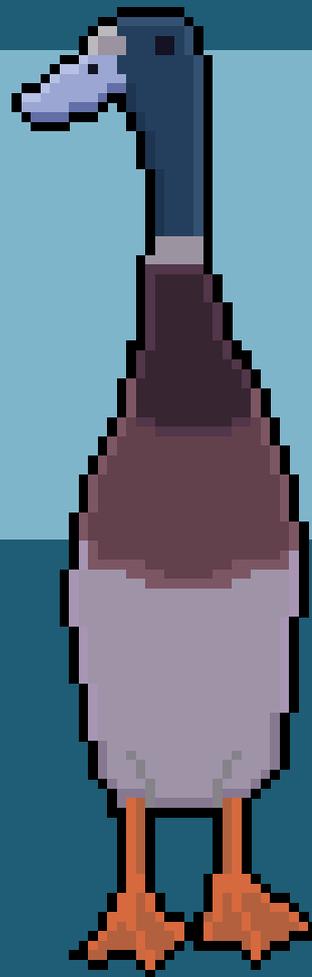




IGGI CONFERENCE 2022

6-7 SEPTEMBER





IGGI

**The EPSRC Centre for Doctoral Training  
in Intelligent Games and Game Intelligence**

**[www.iggi.org.uk](http://www.iggi.org.uk)  
@iggiphd**





## TABLE OF CONTENTS

<b>Welcome</b> .....	<b>6</b>
<b>What is IGGI?</b> .....	<b>7</b>
<b>How to get involved</b> .....	<b>8</b>
<b>IGGI partners and collaborators</b> .....	<b>9</b>
<b>IGGI Researchers</b> .....	<b>12</b>
<b>IGGI Alumni</b> .....	<b>84</b>
<b>IGGI Conference – Foreword</b> .....	<b>86</b>
<b>Keynote Speakers</b> .....	<b>88</b>
<b>Rachel Kowert</b>	
<b>Tom Cole</b>	
<b>Sahar Asadi</b>	
<b>Conference Programme</b> .....	<b>92</b>
<b>Accessibility Information</b> .....	<b>96</b>
<b>Conference Committee</b> .....	<b>97</b>

## WELCOME

**Welcome to IGGI 2022! Whilst we've managed to keep things going through the challenges and constraints of covid, there's definitely something special about meeting together in the real world.**

The annual IGGI conference brings together PhD students, supervisors and researchers from the EPSRC Centre for Doctoral Training in Intelligent Games and Game Intelligence (IGGI) with practitioners from industry and the third sector to share our newest work, welcome our new cohort of students, and forge new connections for research collaborations and placements.

With a total of 110 recruited PhD students, IGGI is the largest doctoral programme in games research across the globe. As its name suggests, IGGI pushes a twofold agenda:

**Intelligent Games:** Advancing game AI, analytics, design, and responsible innovation to boost the UK games industry;

**Game Intelligence:** Advancing applied gaming for social and scientific impact, such as games for mental health or using Esports data to teach data literacy or answer basic science questions.

Despite the problems covid has caused everyone, IGGI has continued its success of previous years. We now have a steady stream of students graduating and many going on to research and industry positions. The research they have produced is outstanding and is making a real difference to the whole field of games research and to the industry partners that have worked with us. And soon we will be kicking off our recruitment round for our last intake of IGGI students in the current project. There's always time for you to get (more!) involved.

To find out more about how you might work with us, do get in touch with me or any of the IGGI staff. I hope you really enjoy the conference and I am very much looking forward to talking to you in person.

**The IGGI Management Team:** Paul Cairns, Peter Cowling, Simon Lucas, Sebastian Deterding, Atau Tanaka and Michael Fairbank

## WHAT IS IGGI?

The EPSRC Centre for Doctoral Training in Intelligent Games and Game Intelligence (IGGI) is a £25 million EPSRC Centre for Doctoral Training with the mission to develop cutting-edge research the games industry needs and to transform the way the games industry works with the academic community. IGGI is a collaboration between the University of York, the University of Essex, Goldsmiths, University of London, and Queen Mary University of London, as well as more than 60 games industry partners like Creative Assembly, AI Factory, UKIE, TIGA, or Sony.

IGGI projects are organised around two main themes:

### 1. INTELLIGENT GAMES

Using research advances to seed the creation of a new generation of more intelligent and engaging games.

### 2. GAME INTELLIGENCE

Using games as a data source and tool to further science and societal wellbeing.

Around these themes, IGGI enables industry partners to access and influence research in analytics, artificial intelligence (AI), audio, computational creativity, design, engagement, gamification, human-computer interaction, psychology, and software development. IGGI students and researchers are already working with game studios, startups and Fortune 500 companies like Bossa Studios, BT, Google Deepmind, Media Molecule, MindArk, Microsoft, Prowler, Splash Damage, Square Enix, Sony or Visteon to develop more engaging, human-like AI, create radically faster ways of balancing games or use machine learning to produce new forms of art and heritage experiences.

## HOW TO GET INVOLVED

The main way to engage with us is through our students. IGGI is a highly competitive PhD programme, attracting top creative and technical talent from around the world and a wide range of backgrounds. Working with our students, you can conduct, access and embed cutting edge research in your organisation, kick-start collaboration with our researchers, and build relationships with potential future recruits.

While we are always open to find an arrangement that fits you, here are some of the usual ways that partners have become involved:

**Placements:** These can last from 2 weeks to 6 months and are negotiated to suit your company needs.

**Sponsorships:** Partly or fully sponsor a research project that aligns with your interests to make it happen and enjoy a preferential working relationship or IP agreement.

**Co-supervision:** Specify research topics of interest to you for our annual recruitment cycle in return for ongoing support and guidance when the fitting student is recruited.

**Industry days:** Half- or full-day sessions with students such as mini-conferences, networking events workshops, design jams or hackathons around particular themes of your interest, hosted at one of our sites or on your premises.

**Coaching and mentoring:** Even something as minimal as occasional emails is a great way to build relations with IGGI students and share your valuable knowledge and experience.

**Access to data, software or facilities:** Access to game data is essential to our research, while our analyses can provide deep insight into your players and design challenges. Access to industry software means our research is exposed to the acid test of industry work environments - and its results are far easier to integrate for you. And while universities have excellent resources, there is always equipment to which we would like to have access.

**Student offers:** Introduce students to your organisation or products through discounted memberships or subscriptions during their PhD.

### Interested?

We always welcome new partners. If you are interested, please contact, Susanne Binder, the IGGI Manager for External Relationships on [IGGI-admin@york.ac.uk](mailto:IGGI-admin@york.ac.uk)

## IGGI PARTNERS AND COLLABORATORS

Here's a selection of recent and current IGGI Partners.

**17 Oranges**

**AI Factory**

**BAME in Games**

**Bossa**

**Creative Assembly**

**Die Gute Fabrik**

**Earcom**

**ESL**

**Failbetter Games**

**Fusebox Games**

**Game Republic**

**DeepMind**

**Human VR**

**Inhalation**

**ITU Copenhagen**

**Kythera AI**

**Microsoft Research**

**modl.ai**

**NATS**

**Nemisindo**

**Player Research**

**Revolution Games**

**Rewind**

**Safe In Our World**

**Shanghai Jump Net  
Technology Co., Ltd.**

**Sony**

**Square Enix**

**Swords Narrative**

**Take This**

**Team Genj**

**The Chinese Room**

**TIGA**

**Tommy Tompson**

**UKIE**

**weavr.tv**

**WildMeta**

**Women in Games**





IGGI RESEARCHERS



## ÁDÁM KATONA

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**Skills:** Machine Learning, Evolutionary computation

## BIOGRAPHY

Ádám did his MSc in mechatronics at Budapest University of Technology and Economics. After graduation, he spent two years working on automated driving at Robert Bosch GmbH, during which he got exposed to both the classical and the machine learning approach of creating intelligent agents.

## EVOLVING EVOLVABILITY FOR NEUROEVOLUTION

Evolutionary computation continues to surprise us by producing creative and efficient designs. However despite our best efforts, artificial evolution had not produced anything as complex and interesting as natural evolution. As our hardware is becoming faster and number of cores in our chips increase, the lack of computational power is becoming less of an excuse. It is starting to become more and more obvious that some fundamental component of natural evolution is missing from our simulations. One possible candidate is the evolution of evolvability. Evolution seems to produce organisms which are well suited for further evolution. The goal of my research is to find mechanisms which allows evolution to increase evolvability, and incorporate these in the design of more efficient neuroevolution algorithms. This research is in the intersection of evolutionary computation, evolutionary developmental biology and neural networks.



## ADRIÁN BARAHONA-RÍOS

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**Skills:** Sound Design, Machine Learning, Digital Signal Processing, Game Audio

## BIOGRAPHY

Adrián has been enthusiastic about sound and more specifically about game audio since he began his studies. By the time he completed an HND in Creative Media Production in Madrid, he started working in the industry as a recording engineer in an ADR studio for the Spanish localisation of video games (such as Fallout 4, Until Dawn or Just Cause 3). He moved from Spain to the UK in 2015 to take a BA (top-up) in Music Production at the Southampton Solent University and an MSc in Sound Design at the University of Edinburgh immediately after. During that journey, he focused his career in procedural audio and explored ways to create models for interactive applications by using different techniques.

## SOUND EFFECT SYNTHESIS USING DEEP LEARNING

From 2018 and in collaboration with Sony Interactive Entertainment Europe, Adrián has been researching strategies to increase the efficiency in the creation of procedural audio models for video games by using DSP and machine learning approaches. His main research interests, applied to the synthesis of sound effects, are generative deep learning to synthesise audio and machine learning to find out the best parameters for a synthesiser to generate a target sound.



## ALAN PEDRASSOLI CHITAYAT

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**Skills:** Machine Learning, Data Visualisation, Data Science

## BIOGRAPHY

Alan graduated with his BEng in Computer Science at the University of York.

Having worked on the ML and Data Science industry for 3 years, Alan was able to carry his own research supported by industrial partners which allowed him to gain the knowledge and expertise needed to apply for his PhD.

## UNDERSTANDING PLAYER DECISION MAKING

Alan's research focuses on "Understanding Player Decision Making", with a particular focus on esports players for the purpose of broadcasting.

During his last workplace before starting his PhD, Alan has worked on an esports companion app, which used creative AI/ML to generate insightful storytelling to improve on the audience experience. Through this position, Alan has built a fascination with insightful and explainable narrative generation and has since used his AI/ML experience paired with HCI and design patterns to generate useful narratives through transparent Data-Driven Audience Experience (DAX).



## AMY SMITH

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**Skills:** Computational Creativity, Digital Art, Design and Development

## BIOGRAPHY

Amy studied Fine Art at Bath School of Art and Design at undergraduate level and had a career as a professional tattoo artist for several years after graduating. After becoming interested in learning how to code, she started her Master's degree in Computer Science in 2018 at the University of Birmingham. It was during her time at UoB that she discovered her interest in Artificial Intelligence. Amy then joined the IGGI programme as part of the 2020 cohort. Her interests mainly lie at the intersection of generative deep learning and visual art. Her work explores how code can produce artistic imagery and the role that social media can play in this process; she often draws from her experience as an art student and professional artist to enhance her approach to her work.

