



ATTENTION & XR

SYMPOSIUM OF ATTENTION AND PERCEPTION IN XR (HYBRID)

20 – 21 June 2024

Registration: [Select tickets – ATTENTION AND PERCEPTION IN XR: A HYBRID SYMPOSIUM – King's College London, Strand campus, Macadam 3.1 and ONLINE \(tickettailor.com\)](#)

The event is free and open to all, but places need to be reserved.

Organised by **XR and Attention Research Group** and supported by **the Centre for Attention Studies**, King's College London, the symposium on *Attention and Perception in XR (Extended Reality)* is a hybrid event that combines presentations, discussions, immersive project showcases, and networking activities across two days. It brings together scholars and creatives to discuss the problem of attention and perception in XR, and explore what XR means for us at this present historical and technical moment. Structured around three intersecting themes, the symposium seeks to open up discussion and further research into the physiological and socio-cultural mechanisms of making and shaping attention in and with XR; into how we might use those to make XR spaces more body-caring and human-centred and how performing arts might inform the design of those spaces; and, last but not least, into how we might reshape the knowledge of cultural heritage and create new centres of attention across disciplinary boundaries.

PROGRAMME

DAY 1 (all hybrid)

10.45-11.00 Registration
11.00-11.10 Welcome

Attention Design and User Perception

11.10-11.15 Intro
11.15-11.30 Rob Morgan (Creative Director, *Playlines*)
***Surprising Myself: Drawing Attention to Augmented Identities in XR
Storytelling Through Anagnorisis***

One of the challenges of XR storytelling is that the player's attention is hybridised (not necessarily split) across digital/fictional and physical/real dimensions. Players' identities are also hybridised; rather than piloting an avatar via a controller as in flatscreen videogames, or embodying an avatar as in VR, augmented players are embodied largely as themselves. This also means it's challenging to superimpose player-character identities onto players; most successful AR experiences to date have only superimposed light, pliable identities like 'Pokémon Trainer' onto players. But to achieve sophisticated augmented storytelling we will sometimes need to more strongly characterise protagonists.

So how do we turn AR players into augmented player-protagonists? Veteran XR storyteller Rob Morgan will argue that the player's attention is key. Particularly in ways that augmenting storytellers can draw players' attention to ways in which they're already embodying the role the story needs them to play. Drawing on roleplaying, LARP and other media where players are acclimatised to maintaining hybrid identities, Morgan will outline techniques and case studies for creating augmented anagnorisis, adapting the Aristotelian dramaturgy technique to develop new types of 'realisation of (augmented) self'.

By manipulating the player's attention, AR storytellers can get players playing-along, even role-playing, before they even realise they're doing it. Then by drawing attention to their hybridised identity through anagnorisis, storytellers can show players that they are already participating in the world of the story, and that their authentic, grounded emotions can be part of the story too.

BIO: Rob Morgan is a writer, experience designer, digital dramaturg and researcher across VR, AR, mixed reality and immersive theatre. Rob writes and designs award-winning immersive experiences and has helped create story worlds and XR installations for some of the world's largest licenses, attractions and cultural institutions. As a game writer Rob has helped create some of the most critically-acclaimed games in VR and interactive narrative, and he is a pioneer of Mixed Reality theatre. Rob is founder and Creative Director of AR design studio Playlines, a Visiting Fellow at King's College London, and a founding director of the XRchiving conference on immersive technology for culture and heritage. His book '*Augmenting Imagination: Storytelling for Mixed Reality and Spatial Computing*' is due Oct 2024 from Routledge.

11.30-11.45 **CyberRäuber: Björn Lengers & Marcel Knapke (Digital Performing Arts Collective)**
Orchestrating Perception: User-Centered Design for Immersive XR Experiences

This talk explores the power of user-centered design in creating engaging XR experiences, such as "Things Fall Apart" and "Palace of Memory", that shape the perception and behavior of participants. We will examine how designers can orchestrate perception and behavior by leveraging design elements such as the XR camera, visuals, and multi-user interactions.

Key topics include blurring the boundaries between VR and XR, using the XR camera as a stylized narrative component to guide user attention, and designing multi-user experiences that foster shared perception and behavior. We will also discuss the importance of creating visuals that blend seamlessly with the environment to enhance immersion and magic.

