hospital in China, working on AI for neurodevelopmental disorders including Autism, Duchenne Muscular Dystrophy. He is also the Head of the Department of Rehabilitation at Shenzhen Children's Hospital.

Tentative Schedule & Plan

This one-day in-person workshop will have 6 invited keynote talks, 5 highlight accepted paper talks, 2 panel discussion (Table 1). We expect this to be a medium size workshop, with at least **70 attendees and 30+ submissions** from researchers with diverse backgrounds. We will provide recordings of the talks and panel discussions on our website. The workshop's web chair will also share updates and promotional information on Twitter, LinkedIn, and the ML Google Group to invite wider participation. All information will be regularly updated on our workshop website.

Organizers

• **Xu Cao** is the co-founder and research scientist of PediaMed AI and having research interests in AI for Pediatrics, AI for Autism, Developmental Machine Learning, Human Digital Twin. He is a PhD student at Health Care Engineering Systems Center of UIUC, advised by Prof. James M. Rehg. He was the organizer of LLVM-AD workshop at WACV 2024 and ITSC 2024 and serves as the research roundtable subchair at ML4H 2024.

Table 1: Tentative AI for Children Workshop Schedule for a one-day plan

Time	Event	Speaker
9:30am – 9:45pm	*Opening Remarks*	
9:45am – 10:15am	Keynote: Challenge of AI for pediatrics	Prof. Daniel Rückert (Imperial College London)
10:15am – 10:45am	Keynote: LLMs for K–12 education	Prof. Aidong Zhang (University of Virginia)
10:45am – 11:00am	*Coffee Break & Poster Discussion*	
11:00am – 11:30am	Keynote: How LLMs affect child psychological development	Prof. Zhen Wu (Tsinghua University)
11:30am – 12:00pm	Keynote: AI for children under low resource settings: the need from children in Africa	Dr. Alhassan Abdul-Mumin (Tamale Teaching Hospital in Tamale, Ghana)
12:00pm – 1:00pm	*Lunch*	
1:00pm – 1:30pm	*After Lunch Poster Discussion*	
1:30pm – 2:00pm	5 Oral Papers (6 min each)	Authors
2:00pm – 2:30pm	Panel Discussion: AI for Children's Development and Education	Panelists 1
2:30pm – 3:00pm	Keynote	Keynote Speaker 5
3:00pm – 3:15pm	*Coffee Break & Poster Discussion*	
3:15pm – 3:45pm	Keynote	Keynote Speaker 6
3:45pm – 4:15pm	Panel Discussion: AI for Pediatrics	Panelists 2
4:15pm – 4:30pm	Summary of the Workshop	Prof. James M. Rehg
4:30pm – 4:45pm	*Closing Remarks*	

(Email: xucao2@illinois.edu)

- **Jintai Chen PhD** is the corresponding organizer of the workshop. He is an Assistant Professor at Hong Kong University of Science and Technology (Guangzhou). Before joined HKUST-Guangzhou, he was a PostDoc researcher at Computer Science Department of UIUC in the USA, working closely with Prof. Jimeng Sun. His research interests encompass a wide range of topics within AI for Healthcare, including the diagnosis of pediatric congenital heart diseases.
  (Email: jtchen721@gmail.com)

- **Wenqian Ye** is the co-founder and research scientist of PediaMed AI and having research interests in AI Alignment, Multimodal Learning and AI for Healthcare. He is currently a PhD student at the Department of Computer Science, University of Virginia, advised by Prof. Aidong Zhang. He was the organizer of LLVM-AD workshop at WACV 2024 and ITSC 2024. He has publications in multiple top-tier AI conferences, including CVPR, IJCAI, KDD, ECCV, and UAI.
  (Email: wenqian@virginia.edu)

- **Ana Jojic** received B.S. from the University of Washington. She is currently a Ph.D. student in the Siebel School of Computing and Data Science at the University of Illinois at Urbana-Champaign. Her research interests include multi-modal models, particularly vision-language, social AI, and AI in healthcare and education. She has publications in UAI and Cell Reports Medicine, and, as a first author, in ICLR 2024 AGI Workshop.
  (Email: ajojic2@illinois.edu)