## @ARTBHOT: TOWARDS A BOT WITH A CREATIVE PRESENCE ON TWITTER

Different implementations of text-to-image deep learning models are becoming increasingly popular in the public domain, particularly on social media. Apps like 'Wombo Dream' and the more recent, free to use, mini version of DALL.E (from OpenAI) have replaced the previously used Google Colab notebooks for accessing and interacting with this technology. Google Colab notebooks have a potential barrier to

entry for individuals with no technical background, and so these newer apps open up text-to-image image synthesis methods to a much wider audience - as they are easy to use.

The Twitter bot that Amy has implemented also brings the text-to-image image synthesis method to a wider audience, by bringing it on to one of the largest social media platforms used by the public today.

'@artbot' uses text-to-image deep learning technology to turn user tweet text in to images. The bot can process this text and then reply to Twitter users with novel imagery based on the text prompt. It can also respond to user tweets with animations. In the future, we aim to increase the creative autonomy of the bot, and use it to answer questions about user interactions with computationally creative agents.



## BOBBY KHALEQUE

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**Skills:** Automated Game Design, Procedural Content Generation, Unity Game Development, Evolutionary Algorithms

## BIOGRAPHY

Bobby is a second year IGGI researcher at QMUL who is part of the Game AI research group. Bobby has a background in Computer Science and Artificial Intelligence, and therefore decided to pursue games research, particularly for Automated Game Design and Exploratory Games. Since starting the IGGI program Bobby, alongside his IGGI colleague, Michael Saiger, have published in the Press Start Journal, a paper titled: What Factors Do Players Perceive as Methods of Retention in Battle Royale Games?

Bobby's research interests include: Computational Creativity, Automated Game design and Game AI in general.

## AUTOMATED GAME DESIGN (AGD) FOR EXPLORATORY GAMES

Automated Game Design is a form of AI assisted game design where whole playable games are generated. This is applied to Exploratory Games. Exploratory games can be defined as games which may focus less (or sometimes not at all) on rules and mechanics but instead reveal one or more themes/narratives through their visual and world design. Some examples of Exploratory Games are; The Outer Wilds, Journey and No Man's Sky.

Bobby has chosen to pursue this due to the lack of research in AGD, especially in regard to experiences focusing less on rules and mechanics and more on visual and world design.

Bobby is currently working on a project where low cost AI agents, developed in Unity, give feedback on how "interesting" an environment might be. This feedback is then planned to be used in an environment generation process to generate more interesting environments for a player to explore.



## CALLUM DEERY

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**Skills:** Games user research, Game design, Pixel Art

## BIOGRAPHY

Callum is a games user researcher and occasional game designer. From investigating how players view difficulty options as part of Human Centered Interactive Technologies Masters at the University of York, Callum is now working on games user research techniques after some time working on indie game projects.

## EMBEDDED QUESTIONNAIRES FOR ADAPTIVE GAMES

The games industry increasingly relies on measuring the player experience to make game design decisions, from techniques as simple as watching a player play to as complex as a telemetry pipeline. These techniques currently have a gap in ability to understand how a player is feeling in real time. This is a gap embedded questionnaires may be able to fill, by sneaking questionnaires into games in a way which doesn't break immersion it may be possible to address this gap.

This research is using a creative practice approach to investigate this possibility and create practical advice for developers with an interest in using this new game user research technique.



## CARLOS GONZALEZ DIAZ

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**Skills:** HCI, VR, ML, Software  
Engineering, Qual & Quant methods

## BIOGRAPHY

Carlos is finishing his PhD at the University of York. He holds an MSc in Serious Games at the University of Skövde (Sweden) and a BSc in Software Engineering (Spain). He has been closely connected with industry throughout his PhD, having worked in the last years for Microsoft Research, Sony Interactive Entertainment R&D, Musemio Ltd R&D and Goldsmiths, UoL; as well as having done consulting for tech companies such as Unity Technologies.

## INTERACTIVE MACHINE LEARNING FOR MORE ENJOYABLE VR INTERACTIONS

The purpose of my PhD research is to advance game technologies by democratising the use of ML techniques among non-experts through innovative tools and plugins for game engines. I developed ML specific visual scripting languages and used mixed-methods research approaches to understand how to better support developers in creating VR interactions and the challenges behind human-AI interaction.

I had several technical jobs throughout my PhD, as my expertise is highly applicable in both industry and academia. Thanks to the broad range of expertise that I gathered through many years of industrial work and academic study, I can tackle the challenges emerging from the inter-disciplinary nature of modern work: where user psychology, immersive technology and artificial intelligence intersect.

Please refer to my website for completely up-to-date information regarding publications. Feel free to reach out if you want more information or want to chat about my/your work. I am looking for positions starting in February 2023 onwards.



## CHARLIE RINGER

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**Skills:** Machine Learning, Artificial Intelligence, Python.

## BIOGRAPHY

Charlie was born and raised on the sunny Isle of Wight, off the south coast. He took an unconventional route to academia, first working for several years in the video games industry before getting his BSc in Computer Science from Goldsmiths in London. After his degree he joined IGGI to pursue a PhD focusing on how to apply Machine Learning in a dynamic and variable setting such as video games. His main motivation is to develop tools and techniques which use Machine Learning to provide services that would otherwise be impossible or infeasible.

## EMOTIONAL AND SALIENT MOMENT MODELLING IN VIDEO GAME STREAMS

The main aim of Charlie's research is to use machine learning techniques, especially those developed for affective computing, to develop suitable methods for assessing the salient moments in video game livestreams by utilising the various sources of information in a stream, such as facial expressions and gestures of the player, viewer chat logs, and the actual game footage. Video game livestreams are a new and exciting paradigm for studying the experience of playing games and observing video game play, of which salient and 'highlight' moments are important, as they are data rich, containing many views, e.g. webcam, stream audio, game footage, and chat, as well as types of interaction, e.g. between the player and the game, the player and other players, the player and the viewers, and the viewers and the game, and event occurrence. The potential impact of this research spans several practical applications, from building automatic 'highlight' detection tools for streaming platform to furthering our knowledge of how to build computational models of multi-modal saliency



## CHARLINE FOCH

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**Skills:** Qualitative research, game design, game analysis, teaching

## BIOGRAPHY

Born and raised in France, Charline first came to the UK in 2011 to study English and Film Studies at King's College London, before going on to a MSc in Film, Exhibition and Curation at the University of Edinburgh. By chance or accident, she stumbled into the games industry by working in an indie game studio in Berlin, where she touched upon customer support, community management and QA. This experience gave her the push to apply for a PhD on video games. In her spare time, she enjoys watching (too many) movies, playing volleyball, making art and making games (most of which she has yet to finish).

## GAME (NOT) OVER: UNDERSTANDING DESIRABLE PERCEIVED ASPECTS OF FAILURE FOR GAME PLAYERS AND DESIGNERS.

Charline's research focuses on how people conceptualise failure, with an emphasis on its perceived positive, desirable effects on the player experience. Throughout her PhD, she has conducted research among video game players to gain a better understanding of what they perceive as the purpose of failure in the games they play; and among video game designers to gain a better understanding of what processes, concerns and ideas have gone into the design and implementation of failure in their games. With a deliberate

focus on narrative-driven games, she now aims at designing a toolkit to encourage game designers to critically reflect on and discuss the intersection between failure, game mechanics, storytelling, and player experience when working on their games.

As part of her PhD, Charline has also worked with the Digital Creativity Labs on the PlayOn! project, a European project gathering 9 theatres across Europe working on immersive technologies (such as VR, AR, the use of apps for audience participation...) and theatre production. During her time at PlayOn!, she has worked on the connections between the games industry and the performance arts, investigating how technology, game design principles, and theatre can work together, and what barriers practitioners face when attempting to reconcile all sides in a single production through collaboration and experimentation.



## DAN COOKE

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**Skills:** Finance, Accounting, Statistics

## BIOGRAPHY

Dan has a keen interest in the world of Finance and how users respond to monetisation in the videogames industry. He has a background in Accounting and Finance and graduated with a MA in Applied Accounting from De Montfort University in 2019. He is interested further in E-Sports and competitive gaming and the rise of free to play games in the industry. His research interests include how users respond to videogame monetisation and the links between monetisation methods and the acceptability and successfulness of videogames across platforms.

## ACCEPTABILITY OF VIDEO GAME MONETISATION

This project aims to tie together the world of video gaming with financial analysis. With the use of computer science techniques and analytics I shall integrate my background in finance and accounting with industry data to develop an understanding as to the acceptability and sustainability of different types of monetisation within videogames. This will benefit both users and the industry by indicating which monetisation methods from actual user interaction data with games and monetisation are sustainable. Having this understanding should help push companies in a direction of mutual benefit for themselves and users allowing them to maximise revenue and shareholder/developer wealth while retaining users and building communities which will provide stable long-term revenue in a non-predatory manner.



## DAN GOMME

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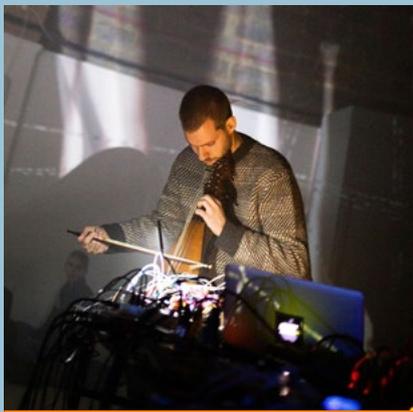
**Skills:** Player Experience, HCI, UX

## BIOGRAPHY

A longtime programmer having turned to the dark arts of psychology and statistics to figure out some of how humans tick, Dan's always been interested in both machines and the people that use them. He's played a good few games older than he is, and some that are probably more complex too. Much as he has a BSc in Computer Games from the University of Essex, he's curious about nearly everything - music, magic, writing, design... The list goes on, and he hopes to get vaguely close to mastering even one of them some day.

## MEETING THE EXPECTATIONS PLAYERS HAVE OF STRATEGY GAME AI

We all know that there's room for improvement when it comes to AI in games. But what's better, what's an improvement there? Is it AI winning just the right amount? Or is there some finer nuance to the problem? That's where I come in. By doing the unthinkable - asking players about their experiences with strategy game AI - I've been exploring their frustrations, and the expectations that players seem to have of the opponents they play against. By further investigating what these expectations are (such as providing suspense and tension in competition), and how to better meet those expectations, we can improve player experiences even in domains where we don't yet have the computing power to make players that can match human skill.



