

DR. JULIA CHATAIN

julia.chatain@sec.ethz.ch

juliachatain.com

Senior Scientist, Future Embodied Learning Technologies (FELT), Singapore-ETH Centre

I am an **interdisciplinary researcher** between Human-Computer Interaction and Learning Sciences, with a strong technical background. Because learning is not effortless, I am interested in integrating the **right kinds of difficulties** in interaction to support learning, leveraging both **cognitive and emotional** mechanisms, in an **inclusive** manner.

My work has been recognized by the Computer Science community (**ETH medal** for outstanding dissertation in Computer Science) as well as the Learning Sciences community (**Jacobs Foundation Young Scholar grant**).

I am currently building a 5-year **large scale international research programme** between top institutions in Singapore (NUS, NIE/NTU, SMU, A*STAR) and in Switzerland (ETHZ, EPFL).

I am a passionate teacher, having **supervised about 20 students** and **taught in formal and non-formal settings**.

ACADEMIC BACKGROUND

Senior Scientist

mar. 2024 - now

Singapore-ETH Centre, Singapore

- Creating a proposal for Future Embodied Learning Technologies (FELT), a **5-year ~25M SGD programme** with PIs from Singapore (NUS, NTU, SMU, A*STAR) and Switzerland (EPFL, ETHZ)
- Submitted **1'400'000 CHF** SNF grant application, in collaboration with ETHZ and FHNW
- Received Jacobs Foundation grant for Young Scholars, **120'000 CHF** (10 scholars worldwide) 🏆

Reference: Prof. Dr. Manu Kapur, manu.kapur@sec.ethz.ch

Doctorate of Science in Human-Computer Interaction and Learning Sciences

jul. 2019 - mar. 2023

Game Technology Center, Professorship for Learning Sciences and Higher Education, ETH Zurich, Switzerland

- **Interdisciplinary doctorate between HCI and Learning Sciences**
- Design framework for embodied learning in VR (**theoretical contribution**)
- Grasping derivatives: **Large scale studies in Swiss highschools** for embodied learning in VR
- Embodied concreteness: Study integrated in an ETHZ course "Data Structures and Algorithms"
- DigiGlo, in collaboration with Tel-Aviv University: Avatars designed for meaningful interaction
- Received **ETH Medal** for outstanding dissertation (under 8% of doctorate recipients) 🏆

References: Prof. Dr. Robert W. Sumner, sumner@disneyresearch.com, Prof. Dr. Manu Kapur, manu.kapur@sec.ethz.ch

Researcher

sep. 2015 - jan. 2017

Potioc, Inria, Bordeaux, France

- Sympapse, in collaboration with **CapSciences**: Spatial Augmented Reality tool to let citizens draw and write feedback about their city and navigate through the contributions of others
- FlyMap, in collaboration with **Stanford**: Spatial Augmented Reality drone projects a map on the floor, lets visitors explore the possible destinations, and guides them through the campus.

Master of Science in Computer Science

sep. 2013 - jul. 2015

Ecole Polytechnique Fédérale de Lausanne, Switzerland

- Focus on Computer Vision, Computer Graphics, and Computer Supported Cooperative Work
- Master thesis in **HCI** "SyMAPse: Augmented Interactive Maps for Subjective Expression" with **CHILI (EPFL)**, Cap Sciences, and Inria Bordeaux

Reference: Prof. Dr. Pierre Dillenbourg, pierre.dillenbourg@epfl.ch

Research Internship

apr. 2013 - aug. 2013

REVES, Inria, Sophia Antipolis, France

- Research project on "Inverse vector shade trees"

Engineering degree

sep. 2010 - jul. 2015

École polytechnique, Palaiseau (Paris area), France

- Courses on theoretical Computer Science
- Received award for **outstanding investment** 🏆

Preparation to French "Grandes Écoles"

sep. 2008 - jul. 2010

Lycée Descartes, Tours, France

- Focus on **Mathematics**, special option theoretical **Computer Science**
- Accepted at École polytechnique (**admission rate <10%**, only person from my region that year)
- Selected for **Elite class** (MP*) 🏆

EXPERIENCE

Beyond my academic background, I have **management** experience as a group leader, **strong technical skills** as a software engineer in academic and non-academic contexts, and **start-up** experience for potential spin-offs of research projects.

Group Leader EduTech

may 2024 - feb. 2024

Unit for Teaching and Learning (UTL, former LET), ETH Zurich, Switzerland

Led a team co-designing and developing educational technology solutions for ETHZ lecturers and students, with a focus on XR, AI-supported learning, and accessibility

Example of completed projects:

- Scientific visualizations in VR for learners with low vision, **nominated for ZHdK Design Prize** 🏆
- Automatic grading of hand-written math exams using LLMs
- Interactive game-based learning activity to foster interest in environmental sciences studies

Reference: Prof. Dr. Gerd Kortemeyer, gerd.kortemeyer@sl.ethz.ch

Software Engineer

mar. 2017 - jun. 2019

Game Technology Center, ETH Zurich, Switzerland

Designed and implemented interactive tools for creativity or learning, including:

- Game Creator: A visual programming tool for video games, presented at **World Economic Forum 2019**, resulted in an **ETH Spin-off** "Enlightware"
- A playful Augmented Reality Christmas catalog for Franz Carl Weber
- Gnome Trader: An Augmented Reality trading game for Smart Cities (European Project)
- Contributed to grant writing for an AR guide in art museums (**1M CHF**)

Reference: Dr. Fabio Zünd, fzuend@ethz.ch

Software Engineer Intern

jul. 2016 - sep. 2016

Google, Zurich, Switzerland

Developed an evaluation tool for a reverse geocoding algorithm

Software Engineer Intern

jul. 2014 - sep. 2014

Fitile, Paris, France

Defined architecture for a garment simulation tool, including avatar generation based on user's measurements

Program Manager Intern

aug. 2012

Microsoft, Paris, France

Developed an algorithm to generate animations synchronized with music

Quality control adjunct

jan. 2011 - apr. 2011

CNFDG, Gendarmerie Nationale, Paris, France (Part of mandatory military service)

Developed quality indicators for ISO-9001 certification as well as accompanying dashboards

Note:

🏆 = Special recognition for projects I was involved in. However, as all things, these projects are the result of the work of many: the full list of contributors is available in the related publications.

SUPERVISION

I have **supervised 20 students**, from top institutions such as ETH Zurich (Switzerland) and École polytechnique (France), from **diverse domains** such as computer science, mathematics, design, learning sciences, or cognitive sciences.

Doctoral researchers — Titles are tentative

Embodied interventions for Language Learning in Multilingual Contexts <i>Xiaoxuan Li, ETH Zurich-EPFL (JDPLS), Switzerland</i>	<i>ongoing</i>
Curiosity as a Mediator and Outcome of Embodied Learning <i>Laura Bock, ETH Zurich-EPFL (JDPLS), Switzerland</i>	<i>ongoing</i>
Semantic Avatars: Deliberately designing Avatars for Embodied Meaning-Making <i>Maria-Ioanna Magkouta, ETH Zurich-EPFL (JDPLS), Switzerland</i>	<i>ongoing</i>
Embodied Approach to making Difficulties Desirable to Students <i>Fan Wang, ETH Zurich-EPFL (JDPLS), Switzerland</i>	<i>ongoing</i>

Master students

Learning beyond Sight: Making Scientific Visualizations more Accessible to People with Vision Impairments <i>Helena Klein, ZHdK, Switzerland</i>	<i>jun. 2024</i>
AI-Assisted Grading of Mathematical Answers Using GPT-4 <i>Tianyi Liu, ETH Zurich, Switzerland</i>	<i>may 2024</i>
Playful Experiences with Embodied Interaction in Augmented Reality <i>Martina Kessler, ETH Zurich, Switzerland</i>	<i>feb. 2023</i>
Co-Designing a Computer Science Learning Game for Girls with Girls <i>Dominic Weibel, ETH Zurich, Switzerland</i>	<i>sep. 2022</i>
Gender Equality in Computer Science: Video Games as Preparation for Future Learning <i>Bodo Brägger, ETH Zurich, Switzerland</i>	<i>feb. 2022</i>
Learning Graph Theory with Embodied Interaction in Virtual Reality <i>Rudolf Varga, ETH Zurich, Switzerland</i>	<i>sep. 2021</i>
Mathematics Input for Educational Applications in Virtual Reality <i>Luigi Sansonetti, ETH Zurich, Switzerland</i>	<i>may. 2021</i>
Embodied Analysis in Virtual Reality <i>Virginia Ramp, ETH Zurich, Switzerland</i>	<i>oct. 2020</i>

Bachelor students or equivalent

StratLayer: A Modular System to Control the Dialog Strategy of LLM Tutors <i>Romain Puech, École polytechnique, France</i>	<i>mar. 2024</i>
Virtual Reality Cytology Lab for Risk Awareness <i>Robin Hänni, ETH Zurich, Switzerland</i>	<i>dec. 2022</i>
Design and Evaluation of Embodied Interaction in VR for Learning Derivatives <i>Bibin Muttappillil, ETH Zurich, Switzerland</i>	<i>mar. 2022</i>
VR Game Prototype for Hand Tracking and Projection <i>Lea Reichardt, ETH Zurich, Switzerland</i>	<i>dec. 2022</i>
Application Mobile intégrant un GPS Narratif <i>Charles Coeurderoy and Violaine Sudret, ENSEIRB-MATMECA, France</i>	<i>nov. 2015</i>

High-school project or equivalent

Evaluation of an Innovative Math Learning App based on Productive Failure <i>Ruhi Pungaliya, Zurich International School, Switzerland</i>	<i>jul. 2023</i>
Entwicklung eines Games in der Erweiterten Realität <i>Jennifer Labun, AKAD COLLEGE, Switzerland</i>	<i>apr. 2018</i>

TEACHING

I have **taught lectures** on various topics, including computer sciences and human-computer interaction, but also **designed course and exam materials** as well as **managed over 20 TAs**.

