

Hugo Brument, PhD

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RESEARCH PROFILE

Post-doctoral researcher and project lead at TU Wien's Institute of Visual Computing and Human-Centered Technology. My research sits at the intersection of human-centered immersive technology and applied systems design: I design controlled user studies and deploy XR systems in the field, with a focus on how cognitive, perceptual, and contextual factors shape the way people experience and adopt new technology. This work reaches real-world, inclusive outcomes in practice: PostDisaster builds MR decision-support tools for community emergency planning with non-expert users; the NATO CBRN XR training platform was designed for diverse operator profiles where the least experienced user sets the interface standard. I have co-authored EUR 800k+ in competitive research funding across EU Horizon, FFG, and NATO programs, supervised 15+ student researchers, and published 20+ peer-reviewed papers across IEEE TVCG, IEEE VR, and ACM SIGGRAPH.

EDUCATION

PhD in Computer Science - Oct 2018 - Dec 2021, Université de Rennes, France Dissertation: *Towards User-Adapted Navigation Techniques: Study of Factors Influencing User Behavior in Virtual Reality*. Jury: Frank Steinicke (TU Hamburg), Jean-Rémy Chardonnet (Arts et Métiers), Guillaume Moreau (IMT Atlantique), Anouk Lamontagne (McGill University), Gerd Bruder (University of Central Florida), Ferran Argelaguet (INRIA Rennes), Maud Marchal (INSA Rennes), Anne-Hélène Olivier (Univ. Rennes).

Master's Degree in Research in Computer Science - Sep 2017 - Jun 2018, Université de Rennes, France - Specialization: human-computer interaction, experimental research methods, and behavioral analysis.

Engineering Degree in Computer Science - Sep 2015 - Jun 2018, Institut National des Sciences Appliquées (INSA), Rennes, France

Bachelor's Degree in Computer Science - Jan 2013 - Feb 2015, IUT Caucriauville, Le Havre, France

PROFESSIONAL EXPERIENCE

TU Wien - Institute of Visual Computing and Human-Centered Technology - Jan 2022 - present
University Assistant and XR Project Lead (Post-doc) - Vienna, Austria

- **Research group operations:** supervised 20+ student researchers (1 PhD candidate, 7 master theses, 11+ bachelor theses) and coordinated a working group across EU, FFG, and NATO projects running in parallel.
- **Competitive funding acquisition:** co-authored 800k+ euros in competitive research grants including PostDisaster (EUR 500k FFG, 2025-2027), GeoCROW (EUR 300k FFG, 2023-2025), and VERTiGo (EUR 100k EU EDIDP subcontract, 2022-2024).
- **Applied and field research:** designed and deployed XR systems with NATO CBRN first responders and emergency operators across 4 partner nations; ran field studies under real-world operational conditions.
- **Publication output:** published 20+ peer-reviewed papers across IEEE TVCG, IEEE VR, ACM VRST, ACM SIGGRAPH, and ACM SUI; 150+ citations, h-index 6 (2026).
- **Teaching responsibility:** responsible lecturer for two 6-ECTS master-level courses (Multimodal Interfaces; Advanced Topics in VR), co-responsible for two further courses; co-developed the reformed Visual Computing master program curriculum.
- **International collaboration:** co-workshop chairs at IEEE VR 2025 and 2024; IPC member at IEEE VR, IEEE ISMAR, ACM VRST, ACM SUI, EUROXR (2022-2026).
- **Institutional service:** delegate member, Scientific Staff Council of the Faculty of Informatics; co-developer and maintainer of the VR&AR research group website (vr.tuwien.ac.at).

Université de Rennes / INRIA Rennes - Oct 2018 - Dec 2021 *PhD Researcher - Rennes, France*

- Doctoral research characterizing how cognitive load, perceptual biases, and environmental conditions systematically influence user behavior in VR navigation; produced computational models for adaptive interface design.
- Conducted collaborative research with TU Wien and University of Central Florida (3-month research stay funded by Doctoral School of Brittany - top 25% of applicants).
- Published in IEEE TVCG, ACM SUI, ICAT-EGVE, and EuroXR (Best Scientific Paper Award, EuroVR 2020).