## DIMITRIS MENEXOPOULOS

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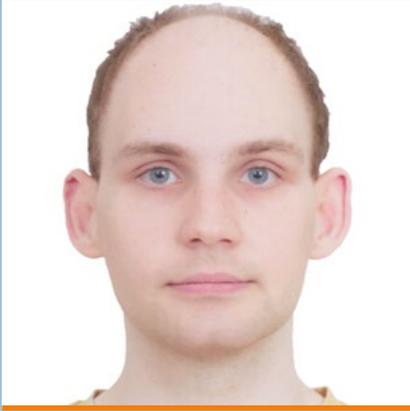
**Skills:** Music Composition, Sound Design, Creative Audio Technology

## BIOGRAPHY

Dimitris Menexopoulos is a versatile composer, sound designer, audio technologist and multi-instrumentalist from Thessaloniki, Greece. He has two solo albums under his name (Perpetuum Mobile - 2017, Phenomena - 2014), two EPs (Modern Catwalk Music - 2022, 40 EP - 2020), two soundtracks (Iolas Wonderland - 2021, The Village - 2019) and various performances internationally. His collaborations include electronic musician Robert Rich (Vestiges - 2016), director Shekhar Kapur (Brides of the Well - 2018) and film composer George Kallis (The Last Warrior: Root of Evil - 2021, Cliffs of Freedom - 2019) among others. As a designer, he has exhibited work at sites including the Barbican Centre (Nesta FutureFest - 2019, with Akvile Terminaite), the Somerset House (24 Hours in Uchronia with Helga Schmid - 2020) and Apple Regent Street (Today at Apple - 2020, with Yiming Yang). His current research is on Graphics-Based Procedural Game Audio. His original music devices have been displayed at venues in the UK (Iklectik - 2020), France (IRCAM - 2020, 2019) and in the USA (Mass MoCA - 2019).

## EXPLOITING GAME GRAPHICS RENDERING FOR SOUND GENERATION

While procedural content generation is extensively exploited in graphics rendering, little attention is given to its application in game audio, where assets are still predominantly sample-based. This approach has given convincing results in the past, but as modern video games keep growing into more complex immersive experiences, sample-based audio implementations are starting to show their aesthetic and technical limitations. Since there's a plethora of information dictating graphics generation that is readily available in the game engine, the potential to use it for procedural sound generation seems highly promising. This observation gives rise to the following research question: how can existing animation information, available in the game engine, be used to generate the sounds produced when objects interact in real time inside a digital environment? The focus of this research lies in the exploration and development of game graphics exploitation techniques for both real time sound effects design and music synthesis applications.



## DOMINIK JEURISSEN

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**Skills:** Game AI, Reinforcement Learning, Software Development

## BIOGRAPHY

Dominik has always had a fascination for analyzing and automating complex tasks. As a result, his bachelor at FH-Aachen focused on software development paired with applied mathematics, and his master at Maastricht University focused on Artificial Intelligence. His goal is to research how to achieve general artificial intelligence. He currently focuses on intrinsically motivated reinforcement learning and solving catastrophic forgetting. During his spare time, Dominik enjoys playing board games with friends, participating in programming challenges, and cooking.

## MODELLING PLAYER BEHAVIOUR IN TOTAL-WAR GAMES (HUMAN-LIKE PLAY USING INTRINSIC MOTIVATION)

This project is conducted in collaboration with Creative Assembly, the creators of the Total War series. Total War is a turn-based strategy game in which the battles between units are conducted in real-time. This project will focus on modelling the playstyles of Total War players to create more sophisticated AI opponents and use the gathered knowledge to improve the game's design. We plan to achieve this goal by creating more human-like AI, which can then be parametrised to replicate different playstyles or be used to evaluate a game's design.

Since games are played to have fun, a human-like AI should also play for fun. While there have been attempts to create more fun agents, these approaches often focus on a single definition of what fun is. Since fun is subjective, there cannot be a single metric for measuring it. However, we know that players keep playing games if it motivates them to keep playing. Motivation is usually categorised into intrinsic and extrinsic motivation. Extrinsic motivation is triggered by external factors like a promised reward or punishment. In contrast, intrinsic motivation is triggered by doing something for its inherent satisfaction. While a game provides extrinsic motivation using victory conditions or achievements, intrinsic motivation dictates if and how a player plays a game. Some studies even suggest that every intrinsically motivated action equates to having fun. As such, we aim to find metrics for measuring intrinsic motivation that we can then use to train human-like agents.



## ELENA PETROVSKAYA

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**Skills:** Qualitative data analysis; study design; interviewing

## BIOGRAPHY

Elena was always interested in what affected how people thought and acted in different situations. She studied a Psychology BSc at UCL, during which time she was a summer intern at the UCL Interaction Centre and discovered human-computer interaction. Inspired by this - and believing the study of how humans interact with tech to be one of the most relevant current psychological issues - she went on to do the eponymous MSc at the Centre, which brought her to IGGI. Elena's primary goal is to create knowledge which helps people, which motivates her PhD topic and a variety of other experiences she has accumulated, such as work in a healthcare consultancy. It also motivates her passion for the environment and vegetarianism. Outside of research, Elena is a musician, amateur chef, and frequent hiker.

## 'PREDATORY' MONETISATION: UNDERSTANDING PROBLEMATIC MICROTRANSACTIONS THROUGH A PLAYER-CENTRIC PERSPECTIVE.

As revenue generation in digital games becomes more dependent on in-game continuous player spending, game design becomes more tailored to incentivise this. Elements like player retention, increased time on device, and conversion of free to paid play all aid this convergence. These are manifested as microtransactions:

uncapped, repeated in-game purchases. Microtransactions have been noticed and criticised by ethicists, researchers and regulators for their potential to exploit and manipulate players and affect their wellbeing. Indeed, one type known as loot boxes has already been regulated in some countries.

However, other types remain relatively unexplored. Elena's project has taken a player-centric approach to developing a landscape of possibly predatory microtransactions and establishing their prevalence. Later work assessed possible consequences of interaction with such design elements: what happens when you play a game which has been designed to drive player spending? This has led to an evaluation of the position of such games within gambling and gaming disorders. Current work is also focusing on vulnerability to microtransactions - are some people more susceptible to others? The project will conclude with generating a set of recommendations for how players, regulators and the industry can move forward to protect players in this context.



## ERIN ROBINSON

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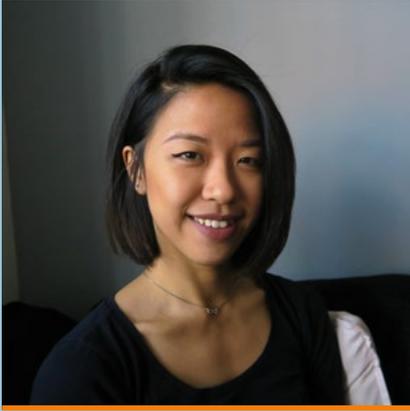
**Skills:** Installation Design, Improvised & Generative Music

## BIOGRAPHY

Erin is an experienced artist, installation designer, experimental musician and music educator (open-ended musical play sessions for Early Years Foundation Settings). She is currently a PhD researcher with IGGI exploring playful design for interactive installations for casual creation. Her work outside of research includes being part London based sound art collective SubPhonics, who take an improvisatory and multidisciplinary approach to experimental ambient music, in which they have recorded music for film and enjoy gGGIng around London.

## DESIGNING PLAYFUL INTERACTIVE INSTALLATIONS FOR THE PURPOSES OF CASUAL CREATIVITY IN ADULTHOOD

It is a common criticism of interactive installations that they frequently contain vapid and non-meaningful interactions, with maximalist visual spectacles often falling short in experience, in a phrase, style over substance. Erin's research intends to address these issues by aiding designers in the development of meaningful, engaging and playful interactive installations aimed at adults for the purposes of casual creative play, which leave audiences feeling satisfied, creative, and with a sense of meaningful authorship over artefacts created through interacting with the possibility space. She will be taking a research through design approach to identify design strategies which allow adults modes of fun creative play which incorporate social interactivity and physicality in public spaces.



## EVELYN TAN

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## BIOGRAPHY

Evelyn is a mixed-methods researcher with a background in Industrial/Organizational Psychology specializing in teamwork in virtual teams. She is in the final year of her PhD which focuses on identifying communication patterns of cohesive ad hoc teams in competitive games. Her work is based on team dynamics research conducted on fast-paced, dynamic, high risk teams (i.e. aviation, medical, military). Evelyn is passionate about developing sustainable high performance in esports teams. Most recently, she was a performance coach for a professional Valorant team based in Singapore.

In her free time, Evelyn plays League of Legends and Valorant and walks her dog, Sox.

## INVESTIGATING COMMUNICATION PATTERNS AS INDICATORS OF COHESION IN AD HOC TEAMS

In competitive team-based games, players often play in ad hoc teams. Ad hoc teams form at the start of a match, are typically composed of strangers with specific roles, and have to perform immediately once formed. These teams do not have prior experience together and are unlikely to have a future together once the match ends. This poses several challenges to effective teamwork such as coordination and cooperation. However, there are many instances of successful ad hoc teams. This begs the question of what makes them successful?

This research project investigates the factors that influence cohesive ad hoc teams. In particular, the project focuses on team communication and whether communication patterns (e.g. frequency, distribution, content) indicate different levels of cohesion. This project focuses on competitive team-based games such as League of Legends, Dota 2, Overwatch, and Valorant.



## EVGENII KASHIN

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**Skills:** Computer vision, deep learning

## BIOGRAPHY

Evgenii created his first “game” at school in the Warcraft3 game editor. It was a PVE-map with a choice of characters from his friends. Evgenii is interested in explaining our world through 2D images and automatic creation of 3D content. He has a background in Computer Science, and has worked as a Machine Learning Engineer on computer vision and graphics projects for the last 5 years. Evgenii published an article at ECCV2020 related to user face manipulations, which luckily was cited over 50 times. In his last position at Snap, he did ML to create funny lenses (type Cartoon in Snapchat) and researched 3D object capturing. The hobbies of Evgenii include bouldering, hiking, track-day racing and, of course, computer games.

## FEW-SHOT SCENE ACQUISITION FOR GAME ENVIRONMENTS CREATION

This project aims to create an affordable method of obtaining 3D assets for game development. The method will consist of reconstructing a real scene from few images with physically realistic materials for rendering. Just imagine using a few images from the internet or your camera to create an asset for your game!

Modern 3D content production plays a crucial role in the games making and VR/AR applications. However, the

entry threshold into this field is currently too high. This affects companies and independent developers alike, requiring a lot of work to master complex 3D software packages as well as sophisticated geometry and material capture setups. This project proposes a way to democratize this field for widespread use and make faster creation of game environments possible.

The use of learnable priors will allow complex scenes to be reconstructed from a few images to render the scene in-game. Volumetric rendering techniques with implicit representations look like the best starting point here due to the ease of differentiation and photorealism. The final model can be used as a game renderer or an intermediate representation of the received scene, converted into classic meshes and textures at the end.