By exploring these concepts, we aim to contribute to the discourse on attention and perception in XR, inspiring designers to create impactful experiences that resonate with users. We hope to foster collaborations and provide insights into crafting XR experiences that captivate participants and shape their perception and behavior, leading to more novel and meaningful interactions.

BIO: Marcel Knapke and Björn Lengers have been working together under the name CyberRäuber as a digital performing arts collective since 2016. According to "Theater der Zeit", their work is characterised by "a unique mixture of affinity for technology, pioneering spirit, pragmatism and love of theatre". Driven by curiosity and a belief in the great future of theatre, they are experts in the digital exploration of theatre traditions. Their work is shown internationally in theatres, festivals and galleries. Recent works include Things Fall Apart (a musical installation in mixed reality, most recently at the London Film Festival), Solingen 1993 (Schauspielhaus Düsseldorf), Palast der Erinnerung (Stiftung Humboldtforum Berlin) and Deus in Machina - Ein Ritual (Staatstheater Nürnberg).

11.45-12.00 **Nadine Aburumman (Lecturer in Computer Science, Brunel University)**
Real-Time Physics for Realistic Virtual Humans

Virtual humans are computer-generated characters that consist of a visual body with a human-like appearance and may express a range of observable behaviours. They are often designed to replace actual humans in virtual environments for entertainment, education, and immersive reality applications. This raises a demand to animate virtual humans in a believable manner, as they are

expected to interact with real humans in an immersive environment. However, creating realistic motions for dressed virtual humans is still a central challenge in computer graphics and interactive applications. In this talk, I'll discuss the main challenges of employing physics in the deformation process of virtual humans, enriching the purely geometric and kinematic deformations with physically realistic simulations.

BIO: Nadine is a lecturer in the Computer Science Department and is leading the [Graphics and Extended Reality Team \(GERT\)](#) and a member of the [Interactive Multimedia System \(IMS\)](#) research group. She co-coordinates the AI Centre Thought Leadership series ([TLS](#)) for the Centre for AI: Social and Digital Innovation. Before joining Brunel, Nadine was a research associate at the [Institute of Cognitive Neuroscience \(ICN\)](#) at University College London (UCL).

12.00-12.15 Stephanie Janes (Lecturer in Immersive Media and Global Media Industries, CMCI, KCL)

XR, Attention Economies and Experience Economies

Michael Goldhaber's article *The Attention Economy and the Net* (1997) and Pine & Gilmore's *Welcome to the Experience Economy* (1998) were published at around the same time, and the latter might almost be considered a solution to a problem posed by the former. Where Goldhaber suggests that attention is the single most valuable commodity in the information age, Pine & Gilmore argue that the way for brands to gain and retain that attention in a meaningful way is to trade not in products but experiences. As a result, immersive experiences and XR productions have become increasingly common in creative marketing campaigns for companies ranging from charities and NGOs to Hollywood blockbusters and fashion brands. This paper will use several case studies to explore how creative XR has been used in promotional contexts in the past, what kinds of attention it might demand from consumers, how it seeks to commodify that attention and what benefits and risks might be associated with attempting to 'immerse' audiences in creative branded content.

BIO: Stephanie is a Lecturer in Immersive Media and Global Media industries in the Department of Culture, Media and the Creative Industries at KCL. Her research interests include (but are not limited to) immersive promotional media, media audiences, alternate reality games and digital media cultures.

12.15-12.45 Discussion I

12.45-13.10 Lunch (provided)

Attention Modes and Artistic Treatment

13.10-13.15 Intro

13.15-13.30 Joanna Zylińska (Prof of Media Philosophy and Critical Practice, DDH, KCL)

Attention in the Image Envelope

Driven by AI, machine vision and computational image rendering, present-day imaging technologies expand our sense of reality, while presenting us with a sense of enclosure. They also attune our attention to a unique spatiality and rhythm. This talk will investigate what it means for humans to live surrounded by incessant image flows. 'The image envelope' will be the name given to this dual experience of perceptual expansion and enclosure. This talk will ask whether this ever-enclosing image envelope can be more than another business venture for Big Tech. Seeking alternative ways of attending to image technology in VR/XR, we will explore the possibility of opening up the image envelope with a view to allowing us to see, sense and experience the world anew.