INRIA Rennes & TU Wien - Feb 2018 - Jun 2018 *Research Intern - User Behavior in Virtual Environments - Rennes & Vienna*

- Conducted behavioral study on body segment dynamics during VR navigation; bilateral INRIA-TU Wien research collaboration.

GRANTS & RESEARCH FUNDING

Project	Funder	Period	Amount
PostDisaster - MR tools for post-disaster community planning and emergency response. Co-author and project lead.	FFG Kooperative F&E	2025-2027	EUR 500,000
GeoSemanticCROW (GeoCROW) - Immersive geospatial XR systems for situational awareness. Co-author and project lead.	FFG Kooperative F&E	2023-2025	EUR 300,000
VERTigO - Immersive XR training solutions for international defense teams. Subcontract co-author.	EU EDIDP-SVTE-2020-047	2022-2024	EUR 100,000
Scientific mobility grant - Research stay at University of Central Florida (top 25% of PhD applicants at INRIA).	Doctoral School of Brittany	2020	EUR 5,000
PhD fellowship - French Ministry of Higher Education and Research (top 10% of master applicants).	French Ministry	2018-2021	EUR 80,000

AWARDS & RECOGNITION

- **HFM Panel Excellence Award** - NATO STO HFM Panel, 2026. Awarded for the Study, Design, Building and Deployment of a CBRN XR Training Platform within NATO RTG HFM MSG-354.
- **Best Paper Honorable Mention** - ICAT-EGVE 2025. Paper: "SCENTAUR - An Encountered-Type Olfactory Display for Large-Scale Smell Interaction in VR."
- **Best Emerging Technology Demo** - ACM SIGGRAPH 2023. Demo: Action-Origami Inspired Haptic Devices for Virtual Reality.
- **VGCT Virtual Reality Best Dissertation Honorable Mention** - IEEE VR 2023.
- **Best Scientific Paper Award** - EuroVR 2020.
- **Best 3DUI Demo Award** - IEEE VR 2019.

TEACHING ACTIVITIES

Course	Role	Level	Period
Multimodal Interfaces - TU Wien	Responsible lecturer	Master, 6 ECTS	2022-2026
Advanced Topics in Virtual Reality - TU Wien	Responsible lecturer	Master, 6 ECTS	2022-2026
Virtual Reality - TU Wien	Co-responsible lecturer	Master, 6 ECTS	2022-2026
Multimedia - TU Wien	Co-responsible lecturer	Bachelor, 6 ECTS	2022-2026
Object-Oriented Programming - INSA Rennes	Teaching assistant	Bachelor, 6 ECTS	2019
Introduction to Programming - Univ. Rennes	Teaching assistant	Bachelor, 6 ECTS	2018-2021

STUDENT SUPERVISION

PhD Student

- Tobias Batik (2025-ongoing) - Use of Gaussian Splatting for 3D reconstruction with drones. Co-supervised with Hannes Kaufmann.
- Matteo Bosco (2024-ongoing) - Using Large Language Model to improve Human-Agent Interaction in Virtual Reality. Co-supervised with Hannes Kaufmann.

Master Theses

- Johannes Schimmerl (2026-ongoing) - Impact of Visual Alterations on Motor Decision-Making in AR.
- Aya Wahbi (2026-ongoing) - Evaluating Deep Learning-Based Urban Landmark Detection for Robustness-Aware Semantic AR Anchor Initialization under Visual Degradation.
- Tobias Pelviskt (2026-ongoing) - Influence of Strafe and Drift gains on User Behavior in Virtual Reality.
- Miran Jank (2025-ongoing) - Cross reality interaction in Virtual Reality Tower Defense.
- Michael Frühwirth (2025-2026) - Exploring Visual Patterns Contributing to Cybersickness in Augmented Reality. Co-supervised with Khrystyna Vasylevska.
- Martin Crepaz (2024-2025) - A VR Interface for Teleoperating Mobile Robots in Exploratory Tasks. Co-supervised with Hannes Kaufmann.
- Oskar Perl (2023-2025) - Individual and Collaborative Interactions with Multimodal Data in VR. Co-supervised with Hannes Kaufmann.
- Christoph Götz (2022-2025) - Towards Large-Scale Smell Display for Enhancing Immersion during Walking in VR. Co-supervised with Hannes Kaufmann.
- Gabriel Ratschiller (2024) - Design and Evaluation of Selection Metaphors for a Co-Embodied Avatar in VR. Co-supervised with Hannes Kaufmann.
- Tobias Batik (2022-2023) - Design and Evaluation of a Novel Shape-Changing Haptic Device for VR. Co-supervised with Khrystyna Vasylevska.