## FLORENCE SMITH NICHOLLS

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**Skills:** Digital Archaeology, Narrative Design, Computational Creativity

## BIOGRAPHY

Florence has a professional background in archaeology, having worked as a field archaeologist and heritage consultant in London. Before joining IGGI, they conducted independent research in the emerging field of archaeogaming. They are a freelance games journalist, with features published at Eurogamer, EGM and Wireframe. They are currently working as a Story Tech for the independent games studio Die Gute Fabrik, and are a member of the games AI research group Knives & Paintbrushes.

## PROCEDURAL GENERATION AS GENERATIVE ARCHAEOLOGY

The archaeological study of video games has taken many forms: the ethics of looting mechanics, games as digital landscapes to be recorded and the medium as a way of expressing multivocal archaeological interpretations. Procedurally generated content presents an interesting challenge for a digital archaeologist: is it as culturally significant as finite hand-crafted content?

This project aims to build on existing archaeological recording of procedurally generated games and the development of information games to create generative archaeology games. Generative archaeology games invite the player to archaeologically interpret procedurally generated content as a form of

environmental storytelling. Subsequently, the player will be encouraged to record that content through various game mechanics, such as screenshots or gameplay diaries.

Florence recently co-wrote a paper entitled 'The Dark Souls of Archaeology: Recording Elden Ring,' which has been accepted to the Foundations of Digital Games conference. This paper explores themes relevant to their main research project, such as the creation of hand-drawn scale plans to record the context of player messages in the game world. The research is a proof of concept for applying archaeological methodologies to video games.



## FRANCESCA FOFFANO

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**Skills:** Player experience & perception, Mix methods analysis, Qualitative analysis

## BIOGRAPHY

Francesca's work represents her fascination with how players elaborate and understand complex situations in video games. She likes to use mixed methods (both qualitative and quantitative) to understand high-level player perception in video games using her competencies in HCI (MSc at the University of Trento) and Psychology (BSc at the University of Padua). Prior to joining the PhD, she developed international experience in industry and research. She worked as Research Fellow on AI and ethics for the European project AI4EU at ECLT (Ca' Foscari University of Venice) and on players' perception of adaptive videogames at Reykjavik University. She also was involved as UX Strategist in creative content for MediaMonks headquarter (Amsterdam).

## WE ALL GET STUCK... BUT WHY?

Players will tell you exactly when they got stuck playing a game, but how we define stuck in the first place is still open to discussion. This PhD research aims to identify how and when this happens to help in predicting when players need support. The goal is to smoothen the player experience by reducing the need for external support (such as online guides, walkthroughs, and online forums) that might affect player immersion. The current stage of the research uses in-depth interviews to understand what players have in common, no matter what task they are doing or game they are playing. So why rely on user tests that consider singular test cases instead of understanding where they originate?



## G. CRISTINA DOBRE

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**Skills:** Python, C#, Java, TensorFlow, Unity3D

## BIOGRAPHY

I have a theoretical background in Computer Science, completing with distinction an undergraduate degree in 2017. My thesis explored automatic detection of duplicate questions in community-based question answering platforms by learning semantic representation of queries. I have also had different jobs in the industry, such as a database developer, mocap animator and doctoral researcher. I worked for Microsoft Research Cambridge, University of Oxford, Dream Reality Interactive and Goldsmiths, University of London.

## IMMERSIVE ML FOR SOCIAL INTERACTION IN VIRTUAL ENVIRONMENTS: PEOPLE, AGENTS, AVATARS

My current focus is on the nonverbal cues that influence and shape the social interaction in immersive VR environments. More broadly, I'm investigating autonomous agents (or virtual humans/NPCs) in social settings in terms of non-verbal interactions with users. I'm interested in the underlying mechanics of social interaction that help developing an emphatic and engaging virtual human. At the moment, I'm working on ML models based on multimodal datasets to detect various social cues (such as gaze) or various human-defined social attitudes (such

as engagement) in social interactions in VR. I'm also interested in generating more complex behaviour for virtual characters (NPCs) that will improve the user's experience with the NPCs in a social VR setting.

Designing communication and other social interactions in immersive VR can be a challenging task, and aspects on this are addressed in my research. The findings from these studies can help game designers and game developers determine the appropriate non-player character's non-verbal (and verbal) behaviour in games, especially in VR games. Along with its applications in the games industry, the findings would be useful for other applications such as designing multi-modal human-machine interactions and other systems for medical purposes, for social anxiety disorders therapy, simulations, training or learning.



## GEORGE LONG

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**Skills:** Game Design, Game Balance, Artificial Intelligence, Statistical Forward Planning, Evolutionary Algorithms

## BIOGRAPHY

George is an IGGI PhD student interested in AI assisted game design, particularly in how it can be used to assist in the creation and balancing of game mechanics. After graduating with a BSc in Computer Science at the University of Essex, he joined IGGI in 2021 to be able to research how Artificial Intelligence can be applied specifically to reduce the prevalence of Min-Maxing in Role-Playing Games.

## USING ARTIFICIAL INTELLIGENCE TO REDUCE THE EFFECTIVENESS OF MIN-MAXING IN ROLE-PLAYING GAMES

My research focuses on the concepts of Min-Maxing and Meta in Role-Playing Games, and how we can use AI assisted game design to reduce their prevalence. Min-Maxing in Role-Playing Game refers to the idea of building a character in a Role-Playing Game by maximising their positive traits while minimising negative ones, often through exploiting game mechanics. This can cause optimal strategies to emerge which not only have the potential to upset the game balance, but when these strategies become prominent enough in the community to form a Meta, it can have wider consequences such as the shunning of players deemed not to be using optimal strategies, and loss of creative choice when building characters.

There are two methods I am looking into to reduce the effectiveness of Min-Maxing. The first is using AI to discover these Min-Maxed strategies. Secondly, how AI can be used in the game balancing process to identify and modify the mechanics which enable these strategies. Currently, I am focusing on the first method, with my research looking into how we can measure the effectiveness of units in combat scenarios to identify which units could be considered unbalanced.



## GUILHERME MATOS DE FARIA

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### BIOGRAPHY

Hi! I am a Portuguese student with a background in Artificial Intelligence. In 2016 I started attending video game tournaments and learned to analyse my matches and improve from it. When I did my masters in AI, I noticed that I could join my professional skills and my hobbies together to create something relevant to AI and competitive gaming.

### UNDERSTAND THE IMPACT OF PLAYER DECISIONS IN VIDEO GAMES

I am looking to better understand which actions and decisions have the biggest impact on the outcome of a game. Currently, I am particularly focused on competitive turn based card games. What are the best players doing to win? How can players adapt to improve their chances of success? These are the questions I am hoping to help answer, giving players a better understanding of the game and how to improve.



## HENRIK SILJEBRAT

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**Skills:** Python, JavaScript, DevOps; statistics, behavioural modelling, reinforcement learning

## BIOGRAPHY

Henrik is a cognitive scientist and wannabe writer. After years working in IT with sysadmin and DevOps, he did a Masters in Cognitive Science which refuelled his curiosity for brains, AI and all inbetween. He still hasn't created flying robot monkeys, but is content with pursuing a PhD focussed on behavioural modelling. All the while dancing to Led Zeppelin and making awful puns.

## LEARNING STRUCTURE IN TIME

Reinforcement learning (RL) has seen extraordinary success in the machine learning world in recent years, and is especially intriguing from a neurobiological perspective as we have strong support for these algorithms having neural correlates in the midbrain dopaminergic system of the animal brain.

Although the discovery of the neurobiological correlates of RL, now known as the reward prediction error hypothesis of dopamine, is a big success in the cognitive sciences, there are still many outstanding questions. One such question is how animals manage to create useful representations of incoming sensory information, representations then used for learning and decision making. My work focuses on how these representations of states of the world are created and integrated into task structure and models of the world.

The main methodological approach is behavioural experiments with humans and bumblebees and modelling said behaviour using RL combined with (Bayesian) hidden state models for representing states and task structure.

The potential findings of these experiments have promise to not only elucidate the workings of the animal brain but also provide valuable contributions to artificial intelligence, where improved models of state representations could vastly improve data efficiency and generalizability over current generation systems.



## BIOGRAPHY

Ivan Bravi obtained his BSc and MSc in Engineering of Computer Systems at the Polytechnic University of Milan, Italy. In 2016 he was Visiting Scholar at the NYU's Game Innovation Lab in New York where, under the supervision of Prof. Julian Togelius, he did research in the field of general videogame playing.

## GAME-ANALYZING AI AGENTS

The use of Artificial Intelligence techniques has shown its potential throughout different phases of game development.

The objective of this research is to create a set of AI game-playing agents each one specialized in a specific skill that might be requested to the player. These agents can be used for multiple purposes such as: game analytics to measure the balance between different skills required or a library for NPC's behaviors.

## IVAN BRAVI

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**Skills:** Computer Vision and Machine Learning

## BIOGRAPHY

I am a first-year PhD student at The University of York, supervised by Dr William Smith. My research focuses on deep inverse rendering for photorealistic augmented reality, specifically on designing models that can infer properties of the world, such as illumination, reflectance, and shape, from a small number of visual observations. I'm particularly interested in implicit neural representations, generative models and self-supervised learning. I hold an MEng in Electronic Engineering from The University of York, for which I was awarded the IET Prize for outstanding performance and the Malden Owen Award for the best graduating student on an MEng programme. I am currently on a research internship at Toshiba Computer Vision Research Group in Cambridge, working on SLAM applications using Neural Fields such as NeRF.

## SELF-SUPERVISED INVERSE RENDERING FOR PHOTOREALISTIC AUGMENTED REALITY

Humans are extraordinary at understanding their physical world. For example, when entering a new environment, we instantly understand any objects in the scene, including their positions, materials and uses. We can also predict what the scene would look like from another unseen perspective. Furthermore, we can model the intents

of other dynamic actors within that environment. Our brains draw on prior knowledge to reason and make these inferences.

This level of scene understanding is one of the grand challenges of artificial intelligence and would unlock exciting applications in autonomous robotic navigation and augmented reality (AR). In recent years, deep neural networks have shown great success in many supervised tasks, for example, object detection, classification and image segmentation. However, this supervised learning requires large amounts of labelled data that can be prohibitively expensive or impossible to obtain and does not capture the complete information present in a scene.

On the other hand, humans learn complex scene understanding without direct supervision for perception. My research is around self-supervised scene representation learning, developing algorithms that consume images of an environment and convert these into compact representations for use in downstream tasks such as AR and robotics without human labelled data. Primarily I'm focused on self-supervised inverse rendering, estimating a scene's shape, material properties and lighting from a small number of images.



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**Skills:** MCTS, Game AI, Multi-player games

## BIOGRAPHY

James has picked up degrees in Chemistry, History, Mathematics, Business Administration and Machine Learning. After a career in Consultancy and IT Project Management he is now finally doing the research he always wanted to.

## OPPONENT MODELLING IN TABLETOP GAMES

James is interested in opponent modelling, theory of mind and strategic communication in multi-player games, and how statistical forward planning can be used in modern tabletop board-games (or other turn-based environments).