BIO: [Joanna Zylińska](#) is a writer, artist, curator and Professor of Media Philosophy + Critical Digital Practice at King's College London. She is also a member of [Creative AI Lab](#), a collaboration between King's and Serpentine Galleries. Zylińska is an author of a number of books – including [The Perception Machine: Our Photographic Future Between the Eye and AI](#) (MIT Press, 2023, open access), [AI Art: Machine Visions and Warped Dreams](#) (Open Humanities Press, 2020) and [Nonhuman Photography](#) (MIT Press, 2017). An advocate of 'radical open-access', she is an editor of the MEDIA : ART : WRITE : NOW book series for Open Humanities Press. Her art practice involves experimenting with different kinds of image-based media. She is currently researching perception and cognition as boundary zones between human and machine intelligence, while trying to map out scenarios for alternative image futures.

13.30-13.45 Elliott Hall (Research Software Engineer, King's Digital Lab)

Place Based Immersion

Elliott's creative productions use real world spaces and the internet of things to engage audiences and tell stories in unexpected ways. Fusing live performance and location based, digitally driven interactivity, his collaborations value physicality and ambience on a par with purely digital experiences.

BIO: Elliott Hall is a Creative Technologist, Writer, and Research Software Engineer. As a Creative Technologist he makes immersive family shows using a combination of AR, embedded systems and live performance, using Unreal Engine, Unity, and embedded systems like Raspberry Pis and Micro:Bits. He is the creator of the Digital Ghost Hunt, co-created with Tom Bowtell of KIT Theatre, and the immersive AI installation Room is Sad.

13.45-14.00 Madi Boyd (Visual Artist)

The Complexity of Touch

Artist Madi Boyd will discuss her recent multi-sensory installation, which prioritises touch as the primary mode of engagement and probes the role touch and the body play in shaping perception, memory and imagination. The artist collaborated with Psychology Professor Polly Dalton from at Royal Holloway University to design original research experiments on attention and tactile complexity. The results were used to inform the art installation. This long-standing collaboration has led to several installations over the past decade and is an on-going exploration of the psychological impact of immersive experiences.

BIO: [Madi Boyd](#) is an artist whose work uses light, space, and time as sculptural matter. She has exhibited at, among others, The Science Museum, London, The Science Gallery, Dublin, Art Laboratory Berlin, Puke Ariki Museum, New Zealand, Guangzhou Province, China, Kunstkraft- werk, Leipzig, Science Discovery Centre, Kuala Lumpur, The Discovery Place, USA and Ca' Foscari Zattere, Venice. Boyd studied at The Slade School of Fine Art, her personal tutor was Phyllida Barlow, she graduated in 2005.

14.00-14.30 Lois Svard (Prof of Music Emerita, Bucknell University)

Might the Study of Music Inform the Study of Extended Reality?

In a world in which the visual dominates, looking at the process of making music can show us the importance of sound and the movement that creates it. We perceive a work of visual art "all at once," even though we may take time to explore various aspects of the art piece. But we can only perceive music as it unfolds in time and space, and this requires our attention and focus as a listener. But an even greater degree of extended focus and attention is necessary for a musician to learn to translate a two-dimensional musical score (visual) into a multi-dimensional realization of what that score represents in terms of sound, movement, and the emotional communication that the listener perceives. This presentation will look at possible reasons why our brains have evolved to privilege visual information and why that sometimes hinders us from a more complete sensory experience. It continues with a discussion of sensory information and patterns. All sensory information enters the brain as patterns, whether from the eyes, ears, skin, nose, or tongue. The brain communicates in patterns. Musicians learn to recognize visual patterns in the score and to recognize rhythmic, melodic, and harmonic patterns in the sound of the music. We learn movement patterns in order to create sound on our instruments. The better we are able to see, hear, feel, and recognize those patterns, the easier it is to memorize the musical material. Encoding the information in the brain in more than one way, or with more than one of our senses, makes it more secure and increases our ability to recall the information. And finally, encoding information in the brain in more than one way depends on extended focus and attention, and those are executive function skills – as are working memory and cognitive flexibility, all of which a musician acquires in the process of studying and performing music. The presentation concludes with a discussion of "attention" as the important first step in the process of learning and memory and encoding information securely in the brain.