- **Sheila Agyeiwaa Owusu MD** is a pediatrician of Tamale Teaching Hospital in Ghana and lecturer of University for Development Studies, Tamale, working on intersection of Paediatric infectious disease and Adolescent health particularly in resource-constrained setting. Her newest research direction is using AI tools for paediatric tuberculosis, and adolescent mental health.
  (Email: Nanaagyeiwaa1@gmail.com)

- **Sheng Li PhD** is a Quantitative Foundation Associate Professor of Data Science and an Associate Professor of Computer Science (by courtesy) at the University of Virginia (UVA). His recent research interests include trustworthy representation learning, graph neural networks, visual intelligence, and causal inference. He has published over 170 papers, and has received over 10 research awards, such as the INNS Aharon Katzir Young Investigator Award, Fred C. Davidson Early Career Scholar Award, Adobe Data Science Research Award, Cisco Faculty Research Award, and SDM Best Paper Award.
  (Email: shengli@virginia.edu)

- **Megan Coffee MD, PhD** is an infectious disease physician at NYU Grossman School of Medicine and assistant professor of Population and Family Health at Columbia University in the USA. She's worked in infectious disease research and care in multiple places around the globe from San Francisco to Haiti to Zimbabwe.

  (Email: megan.coffee@nyulangone.org)

- **Sicheng Zhao PhD** is a research associate professor at Tsinghua University. His research interests include affective computing, multimedia, and domain adaptation. He worked as a postdoc research scientist at Columbia University from 2020 to 2022, as a postdoc research fellow at University of California Berkeley from 2017 to 2020, working closely with Prof. Kurt Keutzer, and as a postdoc at Tsinghua University from 2016 to 2017.

- **James M. Rehg PhD** is a Founder Professor of Computer Science and Industrial and Enterprise Systems Engineering at the University of Illinois Urbana-Champaign. Previously, he was a Professor at Georgia Tech, where he co-Directed the Center for Health Analytics and Informatics. He has served as general chair for CVPR 2009 and program chair for CVPR 2017. He and his students have received a number of best paper awards, including best student paper awards at ICML 2005, BMVC 2010, Mobihealth 2014, Face and Gesture 2015, and a Distinguished Paper Award from ACM IMWUT and a Method of the Year award from the journal Nature Methods.

Organizers and Committee's Expertise

The organizing team brings significant experience in managing high-profile workshops and conferences. For instance, Prof. Sheng Li is the lead organizer of the NeurIPS 2024 Workshop on Large Foundation Models for Educational Assessment. Prof. James M. Rehg has served as the General Chair of CVPR 2009 and Program Chair of CVPR 2017. Xu Cao is serving as the research roundtable sub-chair of ML4H 2024.

Our organizers represent seven diverse institutions, combining expertise from academia, medicine, and industry. This includes several medical doctors (among them pediatricians), professors from leading Computer Science departments, and industry researchers specializing in AI for children. Together, our team covers a broad spectrum of academic and research fields, including education, children's mental health, pediatric radiology, child psychology, computer vision, social AI, and affective computing. Besides, Dr. Megan Coffee worked closely with the WHO in Geneva, International Rescue Committee (IRC), Centers for Disease Control and Prevention (CDC), US State Department, and other institutions. All of the main organizers will attend the ICLR 2025 in-person.

Program Committee (PC) Members

We will recruit more PC members from diverse backgrounds across different countries and organization. The confirmed PC members are:

- Ziran Wang (Purdue University)
- Jianguo Zhang (Beijing Tiantan Hospital)
- Xue-Jun Kong (Harvard Medical School)
- Kaizhao Liang (University of Texas at Austin)
- Bolin Lai (Georgia Institute of Technology)
- Maxwell Alexander Xu (University of Illinois Urbana-Champaign)
- Meihuan Huang (Shenzhen Children's Hospital)
- Zheng Chen (Osaka University)
- Joerg Heintz (University of Illinois Urbana-Champaign)
- Guangtao Zheng (University of Virginia)
- Mohamed Taha (Harvard University)
- Sangmin Lee (Sungkyunkwan University)
- Xiaoqiang Lin (National University of Singapore)