With a constrained budget, how much time should an agent spend thinking about its own plan versus thinking about what other players might be doing to get in the way. How does this balance vary across different games? His secondary research interests are in using AI-playtesting as a tool for game-balancing and game-design.



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**Skills:** Research design; Experience in a range of programming languages including Java, C#/ Unity, and physical computing with Arduino/ Processing.

## BIOGRAPHY

Janet is working towards her PhD in Intelligent Games and Game Intelligence, building on earlier studies for her MSc in Cognitive Computing at Goldsmiths. Her work brings together cognitive science and philosophy of mind with games computing and HCI, to seek new ways of engaging with computer and VR games. Janet enjoys pushing the boundaries of technology.

Her earlier career has encompassed the introduction of word processing and automated publishing to an international legal publishers and their typesetters. She also contributed to the building of a groundbreaking legal database, designed for the then new technologies of CD-ROM and online services.

## MULTI-MODAL PERCEPTUAL FEEDBACK IN VIRTUAL REALITY – IS MORE ALWAYS BETTER?

The object of introducing haptic feedback to VR is to increase the player's sense of 'reality' by reproducing more closely the kind of 'real world' conditions portrayed in the VR experience. The use of different technologies for visual, auditory and haptic feedback encourages the idea that the modalities are separable. This makes it easy to suppose that 'adding haptics' will necessarily improve the experience. However, real-world perception is almost invariably multi-modal. It is important to understand how "the interface between a person and their physical environment" functions holistically, if we are to generate a convincing "interface to a simulated environment".

Recent research has suggested that, if haptic feedback is introduced without due consideration of the holistic perceptual experience, then the sense of presence in the VR can be reduced rather than enhanced. Janet's initial experiments will seek to replicate part of this work, with additional conditions that will shed further light on the phenomenon described. Further empirical studies will build on this, seeking to understand better how and why adding feedback in one modality can enhance the overall experience, and when we are at risk of making things worse.



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## BIOGRAPHY

With previous experience working in the games industry as a games user researcher, Józef is now focused on better understanding the experiences of game developers seeking to make accessible games, with a focus on understanding the barriers and challenges to accessible game development.

## UNDERSTANDING THE BARRIERS AND CHALLENGES TO DESIGNING ACCESSIBLE PLAYER EXPERIENCES

My research is focused on communicating with both game developers and players with disabilities to better understand the experiences of making accessible games and the types of strategies that may facilitate improved accessibility. Through this work I have interviewed developers on their experiences, revealing a number of distinct areas of development that can either be facilitators, or barriers to a developers ability to make accessible games. My further work has tied in with this, collaborating with a major studio in the UK to look at how we can address some of these barriers by injecting knowledge from the experiences of people with disabilities.



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## BIOGRAPHY

After graduating as an Engineer from the Ecole Nationale Supérieure de l'Électronique et de ses Applications (ENSEA), France, with two double-degree diplomas, a MEng in Electrical Engineering and Information Science from the Osaka Prefecture University (OPU), Japan, and a MRes in Artificial Intelligence and Robotics from the Université de Cergy-Pontoise (UCP), France, Kevin Denamganai spent a year accumulating experience as a Robotics & Machine Learning freelancer. He is now putting those skills to use in the IGGI PhD program, which, among other things, gives him the opportunity to reunite with video games. Indeed, it was thanks to a keen interest towards video game creation that he started learning programming around 12.

## EMERGING LANGUAGES AS A TOOL FOR (ARTIFICIAL) THOUGHTS & TACKLING THE AGENT ALIGNMENT PROBLEM

His research interests are about everything psychology, neuroscience, AI, (deep) reinforcement/imitation learning, robotics, and language emergence and grounding as well as human-computer interfaces, challenging the question 'what are the necessary components of artificial agents to be able to converse with human-beings in an engaging manner and to be able to cooperate with them towards a pre-defined goal, e.g. clearing a level in a given video game'.



## KYLE WORRALL

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**Skills:** Audio Programming, Machine Learning, Deep Learning, Music Generation, Expressive Rendering

## BIOGRAPHY

Kyle is a programmer and researcher enhancing the musical expression of generative music (by modelling human performance), and exploring how we can improve music generation in games using machine learning, without stepping on the toes of game composers. He has a background in composition and sound design, has studied an MSc in Sound and Music for Interactive Games at Leeds Beckett University, and is an IMDb accredited composer. His previous research focused on procedural music systems in video games and he has spent time travelling the Mediterranean as a session musician. Kyle is passionate about writing fantasy novels.

## ENHANCING THE EXPRESSION OF GENERATIVE MUSIC TO COMBAT LISTENER FATIGUE

While Kyle's research interests are centred around developing accessible music generation tools for game developers and composers alike, these tools have not been widely used in industry compared to non-music related PCG tools. While these tools are not widely used, RPG games are capable of requiring players to sink extraordinary amounts of time into completing them (100+ hours) while only having a four hour soundtrack. With this extremely long run time, comes the potential for repetition of music to cause listener fatigue in players and harm the

gameplay experience. This problem, and the interactive nature of games, makes for a medium in which music generation seems to be an ideal solution.

To understand the lack of use in industry, Kyle conducted interviews with acclaimed game composers early in the PhD and found emergent themes that showed the general quality of generated music was not human enough, nor expressive enough to match that of human composed assets. This perceived lack of general quality seems to be a major factor holding back music generation in games. To combat this lack of quality, Kyle has worked on using machine learning and neural networks to model expressive human performance using the bare minimum input data that can be expected inside of a game engine. This technology can be applied within game engines to turn non-expressive generative music into something closer in quality to what composers themselves would deliver. This project also looks at how we can better model procedural music systems to work symbiotically with composer assets, rather than replace them in their creative endeavours.



## LAURA HELSBY

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**Skills:** Games & Low Mood, Player Research, Games for Wellbeing

## BIOGRAPHY

Laura has been gaming since she was 5 years old and got her first Gameboy Colour. She achieved a BSc in Psychology from the University of York and a MSc in Foundations of Clinical Psychology from Newcastle University. Her research interests include all aspects of games for mental health, with a particular focus on how games might help improve people's wellbeing and how different types of games influence different types of players.

## THE NATURE OF GAMEPLAY IN A POPULATION WITH PERSISTENT LOW MOOD

This project focuses on how people with persistent low mood play and experience games, and what this might mean for their wellbeing. It also looks at what types of games are appealing to low mood players and why that might be. So far, an interview study has been conducted asking people with low mood what they play and why, with a diary study planned to investigate what feelings they experience before and after play. Future plans involve making direct measures of the impact of particular games on wellbeing, as well as looking further into the FPS and simulation genres to unpack what about these games might make them appealing to people with persistent low mood. This research has applications in game design and mental health research, as well as hopefully helping individuals better understand how and why they play.



## LAUREN WINTER

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## BIOGRAPHY

Lauren was introduced to gaming from an early age when she received a PlayStation One as a gift. From there, video games became a huge part of her life, exploring new worlds through the eyes of a vast array of characters. Following her undergraduate degree in Psychology with Sociology, she completed her MSc in Psychology Research Methods at the University of Nottingham. A fascination with looking for trends in data and creating complex spreadsheets in Excel led her to a job analysing student information in a school, where she also ran four Esports teams competing across three games. Her research interests primarily focus on player research in team-based pvp games and replacing people with AI.

## HOW DOES COMPETITIVE PLAY AFFECT COOPERATIVE PLAY?

This project focusses on the interaction between competitive and cooperative play, such as that found in team-based pvp environments. Combinations of competitive and cooperative play are found in many high grossing games, such as Call of Duty and League of Legends. These games provide environments for players to cooperate with both friends and strangers to compete against other teams. Despite the popularity of these games, little is known about this juncture between competitive environments that

require cooperation and the effects on player experience.

The cooperative nature of these games has been found to have a social element and research has suggested that this is important. Players have been found to have different feelings towards AI teammates and human teammates, despite in both conditions playing with a human. Competitive play also has a social element in these games and has been found to have an impact on the cooperative experience, rather than just the situation and gameplay. Initially, this research will focus on cooperative AI- and human-controlled companions and competitors to investigate whether there is any effect based on what or who is controlling the companions and opponents. Identifying some of the influential factors of competitive games on cooperative gaming will provide insight into the reasons these games are so popular, as well as the potential to identify some areas for improvement.



## LUIZA STEPANYAN

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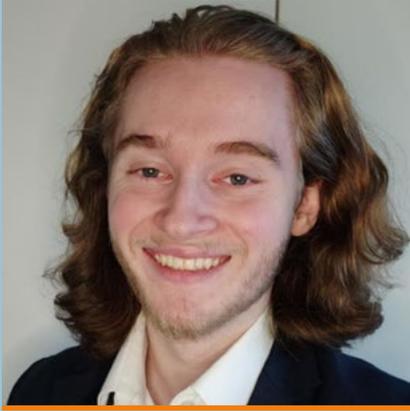
## BIOGRAPHY

Luiza is a multidisciplinary researcher, game designer and artist interested in translating real world concepts into engaging game mechanics. With her background in psychology, robotics, and data science, she is passionate about creating games that can encourage an understanding of ourselves and the world we live in. Her research centres around how video games might be used as interventions for prejudice reduction between conflicting groups and draws on theories of intergroup and cultural psychology. Luiza is also an experienced visual artist and designer specialising in dark abstract art, striking photography, and bold graphic design. She spends her free time developing small atmospheric games that double as metaphors.

## COOPERATIVE MULTIPLAYER GAME DESIGN FOR PREJUDICE REDUCTION

Increasing contact between people from conflicting groups under very specific conditions has been found to be one of the most effective methods for reducing prejudice. Video games present a unique opportunity for facilitating this kind of contact in a way that has the potential to be more pervasive and far-reaching than most contact-based interventions. Online multiplayer games specifically bring together players from all over the world who might not have the opportunity

to ever cross paths in the real world. However, they also have a reputation for leading to toxic interactions or a breakdown in relationships. If these negative outcomes are possible, then so too are positive outcomes. Intergroup Contact Theory lays out certain guidelines for creating positive contact that leads to reduced prejudice between the individuals involved. The present project will be an investigation into how these guidelines may be implemented through game design. Specifically, it will investigate cooperative multiplayer game design with a focus on mechanics that encourage equal status and a striving towards common goals. This will involve an exploration and categorisation of current cooperative multiplayer game mechanics, followed by an empirical investigation into their effects on the relationship between players, and finally the development of a tool that can guide designers seeking to design better player experiences in multiplayer games.



## LUKE FARRAR

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## BIOGRAPHY

Luke Farrar is an IGGI PhD student at The University of York undertaking research in Flexible and Realistic Character Animations in Complex and Dynamic Environments.

Luke's research focus through his bachelor's and master's degrees was on applying machine learning to interesting and unique settings. In his bachelor's he focused on creating an application for individuals that suffered from cognitive impairments through the use of the "Microsoft HoloLens" and machine learning to allow those individuals to maintain a semblance of everyday life. In his postgraduate, Luke focused on using machine learning to generalise high-fidelity scientific simulations to rapidly generate predictions for parameter combinations that had not yet been sampled in order to accelerate the production of new results.