BIO: Pianist **Lois Svard** has received critical acclaim for her performances and recordings of contemporary American piano music. She is also well-known for her work in applying current neuroscience research to the study and performance of music. Her book, *The Musical Brain: what students, teachers, and performers need to know* is published by Oxford University Press and was named one of their most read books of 2023. She also writes a blog [The Musician's Brain](#), that has introduced readers in more than 120 countries to some of the latest research in neuroscience and music.

14.30-14.45 **Nye Parry (Prof of Composition and Electronic Music, Guildhall School of Music)**
Exploded Sounds in Real and Virtual Worlds

Composer Nye Parry discusses two versions of his sound installation *The Exploded Sound*, the project supported by the Guildhall School of Music and Drama. The first, presented in a gallery space in Ljubljana in 2013, consisted of sixty suspended loudspeakers each carrying brief loops of simple sound components adding up to recognisable orchestral and vocal sounds, the second a virtual equivalent online, and currently being developed as a VR experience. The work in its original form draws the listener's attention to their own perception of sound through an aural illusion and the ability to explore a sound through physical movement in the space. The current research asks whether a virtual equivalent to this embodied experience is possible. Can VR offer sound artists an alternative exhibition space and what considerations might be involved in working in this space?

BIO: Nye Parry's work (www.nyeparry.com) encompasses sound installation, multimedia, concert works and over 20 full length scores for contemporary dance companies. He has made sound installations for major museums including the National Maritime Museum, the Science Museum and the British Museum. His installation *Significant Birds* has reached over a million visitors worldwide. His work explores music as a spatial practice, illusion and perception and generative soundscapes. He frequently collaborates with artist Madi Boyd to explore multi-modal relationships and interactions. His writing on music appears in *The Oxford Handbook of Interactive Audio*, *Organised Sound*, *Neue Zeitschrift für Musik* among others. From 2003 – 2011 he led the MA in Sonic Arts at Middlesex University, and he is Professor of Electronic Music and Composition at the Guildhall School of Music and Drama and Trinity Laban Conservatoire.

14.45-15.15 Discussion II

15.15-15.40 Coffee Break (25 min)

Attention and Knowledge Production

15.40-15.45 Intro

15.45-16.00 Luís Felipe Abbud (Visiting PhD Researcher, CMCI, KCL)

DemonumentaAR: Resignifying public Monuments Through AR in São Paulo, Brazil

How much do we know about the public monuments that surround us in the public spaces of our cities? How can pedagogical process of XR design be used as a tool for reflection and resignification of urban memory and identity?

demonumentaAR is an Augmented Reality (AR) experience for handheld devices in public spaces, that proposes a reflection on historical heritage, combining research and digital technologies, through a playful, interactive and experimental pedagogical experience.

Representing the results of a multidisciplinary research project, designed and developed at FAU USP and involving undergraduate and graduate students from the Architecture and Design courses, the experience is based on lowpoly three-dimensional models reconstituting 22 problematic monuments in the city of São Paulo, along with original audio guides that bring the stories of their conceptualizations and constructions, in a way that they can be publicly resignified, based on new relationships with the sociocultural diversity of our present, and through the lenses of decoloniality.

The focus of the project are the monuments created for the celebrations of 1922, including the reverberations of the historical São Paulo's Modern Art Week and the Centenary of Independence in later decades, such as 1954, year of the IV Centenary of the City of São Paulo, and in 1972, controversial dates from the sesquicentennial of Independence, promoted by the military dictatorship under the government of Emilio Garrastazu Médici.