Invited Lecturer dec. 2023
ETH Zurich, Switzerland

“UX Evaluation” for Prof. Mark Pollefeys’ “Mixed Reality” course

Head TA jul. 2019 - mar. 2023
ETH Zurich, Switzerland

“Computer Science I” and “Data structures and algorithms” courses

Workshop teacher nov. 2021; sep. 2023
Eracom, Lausanne, Switzerland

Game Design and Game Programming (1-week workshops)

Teaching Assistant sep. 2015 - jan. 2017
IUT Bordeaux I, France

“C++ and algorithms: practical work” course

INVITED TALKS

I have been invited to present my research on embodiment to events organized by the top scholars in the field, including **Prof. Dor Abrahamson**, **Prof. Mina Johnson-Glenberg**, and **Prof. Mitchell Nathan**.

Designing for Embodied Sense-making of Mathematics: Perspectives on Directed and Spontaneous Bodily Actions 2024
Embodied Underground — Readings Fall 2024, Berkeley School of Education

Embodied Learning Technologies for Mathematics - An Interdisciplinary Exploration of the Design Space 2024
Future of Education for Virtual and Augmented Reality (FEVAR), Arizona State University (ASU)

How to design interactive learning technologies? 2024
National Thinkers Bootcamp, Tao Nan School, Singapore

Embodied Interaction in Virtual Reality for Learning Mathematics 2023
Future Learning Initiative Colloquium (Advisory Board meeting)

Teaching with AI 2023
“AI for Education” workshop, AI+X summit in Zurich

Embodied Learning 2023
“Creative collaborations and innovation through Embodied Methodologies”, IdeaSquare, CERN

Learning math with embodiment in VR 2023
Jacobs Foundation Conference

Grounding Abstract Mathematics with Embodied Interaction 2022
Saarland University, Germany

Panelist “Children & computing: increasing gender diversity” 2022
Interaction Design and Children (IDC)

Grasping Mathematics with Embodied Interaction in VR: The Case of Derivatives 2022
Future Learning Initiative Colloquium

Panelist “IDC for Gender Balance: How can we engage more girls in informatics?” 2021
Interaction Design and Children (IDC)

Grasping Mathematics in Virtual Reality 2021
Future Learning Initiative Colloquium

Grounding abstract mathematics through interactive multi-representations 2021
Future Learning Initiative Colloquium

Reconnecting Mind & Body 2020
Ludicious “Game Design and Learning Research - How to promote understanding”

SERVICE AND VOLUNTEERING

I volunteered in the **research community** as a student volunteer, a PC member, and a member of SIGCHI, and I volunteered as a coach, teacher and speaker in **dozens of outreach events for gender diversity**.

AC - Late Breaking Work track <i>ACM conference on Human Factors in Computing Systems (CHI)</i>	2015-2018
PC Member <i>International Symposium on Learning, Design and Technology (LDT)</i> <i>Annual ACM Interaction Design and Children (IDC) Conference</i>	2024
Member Communications Committee <i>Special Interest Group on Computer-Human Interaction (SIGCHI)</i>	2023-2024
Game programming workshop <i>Girls Go MINT (Kantonsschule Baden)</i>	jun. 2022
Web Chair <i>Annual Symposium on Computer-Human Interaction in Play (CHI PLAY)</i>	2021
Outreach talks in various events in the French speaking side of Switzerland <i>Le Coding Club des Filles (EPFL)</i>	2019-2021
Outreach talk, and 12 interviews of experts to inspire young women to follow STEM careers <i>Girls Can Code → Girls Code Too</i>	2021
Outreach talk <i>European Girls' Olympiad in Informatics (EGOI)</i>	2021
Student volunteer <i>Annual Symposium on Computer-Human Interaction in Play (CHI PLAY)</i>	2020
Outreach talks <i>Schnupperstudium (ETHZ)</i>	2017-2022
Coach <i>Django Girls Bordeaux and Django Girls Lausanne</i>	2015-2018

REVIEWS

I reviewed research contributions in **both Computer Science and Learning Sciences** high impact venues.

Reviewer for the following venues: 2015-2024

- ACM conference on Human Factors in Computing Systems (CHI) 🏆
- ACM Symposium on Virtual Reality Software and Technology (VRST)
- IEEE International Symposium on Mixed and Augmented Reality (ISMAR)
- ACM Conference on Designing Interactive Systems (DIS)
- Annual conference on Tangible, Embedded, and Embodied interaction (TEI)
- Annual ACM Interactive Surfaces and Spaces (ISS) 🏆
- Annual ACM Interaction Design and Children (IDC) Conference
- Annual Symposium on Computer-Human Interaction in Play (CHI PLAY)
- Biennial Conference of the European Association for Research on Learning and Instruction (EARLI)
- International Journal of Educational Technology in Higher Education
- Instructional Science
- Journal of the Learning Sciences
- Educational Research Review
- Multimedia Tools and Applications
- International journal of computer-supported collaborative learning
- International journal of educational technology in higher education

Note:

🏆 = Special recognition for **Outstanding reviews**

LANGUAGES

French: Mother tongue, English: Full professional proficiency, German: ~B1, learning in progress.