Luke revels in all things AI, knowing that there is always more to learn and seeks to continually deepen his understanding around AI.

## FLEXIBLE AND REALISTIC CHARACTER ANIMATIONS IN COMPLEX AND DYNAMIC ENVIRONMENTS

Modern games have an increasing focus on hyper-realism and immersion to better capture the attention of players.

One of the ways that games can break this immersion is by having animations that break the flow of movement or actions through the use of predefined animations.

Motion matching is a solution for predicting the best next frame of an animation by looking at the pose and user trajectory. The downside however, is that when you increase the amount of possible animations in the database the runtime cost also increases.

A solution was proposed known as 'learned motion matching' (Holden et al., 2020) which takes the positive properties of motion matching but also achieves the scalability of neural-network-based generative models.

This project will explore and improve the learned motion matching method through implementation of memory layers to improve accuracy without the sacrifice of increasing runtime costs.

A restructuring and adaptation of the existing machine learning neural network used could also improve the learned motion matching method as breaking down each step of the learned motion matching at each step could uncover optimisations that are not initially visible. Another way restructuring could improve the learned motion matching is through creating a more succinct all-in-one approach which may streamline the process.



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**Skills:** UI/UX Design; Development

## BIOGRAPHY

Before joining the IGGI programme in 2020, Madeleine achieved a Bachelor's degree in Psychology and a Master's degree in Cognitive Neuroscience, both from the Friedrich Schiller University in Jena, Germany. She has always been passionate about digital art and design, and she recently started her own design business where she is working independently on web, app, and game development projects. Her research focus lies on leveraging the potential of digital games to examine open questions in cognitive research.

## USING VIDEO GAMES TO INVESTIGATE MECHANISMS OF HUMAN COGNITION

One central system of human cognition is working memory – a limited capacity system that enables us to temporarily keep information in mind. Working memory is important for many other cognitive functions such as reasoning, language comprehension, or decision-making. One mechanism that is considered a key determinant for a person's working memory capacity is the ability to filter out irrelevant distraction. Yet, specific features that make irrelevant items distracting, as well as under which circumstances these items are distracting are still open questions in cognitive research. The current project aims to forward our understanding of

how task-irrelevant material influences working memory capacity by using digital games as a tool. Digital games have some advantages over more traditional methods commonly used in cognitive research – they are highly engaging, scalable, and have the potential to reach larger and more diverse audiences, which can increase the ecological validity of the obtained results. A better understanding of distraction can in turn be beneficial for the design of interfaces: removing irrelevant material that causes distraction can improve usability and ease of use of an application, or, on the contrary, distraction could be introduced as a difficulty factor in games.



## MARKO TOT

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**Skills:** Reinforcement Learning, Model Based Learning, Statistical Forward Planning, Game AI

## BIOGRAPHY

I started my journey in video games when I got my first PC at the age of six, and at that point it was decided that I'm going to make a career out of it. So here I am, ~20 years later, a part of IGGI and a PhD student at Queen Mary University of London, trying to make AI agents that can play games, and regularly spending too much time solving puzzles and playing games myself under the excuse that it's all for 'research purposes'.

## LOCAL FORWARD MODEL LEARNING FOR PLANNING BASED METHODS

Statistical Forward Planning methods have proven to be effective in some simpler domains and, without requiring any prior learning, they provide a good out of the box AI algorithm. However, while these algorithms shine in certain games, they struggle to perform well in cases where the reward received from the game is sparse. In games where it takes a series of optimal actions to reach the goal, without any significant feedback from the environment in between, their performance drops significantly.

My research is focused on solving this problem through automatic sub-goal generation and utilisation of local learned forward models. Creation of the sub-goals could be used to simulate the feedback from the environment and give regular rewards to the agent even in sparse and complex environments.



## MARTIN BALLA

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**Skills:** Python, Java, C++, Machine Learning

## BIOGRAPHY

Martin graduated from the University of Essex with a BSc Computer Science degree. His main interest is Artificial Intelligence and its application to all sorts of problems ranging from computer vision to game AI. He likes spending his spare time with various activities which mainly involves reading, playing video games and skateboarding.

## DEEP REINFORCEMENT LEARNING FOR MULTI-TASK LEARNING

Most applications of Deep Reinforcement Learning only involve learning a single policy, which performs well on the task it was trained on. When the policy is trained on the environment's reward function, the agent overfits to that environment and even small changes (like changing the sprite's colour) can completely break the agent's behaviour. The learned policy on the new task is usually unusable so in order to solve a different task it has to be completely retrained on the new task. This project investigates learning various policies with a single agent using Hierarchical Reinforcement Learning with learning goal conditioned policies.



## MATTHEW WHITBY

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**Skills:** Narrative Design, Player Experience, Tackling Mental Health Stigma with Games

## BIOGRAPHY

Matthew Whitby is a narrative game designer and player experience academic investigating how games can shape perspectives on a small or grand scale. Previously, Matthew has published his undergraduate dissertation within the Games Journal, which explored the creation and design of Games Installations. Games that make full use of their surrounding space, and in fact incorporate the real world with its digital counterpart.

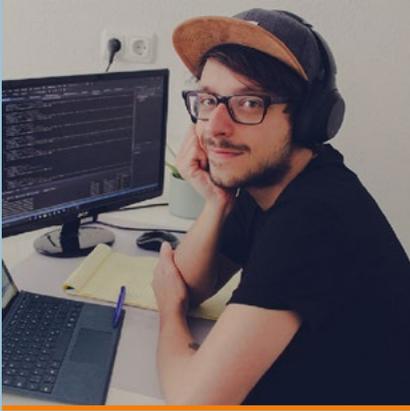
In addition, he's worked with Motek Medical, a rehabilitation company based in Amsterdam, where he developed socially focused multiplayer applications. When he isn't researching, he is a best-selling author of Dungeons & Dragons content, with an excess of 50+ titles to his name.

## DESIGNING FOR PERSPECTIVE CHALLENGING EXPERIENCES IN GAMES

This project explores how games can be used to challenge the way players think or feel. In particular, his work considers how we can make the development of perspective challenging processes easier for game developers. His work has taken him from understanding the phenomena of perspective challenging experiences to helping developers incorporate them into their games using a deck of cards.

More recently, he attended CHI Play 2019 to present the foundational study of his PhD titled: "One of the Baddies All Along: Perspective Challenging Moments in Games". He proceeded to work alongside Take This, a non-profit organisation dedicated to decreasing stigma and increasing support for mental health in the game enthusiast community and inside the game industry. The collaboration resulted in the "Designing Games to Challenge the Stigma Around Mental Health" white paper, which proved to be the perfect opportunity to take his research and apply it with a particular perspective to challenge.

With only a few months of his PhD remaining, Matthew is developing the Challenging Perspectives on Mental Health (CPMH) toolkit, a deck of cards that incorporates all aspects of his research into an actionable tool. In summary, not only are perspective challenging experiences common in games, they're perceived by players as desirable, and with a little help can be designed for.



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**Skills:** Game Design, User Experience Research

## BIOGRAPHY

Maxi is a writer and researcher originally from Germany. He has a Master's degree in Psychology and expanded his interest to Computer Science by studying the emotional relationship between humans and machines. He's interested in how User Experience can be measured, understood, and dynamically improved. He enjoys experimental games with new things to discover, new stories to tell.

## EMOTION DESIGN IN VIDEO GAMES – IMPROVING THEORY AND PRACTICE

Emotion is a term that everybody seems to understand. People know how it is to feel and they know how games make them feel. But as soon as we try to exactly define and measure emotions, things fall apart. Can they be mapped to dimensions or distinct states? Through which mechanisms are they expressed? How can we explain differences between people and situational context when we try to measure the same phenomenon?

In summary: Applying our current understanding of “emotions” within game context does mostly not work as intended. Many of the above questions have no satisfactory answer at the moment. This project tries to address these issues by picking apart what we know and what we don't know and proposing a process that is robust to the unknowns, while making adaptation to emotional data possible.



## MICHAEL AICHMUELLER

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**Skills:** C++, Python, Probability Theory, Reinforcement Learning, Deep Learning, A functioning head on my shoulders

## BIOGRAPHY

My educational background lies in Mathematics with a specialization in Probability Theory. My interests moved towards Deep Learning applications in my Masters' study with research in the (rather disjoint) fields of Reinforcement Learning and Causal Inference. I have applied various algorithms, such as DQN, AlphaZero, MinMax, or MCTS, for building game-playing agents to a set of (im)perfect information games in my spare time. My favourite application remains the board game Stratego.

During my PhD I wish to learn and further the state-of-the-art in searching for optimal solutions to imperfect information games. I am particularly interested in the application of Regret Minimization methods as a means of learning from iterative play and keeping track of what actions proved to fare better than average.

## AI OPTIMAL GAME-PLAYING AGENTS FOR IMPERFECT INFORMATION GAMES

Imperfect Information Games (IIG) are environments where players hold only a part of the total available information due to hidden elements, such as private cards of each player in Poker. Such games are notoriously difficult to learn, in part also because search, as done for perfect information games, is fundamentally

inapplicable without complex adaptations which vastly increase their complexity. Regret Minimization is one of the approaches developed in game theory to solve two-player zero-sum IIGs, i.e. two-player adversarial games in which one player's winnings are another's loss.

In order to minimize regret, the game needs to be played many iterations over and the regret of actions as well as the respective past policies have to be stored in large lookup tables. If an action has done better than average its regret is positive and should be encouraged in the next policy, otherwise diminished. This idea leads to prohibitive memory and time complexity for large games which is why recent approaches fuse the method with Deep Learning estimators. However, there are open questions to answer. I am studying first the efficacy of the baseline regret minimizing algorithms, how and, particularly which ones, are the most promising to be coupled with neural networks. Later on, I wish to potentially combine the method with my own ideas from Hierarchical Reinforcement Learning to develop a scalable approach to regret minimization.



## MICHAEL JOHN SAIGER

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**Skills:** user research, participatory methods, game design, QA

## BIOGRAPHY

Michael is a designer and researcher who is investigating how we engage young people in the design and development of mental health games. Michael's interests reach into player experiences, evaluating engagement, and player retention. He also works as an independent QA consultant, working across both games and web development on projects associated with Mattel, BBC and Drinkaware etc. Michael graduated with a MPhil in Digital Health and Wellbeing from the University of Strathclyde and a BA (Hons) Game Design and Production Management from the Abertay University.

## INVESTIGATING HOW WE ENGAGE YOUNG RESEARCH ADVISORS IN THE DESIGN AND DEVELOPMENT OF MENTAL HEALTH GAMES

User involvement methods, such as co-design, are seen as beneficial. It involves stakeholders in the design, implementation, and evaluation of a product. It has also been used in applied games design, also for young people, but both pose different challenges than the default user involvement for functional software with adults. Because of these differences, there is little guidance on how to successfully deliver user involvement methods with young people in applied games design. Therefore, the goal of Michael's research is to investigate how these methods engage young people during design processes. In addition, what tools and techniques are best suited for young people, how do various roles of young people impact engagement, and how do we evaluate engagement during these processes.