BIO: Luís Felipe Abbud (Sao Paulo, 1985) is an architect and multimedia designer, graduated in architecture at University of Sao Paulo (USP), with an exchange program with Delft University of Technology (TUDelft). Through his ongoing Doctorate research at USP, he is developing a cross-disciplinary framework for audiovisual immersive design, and based on the 'Research through Design' methodology, he is investigating the spatiality derived from XR experiences, by coordinating multidisciplinary design teams for public and cultural projects that merge physical installations with electronic devices, sponsored by national and foreign institutions such as The Secretary of Culture of the State of São Paulo, Banco Iberoamericano de Desenvolvimento - BID and The Lego Foundation. Based in Sao Paulo - Brazil, he is the founder and creative director of Estúdio Hiper-Real, teaches architecture at *Associação Escola da Cidade*, and is an active associate of the tactic urbanism think tank *institute The City Needs You*, all in which he has conceived and developed various cultural projects and activities with special emphasis on engaging communities and activating public spaces. Abbud is currently developing his Doctorate Sandwich research at King's College London, in the Department of Culture, Media & Creative Industries, through the postgraduate scholarship program by CAPES - Coordenação de Aperfeiçoamento de Pessoal de Nível Superior / PPG Design FAUUSP.

16.00-16.15 Hugh Bowden (Prof of Ancient History, KCL)

Virtual Reality Oracle

The Virtual Reality Oracle (VRO) project uses modern resources to explore the ancient world. It aims to enhance historical understanding of ancient Greek oracle consultation and the oracle of Dodona. It is also exploring the role of VR in classrooms, museums and cultural settings; and bringing a richer understanding of sensory processing and brain activity in users of VR.

BIO: Hugh Bowden is Professor of Ancient History at King's College London, specializing in ancient Greek religious experience.

16.15-16.30 Neil Jakeman (Senior Research Software Analyst, KDL)

A Close Reading of Representational Art Using Immersive Tech

This presentation revisits an approach to engaging with an artwork and its compositional detail through immersion. The original work used an exploratory approach to recreate a 2D figurative artwork in 3D in order to recompose its elements and in doing so, attempt to foster an enriched connection to the story moment being depicted. In light of new technological development, and to attempt a more methodical and systematic interpretation. It is suggested that the act of recreating using immersive techniques can focus attention on minutiae that might otherwise go unobserved and potentially opens new critical avenues for non-experts.

BIO: Neil is a Senior Research Software Analyst at King's Digital Lab. Neil's current research interests are focused in the use of creative technology in heritage interpretation and engagement.

16.30-16.45 Gabriele Salciute Civiliene (Senior Lecturer in Digital Humanities, DDH, KCL)

Rhetoric of Attention: VR for Embodied Reading

Like cinema and theatre, VR makes use of observation and attention making mechanisms that depend on neural mirroring. Mirror neurons fire in different parts of the brain when we do things ourselves as well as when we observe others perform. Both cognitively and emotionally, we can relate to what is shown on screen and stage. Mirror neurons also activate in response to both perceived and imagined actions as well as to the sound associated with such actions. Perception and re/production are inherently linked on the physiological level even though we conceptualise them as different things. We can assume that all media makes use of these porous boundaries between the two. Because of this link observing and acting, every mediated perception is potentially embodied and experientially credible: we live what we observe. In this talk, I will discuss some aspects of my VRELL (VR Ethnography and Literature across Languages) project. Premised on the idea that literary texts are experiential artefacts, the project challenges the logocentric modes of literary representation. It uses the medium and storytelling of VR to explore literary imagination in experiential ways and to foreground the acoustic dimensions and variations in literary reading.

BIO: Gabriele is a Senior Lecturer in Digital Humanities in the Department of Digital Humanities, King's College London. The scope of her work and research includes cultural event curation, cross-linguistic computing, speculative design, aesthetic prototypes of computational thinking, and immersive technologies. She is the founder of the *Un.censor.ing* network and a member of several international editorial teams and advisory boards. Gabriele is currently leading a few projects centred on experimenting with and developing digital solutions in visualising intellectual and cultural heritage.

16.45-17.15 Discussion III

17.15-18.00 Drinks Reception

DAY 2

11.00-12.00 Treasure Hunt on RecRoom (**hybrid**)

12.00-13.30 Immersive Project Showcase & Presentations (**onsite only**)

13.30-14.30 Roundtable Discussion (**hybrid**)