Bachelor Theses

- Wieshofer Chiara (2026-ongoing) - Haptic device for Social VR with virtual avatars.
- Kisling Daniel (2026-ongoing) - Development of a Scalp haptic device for Improving Spatial Awareness in VR.
- Osimitz Emanuel Siegfried Markus (2026-ongoing) - Effect of AR Filters on Hand and Arm Perception.
- Adrian Cosic (2025-ongoing) - Multisensory integration to improve Virtual Reality fast pace locomotion.
- Johannes Gabler (2025) - Hyper Reality: AR Sickness Exploration while Reading. Co-supervised with Khrystyna Vasylevska.
- Florian Eßl (2025) - Design of Novel Jumping Metaphor in Virtual Reality.
- Valentin Gobl and Jonas Epner (2025) - Hanger Reflex Device and Perception of Rotation Gains in VR.
- Tobias Brosch (2024) - Migrating the VR Course from Unity to Unreal.
- Niklas Burger (2024) - Multimedia Development in Unreal Engine 5: Comparative Analysis of Unity and Unreal.
- Lea Sahiner and Thomas Heilweger (2023-2024) - Design and Implementation of VR Game with a Co-Embodied Virtual Avatar.
- Christoph Pegrisch (2023-2024) - Co-Embodiment of Non-Human Avatars in VR.
- Barbara Weilgony and Linda Gan (2023-2024) - First Approach to Full Body Co-embodiment in VR. Co-supervised with Iana Podkosova.
- David Skrebic and Milan Kekic (2023) - Design of a Multi-User VR Environment Tutorial in WebXR. Co-supervised with Iana Podkosova.
- Renate Zhang (2023) - User Navigation Behaviour Using Simultaneous Locomotion Techniques in VR.
- Martin Gerdenich (2022-2023) - Influence of Cognitive Load on Unintended Positional Drift during VR Locomotion.

SCIENTIFIC & EDITORIAL RESPONSIBILITIES

Workshop Organisation

- Co-workshop chair, IEEE VR 2025
- Co-organizer, "Perception and Animation of Dissimilar Avatars (PANDAS)", IEEE VR 2024
- Poster Awards Committee, ACM VRST 2024

International Program Committee IEEE VR (2026) | IEEE ISMAR (2022, 2023, 2024, 2025, 2026) | ACM SUI (2023, 2024, 2025) | ACM VRST (2025) | EUROXR (2025, 2026) | AlpCHI (2026)

Reviewing - Conferences ACM CHI | IEEE VR | IEEE ISMAR | ACM VRST | ACM SUI | EuroXR

Reviewing - Journals Nature Scientific Data | Frontiers in Virtual Reality | Elsevier IJHCS & HCI | ACM Transactions on Applied Perception | IEEE TVCG | Springer Virtual Reality

Institutional Service - TU Wien Delegate member, Scientific Staff Council of the Faculty of Informatics | Co-developer, Visual Computing master program reform | Co-developer and maintainer, VR&AR research group website (vr.tuwien.ac.at)

SELECTED RESEARCH PROJECTS

PostDisaster - MR Tools for Community Emergency Planning | FFG 2025-2027 Led user research and XR development program for mixed reality decision-support tools deployed to post-disaster planners and emergency response teams. Applied ethnographic observation, stakeholder interviews, and concept validation with domain experts operating under cognitive and time pressure. Designed for inclusive use with non-expert community members as primary stakeholders.

NATO STO HFM-NMSG-354 - CBRN XR Training Platform | NATO 2023-2025 | HFM Panel Excellence Award 2026 Designed and deployed XR-based training systems for CBRN emergency scenarios across 4 partner nations. Developed behavioral evaluation protocols measuring skill acquisition, decision quality, and technology adoption across diverse operator profiles - civilian first responders, military personnel, and emergency managers. Findings used to iteratively refine training system design.