## BIOGRAPHY

Michelangelo Conserva is a second year PhD student studying principled exploration strategies in reinforcement learning. He is particularly interested in randomized exploration and, more generally, Bayesian methods for reinforcement learning. He holds a BSc in Statistics, Economics and Finance from Sapienza, University of Rome and an MSc in Computational Statistics and Machine learning from University College of London.

## PRINCIPLED EXPLORATION STRATEGIES FOR REINFORCEMENT LEARNING.

As a PhD student at Queen Mary University of London, Michelangelo aims to leverage Bayesian models to develop principled algorithms for reinforcement learning in the context of function approximations. The main challenge lies in finding a balance between computational costs and optimality. Evaluating such balance requires careful evaluation, which is currently lacking in reinforcement learning.

### MICHELANGELO CONSERVA

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**Skills:** fMRI Analysis, Signal Processing, Psychometrics, Experimental Psychology, Behavioural Player Analytics; Python (SciPy stack), Matlab, R, SQL.

## BIOGRAPHY

I am an MPsych Psychology graduate from the University of York, having studied Psychology, Cognitive Neuroscience & Neuroimaging for four years. My Master's research was primarily in vision, attempting to manipulate and record parahippocampal responses to visual stimuli selected parametrically by computer algorithms. During my degree I also spent much of my time researching videogames, studying the literature on the effects of videogame play on sleep, and working with a IGGI PhD student as a lab assistant. Between my degree and my PhD, I have also been working as a data analyst at Digital Creativity Labs researching skill learning in large gaming populations from Riot Games' League of Legends.

## IDENTIFYING THE ROLE OF ATTENTION AND COGNITION WITHIN VIDEOGAME IMMERSION USING NEUROIMAGING METHODS

Immersion is a state in which players are engaged to a degree of total absorption that inhibits the ability to correctly report one's surroundings or time. Present theory on immersion has developed a coherent model that provides sufficient evidence to distinguish itself from other cognitive concepts such as presence, attention, selective attention, absorption

and flow. However, immersion research thus far has been hindered by difficulties with taking in-vivo measurements of cognition and physiological responses during videogame play.

This presents an ideal opportunity for implementations of neuroimaging methods to carry out such real time measurements of attention, as well as other cognitive processes and their roles in videogame immersion. Using various combinations of neural and physiological methods such as skin conductance, eye tracking, electroencephalography and even functional magnetic resonance imaging, it is now possible to obtain richer data in immersion research. The goal of this project is to apply such methods in order to better define and measure videogame immersion, identify the cognitive processes and hierarchical models that are involved in immersion and ultimately contribute to the literature in videogame immersion. Such knowledge would contribute significantly to a better understanding of effective development of videogames, as well as educational tools.



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**Skills:** Qualitative Analysis; Factor Analysis; Decision-Making

## BIOGRAPHY

Nathan is a 4th year student looking at how to measure and understand decision-making in open world games. His interest lies in how to apply psychological concepts such as goals to gameplay, and how to do so in useful and visual ways. He's also played a lot of Skyrim. Talking to him about Skyrim will make him happy.

## MEASURING DECISION-MAKING IN OPEN WORLD GAMES

Players in open world games can choose to do whatever they want whenever they want. But how do they choose what to do? How can we understand and measure this process? And what IS a decision anyway?

These questions are difficult to answer because it's typically hard to observe decisions being made. But by combining gameplay data with explanatory data such as interviews, it's possible to understand what players choose to do and why they chose to do it. This allows us to better understand how the decision-making process works, and how we can make sense of this in terms of player goals. In doing so, it may be possible to make better games, as well as document decision-making in real-time virtual settings.



## NATHAN JOHN-MCDOUGALL

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## BIOGRAPHY

After graduating with a MEng in Computer Science from the University of Bristol, Nathan joined the games industry as a programmer, working for Climax Studios and Freejam games, before moving to developing indie games.

## IMPROVING GAME AI DESIGN USING ADVERSARIAL AGENTS

This project proposes a novel method for improving the quality of behaviour of human authored agents by pitting them against trained agents and observing what bad behaviours/exploits the trained agents reveal. Authored agents refer to AI agents whose actions are explicitly designed by programmers using traditional techniques such as Utility functions, Behaviour Trees and state machines; trained agents refer to agents whose behaviour is learned by playing many games against the authored agents.



## NICK BALLOU

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**Skills:** Psychology research, open science, statistics and visualization in R

## BIOGRAPHY

Hi there! I'm a psychology and human-computer interaction researcher interested in two main topics: how games affect wellbeing, and how we can reform the research ecosystem to be more trustworthy and efficient (aka "open science" or "metascience"). I'm originally from the US, and have bachelor and master's degrees in linguistics, a topic that prepared me well for social science research, but whose use is relegated to excitedly sharing language fun facts at this point. In my free time, I play tennis, cook and bake, read—and of course play games (mostly deckbuilders, roguelikes, and AAA RPGs).

## USING NEED FRUSTRATION TO UNDERSTAND (DIS)ENGAGEMENT AND WELLBEING IN VIDEO GAME PLAY

Psychological need frustration—experiences of feeling controlled and coerced, failure and self-doubt, or loneliness and exclusion—is a promising framework for understanding how players engage with video games. Grounded in self-determination theory, one of the most robust psychological theories, need frustration might help explain how and why players (dis)engage with a game and how gameplay impacts well-being.

To realize this aim, however, we're missing key building blocks: 1) a better grasp on when and why need-frustrating situations arise during play; 2) a questionnaire that can assess how much need frustration people experience in games quantitatively; and 3) studies that combine data on need frustration with carefully tracked behavioral data over time, rather than relying on simple self-reports like "how much time did you spend playing video games last week?" My thesis attempts to address all of these one step at a time and is underpinned by a strong emphasis on open and transparent methods. Results so far are promising—come chat with me to hear more!



## NIRIT BINYAMINI BEN-MEIR

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**Skills:** Interaction and Experience Design, Visualisation, Visual Communication, Education, Ecocentric Design

## BIOGRAPHY

Nirit Binyamini Ben-Meir is a designer/artist based in London. Her work explores the interconnection between society, economy and ecology, aiming to make information accessible to diverse audiences. Nirit has an MA in Information Experience Design from the Royal College of Art London and a B.Des from Bezalel Academy of Art and Design Jerusalem. She has a professional background in visual communication, book design and interaction design. She uses participatory installations, digital tools and responsive plants to create experiences for humans to interact with their biosphere and with each other. She combines ecological systems with technology to challenge human perception and provoke thought about bioethics, power relations, and the Anthropocene implications.

## THE BIO-DIGITAL GARDEN GAME – HUMAN COMPUTER PLANT INTERACTION

In this research I will create the bio-digital garden game as a human-climate interaction microcosmos, composed of computational elements and living moss - an interactive plant that responds to its environment in real-time. I will investigate the interconnection between human, technology and natural ecosystems, inquiring: How can a gamified interaction with a Bio-Digital Garden promote collaboration and environmental stewardship?

The main aim is to investigate how hybrid games combining tacit ecological knowledge with computational interaction can overcome geographical alienation from natural ecosystems and timeframe gaps between human perception and plants' timescales. How might the integration of a living organism in a strategic game, drive players toward ecological stewardship and a pro-social action? How might the real consequences introduced through the moss garden, impact players' choices and attitudes? Would they be willing to forgo individual pay-off for a collective benefit?



## NURIA PEÑA PÉREZ

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**Skills:** Unity, Arduino, Matlab, Labview Real Time

## BIOGRAPHY

Nuria got her bachelor in biomedical engineering in the Universidad Carlos III de Madrid (Spain) before moving to London. After studying an MSc in Neurotechnology and working in robotic neurorehabilitation at Imperial College London, she has discovered the enormous potential of serious games in the field of robotics and stroke rehabilitation. Her projects have included the development of small games in Unity as a tool to study human coordination. She is extremely excited to be a part of the IGGI program. When she is not coding, or eating, or eating and coding, she enjoys travelling and playing or listening to music.

## MODELLING BIMANUAL INTERACTION THROUGH BIMANUAL INTERACTIVE GAMES FOR NEUROREHABILITATION

Strokes affect 15 million people every year. Robotic neurorehabilitation has been proven to help traditional therapy regarding the control over exercises, the number of repetitions performed and the capacity of keeping patients engaged through the use of interactive game environments. I study human motor control and learning during bimanual tasks to investigate how the dynamics of interaction can serve to develop better training systems. This is done through the development of interactive gaming environments that are compatible with rehabilitation robotic devices. The modelling of the recorded human neuromuscular data allows us to explore how can we better help patients to restore their motor function.



## OLIVER WITHINGTON

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## BIOGRAPHY

Ollie Withington is a researcher working on novel methods for visualising and comparing the output spaces of generative systems in the world of video-games. Following three years working in software development for a healthcare management firm, he embarked upon an MSc in Computing and Information systems in 2018 to boost his professional skill-set. He fell in love with the world of AI research through the work started during his final thesis and this, combined with a lifelong love of playing video-games and thinking about their design led to joining the IGGI programme in 2020. He lives in London with his wife and young daughter and when he is not writing about, thinking about, or playing games he can often be found either in the local bouldering gym, or in the park with his family (especially on the rare days when London graces us with sunshine).

## NOVEL METHODS FOR VISUALISING GENERATIVE SPACES

While Ollie is interested in almost all aspects of game research and development, he is especially interested in procedural content generation systems and whether they can be made more consistently helpful for designers and interesting to end users. His research is currently focused on developing novel methods for visualising the possible

outputs from content generation systems. While automatic content generation as a field is thriving, there has been comparatively little work done on novel methods for comparing generators to each other, something he aims to remedy. Ollie's work is focused on using novel data reduction and projection approaches to produce information-rich 2D visualisations of the output spaces of generative systems, allowing for easy assessment of output diversity and system character. The hope is that this work could help game designers and researchers alike make more informed choices about which generators are optimal for their purposes and how to optimise them, as well as making the outputs of these systems more interesting to players.

His latest paper 'Compressing and Comparing the Generative Spaces of Procedural Content Generators' ([arxiv.org/abs/2205.15133](https://arxiv.org/abs/2205.15133)) will be presented at [IEEE Conference on Games](https://www.ieee-games.org/) this Autumn.