GeoSemanticCROW - Immersive Geospatial XR | FFG 2023-2025 Built immersive geospatial data visualization and interaction systems for situational awareness in emergency and field operations. Developed VR interface and user evaluation framework for collaborative multi-user workflows.

Bridges - Collaborative Human-Digital Interaction | EU H2020 2020-2023 Investigated collaboration and behavioral adaptation in hybrid physical-digital multi-user environments. Ran multi-user behavioral studies characterizing how people modify interaction patterns when digital tools are introduced into shared collaborative workflows.

Advanced Computational Design - Haptic Interface Research | FWF 2020-2028 Designed and ran usability and concept validation studies for novel haptic input devices (Shiftly shape-changing device, SCENTAUR olfactory display). Published in IEEE TVCG and ACM SIGGRAPH Emerging Technologies (Best Demo Award 2023).

VERTiGo - Immersive XR Training for Defence | EU EDIDP 2022-2024 Delivered XR-based behavioral training solutions across international teams; designed behavioral outcome measurement protocols and iterative intervention refinement based on operator performance data.

PUBLICATIONS

17 peer-reviewed publications in proceedings (2 under review) | 3 peer-reviewed journal publications (3 under review) | 150 citations | h-index 8 (Google Scholar, 2026) Full list: <https://scholar.google.com/citations?user=8n9osW8AAAAJ>

2025

1. **Hugo Brument**, Iana Podkosova, Gabriel Ratschiller, Damien Vailland, Hannes Kaufmann. Influence of Non Isomorphic Interactions on Users' Agency with a Dissimilar Avatar in VR. *ICAT-EGVE 2025*. <https://doi.org/10.2312/egve.20251356>

2. **Hugo Brument**, Francesco De Pace, Christoph Götz, Hannes Kaufmann. SCENTAUR - An Encountered-Type Olfactory Display for Large-Scale Smell Interaction in VR. *ICAT-EGVE 2025*. <https://doi.org/10.2312/egve.20251345> ★ *Best Paper Honorable Mention*
3. **Hugo Brument**, Martin Gerdenich, Hannes Kaufmann. Higher Cognitive Load Increases Unintended Positional Drift during Navigation in VR. *ACM VRST 2025*. <https://doi.org/10.1145/3756884.3765968>
4. T. Batik, **H. Brument**, K. Vasylevska, H. Kaufmann. Shiftly: A Novel Origami Shape-Shifting Haptic Device for VR. *IEEE Transactions on Visualization and Computer Graphics*, vol. 31, no. 5, pp. 2331-2341, May 2025. <https://doi.org/10.1109/TVCG.2025.3549548>
5. T. Lautenbach, O. Perl, **H. Brument**, H. Kaufmann. GeoCROW: Immersive Geospatial Data Visualization and Interaction in VR. *IEEE VRW 2025*. <https://doi.org/10.1109/VRW66409.2025.00094>
6. **H. Brument**. Preliminary Modelisation of User Locomotion Technique Usage during Navigation with Walking, Steering and Teleportation. *IEEE VRW 2025*. <https://doi.org/10.1109/VRW66409.2025.00064>
7. **Brument, H.**, De Pace, F., Podkosova, I. Does mixed reality influence joint action? Impact of the MR setup on users' behavior and spatial interaction. *Journal of Multimodal User Interfaces* 19, 119-138 (2025). <https://doi.org/10.1007/s12193-024-00445-w>

2024

8. **Brument, H.**, Chaminade, A., Argelaguet, F. Influence of Rotation Gains on Unintended Positional Drift during Virtual Steering Navigation in VR. *ACM VRST 2024*. <https://doi.org/10.1145/3641825.3687734>
9. **Brument, H.**, Lautenbach, T., Podkosova, I. Spatial Awareness and User Preferences During Group Locomotion in VR: A Study with Four-User Groups. *IEEE VRW 2024*. <https://doi.org/10.1109/VRW62533.2024.00078>
10. Vasylevska, K., et al. Stiffness Simulation with Haptic Feedback Using Robotic Gripper and Paper Origami as End-Effector. *IEEE VRW 2024*. <https://doi.org/10.1109/VRW62533.2024.00015>
11. I. Podkosova, **H. Brument**. Towards Full Body Co-Embodiment of Human and Non-Human Avatars in VR. *IEEE VRW 2024*. <https://doi.org/10.1109/VRW62533.2024.00084>
12. **Brument, H.**, Zhang, R., Kaufmann, H. Influence of VR Setup on Locomotion Technique Usage during Navigation with Walking, Steering and Teleportation. *ICAT-EGVE 2024*. <https://doi.org/10.2312/egve.20241377>

2023

13. Podkosova, I., De Pace, F., **Brument, H.** Joint Action in Collaborative Mixed Reality: Effects of Immersion Type and Physical Location. *ACM SUI 2023*. <https://doi.org/10.1145/3607822.3614541>
14. Vasylevska, K., Batik, T., **Brument, H.**, et al. Action-Origami Inspired Haptic Devices for VR. *ACM SIGGRAPH 2023 Emerging Technologies*. <https://doi.org/10.1145/3588037.3595393> ★ *Best Emerging Technology Demo*

2021

15. **Brument, H.**, Bruder, G., Marchal, M., Olivier, A.H., Argelaguet, F. Understanding, Modeling and Simulating Unintended Positional Drift during Repetitive Steering Navigation in VR. *IEEE Transactions on Visualization and Computer Graphics*, 2021. <https://doi.org/10.1109/TVCG.2021.3106504>
16. **Brument, H.**, Olivier, A.H., Marchal, M., Argelaguet, F. Studying the Influence of Translational and Rotational Motion on the Perception of Rotation Gains in VE. *ACM SUI 2021*. <https://doi.org/10.1145/3485279.3485282>

2020

17. **Brument, H.**, Olivier, A.H., Marchal, M., Argelaguet, F. Does the Control Law Matter? Characterization and Evaluation of Control Laws for Virtual Steering Navigation. *ICAT-EGVE 2020*. <https://doi.org/10.2312/egve.20201267>
18. **Brument, H.**, Marchal, M., Olivier, A.H., Argelaguet, F. Influence of Dynamic FoV Restrictions on Rotation Gain Perception in VE. *EuroXR 2020*. https://doi.org/10.1007/978-3-030-62655-6_2 ★ *Best Scientific Paper Award*

2019

19. **Brument, H.**, Podkosova, I., Kaufmann, H., Olivier, A.H., Argelaguet, F. Virtual vs. Physical Navigation in VR: Study of Gaze and Body Segments Temporal Reorientation Behaviour. *IEEE VR 2019*. <https://doi.org/10.1109/VR.2019.8797721>
20. **Brument, H.**, et al. Pyramid Escape: Design of Novel Passive Haptics Interactions for an Immersive and Modular Scenario. *IEEE VR 2019*. <https://doi.org/10.1109/VR.2019.8797848> ★ *Best 3DUI Demo Award*

RESEARCH COLLABORATIONS

TU Wien: Hannes Kaufmann, Khrystyna Vasylevska, Iana Podkosova, Soroosh Mortezaipoor, Emanuel Vonach

National: Georg Regal (AIT, VERTIgO project) | Markus Murtinger (AIT, NATO HFM MSG 354)

International: Gerd Bruder (University of Central Florida, USA) | Ferran Argelaguet (INRIA Rennes, France) | Francesco De Pace (CIM 4.0, Italy)

SKILLS & LANGUAGES

- **Research methods:** user studies (in-lab and field), qualitative interviews, concept validation, usability testing, within/between-subjects experiments, survey design, workshop facilitation, ethical review
- **Data analysis:** R, Python, Matlab, ANOVA, linear mixed models, psychophysics
- **XR development:** Unity 3D, Unreal Engine, Lens Studio; C#, C++, Java
- **Tools:** LaTeX, Git, web technologies, LLM (Codex, Claude)
- **Languages:** French (native) | English (fluent) | German (A2, active development toward B1 by end 2026) | Hungarian (A1)

REFEREES

Hannes Kaufmann Professor, Institute of Visual Computing and Human-Centered Technology, TU Wien, Austria hannes.kaufmann@tuwien.ac.at | +43 1 58801 18860

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