## OZAN VARDAL

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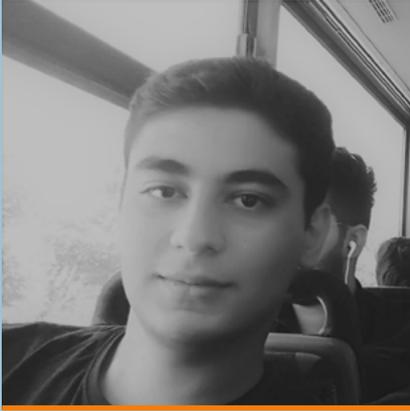
## BIOGRAPHY

Ozan studied undergraduate psychology at the University of Groningen, and holds a master's degree in Performance Psychology from the University of Edinburgh, where he wrote theses on the dynamics of psychological momentum in sport competition and the decision-making of expert applied psychologists respectively. He has long been fascinated with the psychological mechanisms underpinning complex skills, owing to his own background as a classically trained musician and his previous work as a performance psychology consultant with competitive athletes. His primary research interests involve the behavioural and neural factors surrounding human learning and skilled performance.

## USING VIDEO GAMES TO STUDY THE ACQUISITION AND PERFORMANCE OF COMPLEX SKILLS

Ozan views games as behaviourally rich environments for the study of complex skills and human learning. The competitive and immersive nature of games encourages millions of players to develop profound skill over hours, days, and even years of practice. Ozan's work takes advantage of large data repositories generated by such players to study how different patterns of practice result in differences in learning outcomes. He also uses experimental methods in his work, and is currently using neuroimaging methods (MEG) and modelling techniques to identify how shifts between different behavioural and neural states affect performance as people play Tetris.

By using games as a vehicle to study psychology, Ozan aims to develop scalable solutions to studying human learning. He hopes for a future where the science of learning is sufficiently advanced, such that (artificial) trainers can recommend optimised practice schedules for motivated learners, in any performance domain.



## PEYMAN HOSSEINI

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**Skills:** Natural Language Processing, Deep Learning, Data Mining, Classification and Evolutionary Algorithms

## BIOGRAPHY

Peyman is interested in using his computer science knowledge to support society's well-being. Raised in a family where almost everyone's work is somehow related to mathematics and its applications, he became passionate about algorithms and combinatorics from an early age. This prompted him to pursue an undergraduate degree in computer engineering with a focus on IT and AI. He also has been reading about psychology and sociology as his favourite avocation since college. This is one of the main motivations for him to join IGGI as he believes games are an excellent medium to help people in different ways (like improving their problem-solving and multi-tasking skills) and the IGGI project he is involved in allows him to not only extract invaluable knowledge from the gamers' data that can help studios improve their decision making when making sequels or other games, but to also pursue his long-lasting interest in getting involved in projects that aim to analyze gamers data for the betterment of the society.

## MODELLING AND SENTIMENT ANALYSIS OF GAME REVIEWS

This project aims to dive deep into understanding the perception of the players and critics about the games of a game studio in detail, and to this end, strives to use (and improve) the state-of-the-art techniques in language modelling and Natural Language Processing to build systems that automatize the extraction of their invaluable views and feelings about the works of a game studio.

The challenges, however, for developing such a system are immense. Foremost, building systems that are capable of handling and analyzing the nuances of a video game and the feelings the gamers develop towards different aspects of these games require specialized datasets that are currently lacking. Additionally, most current systems that analyze players' emotions use classical machine learning approaches, and in the age of big data, analyzing the massive source of available data requires algorithms capable of handling large amounts of data like RNNs and Attention Models.

By overcoming these challenges and building an effective system for analyzing players' sentiments, we can help game studios to build games that are more immersive, influential, and enjoyable to play.



## PRASAD SANDBHOR

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**Skills:** Applied Game Design, Design Research, Qualitative Research, Design Management

## BIOGRAPHY

Prasad is exploring the potentiality of 'gameful' experiences. He has designed digital, tabletop and hybrid applied games in diverse areas such as education, healthcare, entrepreneurship, social safety, accessibility and sustainability. He collaborates with an ecologist under the 'Play in Nature' initiative to create playful artefacts rooted in ecological phenomena. His PhD research focuses on the utility of story-based games for sensemaking of climate action.

Prasad has 8 years of professional experience working as a multidisciplinary consultant designing B2C and B2B digital products. His experience in leading design teams has made him proficient in strategic management of design. He also teaches game design and user experience design. He writes short stories and essays in his native language, Marathi, maintaining his secret identity as a freelance author.

## STORY-BASED GAMES PLAYED IN A COLLECTIVE SETUP FOR SENSEMAKING OF CLIMATE ACTION

Ongoing efforts at dealing with climate change involve adopting a range of mitigation and adaptation practices into our lifestyles. Although information on such 'climate action' is widely available, many people struggle in actualising

the actions due to various barriers like individual needs and wants, individual desires and aspirations, convenience and comfort, assumptions based on misinformation and constraints related to economic, social, cultural and systemic factors.

The potential of games as tools of climate change engagement for bridging the knowledge action gap has been studied for about two decades. To take it forward, this PhD research aims at appraising story-based games played in a collective setup as opportunities for sensemaking of climate action. It involves designing and evaluating a game that will provide a shared space for having conversations, sharing experiences, trying out alternative actions and understanding their impacts.

The hypothesis is that game-based collective exploration of contextual challenges related to climate change will result in players gaining an authentic feeling of purpose, commitment and confidence for actively engaging in real-world climate actions. The research identifies young adults studying at the university as its key audience. It intends to act as a meaningful intervention during the life-course transition being experienced by the students to help them become independent adults who live sustainably.



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## BIOGRAPHY

Remo is a PhD student at Queen Mary University of London, and he holds a BSc and MSc in Artificial Intelligence at the University of Groningen.

## SCALING UP POSTERIOR SAMPLING

Remo researches principled and efficient exploration approaches for model-based reinforcement learning algorithms. Currently he works on a scaled up variant of 'posterior sampling'.



## ROB HOMEWOOD

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## BIOGRAPHY

Having studied in five countries, Robert is currently undertaking a PhD at Goldsmiths, University of London where he is part of the EPSRC funded IGGI (Intelligent Games and Games Intelligence) program. He also holds a Bachelor's degree in Game Design and Production Management from the University of Abertay Dundee which included a year of studies at the George Mason University Computer Game Design Program. He also spent a year studying Serious Games at Masters level at the University of Skövde in Sweden (which has the longest running Serious Games program in the world). Robert has an active interest in the media arts field and has exhibited his work in three countries.

## PERSONALISED AESTHETICS FOR GAMES

The worldwide games industry is a huge market and as the spectrum of people who spend time playing games increases, there is more and more competition to create games that capture the attentions of a wide audience. Whilst games have been traditionally designed with specific cultural demographics in mind, a game that could dynamically match the cultural values of a range of demographics would maximise its potential market. Robert's research looks at developing techniques for procedurally generating dynamic game assets that can be viewed as being relevant at a 'per player' level. He aims to do this by actively profiling a player's social networks and building up a picture of the cultural references with which they identify. This knowledge could then be used to create game assets that match an aesthetic the player would likely feel comfortable with, allowing a more flexible decoupling between game mechanics and aesthetic during the design process. Designers could then focus on creating interesting game mechanics that could work in a variety of settings and the system would fill in the aesthetic detail based on the requirements of the individual player at run-time.



## RORY DAVIDSON

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**Skills:** Qualitative research, player psychology, game design/analysis

## BIOGRAPHY

I've always been fascinated by computers, but my interest in the psychology of computer users bloomed late, in the final year of my undergraduate Computer Science MEng degree at York, during my final project with my current supervisor, Paul Cairns, looking into immersion in video games. I've been hooked ever since, and after a year in the Psychology department acquiring a MRes to bolster my crossdisciplinarity skills in cognitive psychology research, I applied to IGGI to further my interest in games as learning devices.

## LEARNING AND STRATEGY ACQUISITION IN DIGITAL GAMES

To say that games are powerful tools for learning is not a particularly novel statement. From the "edutainment" games such as Where In The World Is Carmen Sandiego? of the 90s to modern "gamified" learning platforms for adults such as Duolingo and even to simulators used to train professionals such as astronauts, firefighters or military personnel for dangerous situations, the intuition that, if kids can happily memorize the entire gameplay system of Final Fantasy, surely that process can also be put to more practical use in education or training has been a clearly alluring one.

What is less clear is precisely what makes games distinct from other learning contexts. While much research has

been produced on the applications themselves, such as gamification, without a clear basis for why specific gamelike elements affect learning, practical results are often patchy, with difficulty in precisely predicting which gamified learning platforms will succeed and which will fail. My research aims to use cognitive psychology to investigate learning IN games rather than learning FROM them. I aim to describe what makes in-game learning and problem-solving unique in terms of other, more general theories of learning and cognition, such as the dual-process account or the CLARION model, in order to form a model better specialized for the field of digital gaming. In the second phase of research, I will analyse how such a theory may be put to practical use to better inform and ground the design of games and game-like experiences.



## SAHAR MIRHADI

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## BIOGRAPHY

Having worked in sales and marketing for 12 years, Sahar embarked on a new journey towards researching and understanding human behaviour and its interaction with technology. After completing her MSc in Applied Positive Psychology and Coaching Psychology, her interests focused on how digital games could support wellbeing, especially during difficult times. Her research interests bring together positive psychology, interactive media and computer science in understanding the player experience. Sahar is an IGGI student rep and advocates for mental health and wider diversity in academia and industry. Outside of research, she plays Magic: The Gathering competitively and loves to travel.

## HOW DOES GAMING POSITIVELY AFFECT PLAYERS DURING DIFFICULT LIFE EXPERIENCES?

This project investigates how digital gaming positively affects players during difficult life experiences such as grief, job loss and mental health challenges. What has been identified from research in this field is that players turn to games when facing life difficulties in both indirect (escapism) and direct (social support, active coping) ways. The aim of this project will be to investigate these novel insights and identify the wider contextual or psychological factors that may explain this phenomenon.



## SARAH MASTERS

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**Skills:** Indie Game Development, Game Design, Narrative Design, Persuasive Games, Emotion-Centric Game Design, Eco Games

## BIOGRAPHY

Sarah is an indie game developer, writer and artist creating games designed to evoke emotion. Game experiences impacted their inspirations, passions and creativity from childhood, finding a particular interest in serious games and games that can inspire change. They have explored nature and our environment through art and photography, growing increasingly concerned about eco-nihilism, a lack of climate change action, and the cost their art and passions may have on the planet. Their PhD research explores the potential for games and game design to be a part of eco-activism.

## EMOTION-CENTRIC DESIGN: COMBATING CLIMATE CHANGE NIHILISM

The project will explore the role of emotion in persuasive games and the potential for lasting behavioural change with the aim to influence social and political attitudes toward climate change reflection, action and activism.

An iterative design approach will explore player responses to purposefully developed play experiences. Establishing the game design strategies and tactics to evoke emotionally complex, thought-provoking and potentially transformative moments for players. The study will explore storytelling, mechanics, rhetoric and aesthetics that best act as tools for reflection on climate change inaction. Promising design methods will be explored in-depth to create and establish a toolkit of the best approaches for designing persuasive moments in games. Ultimately to play a part in saving the planet, so we can save games.



## BIOGRAPHY

Sebastian is a PhD researcher in generative deep learning with a background in visual communication. Before obtaining a master's degree in artificial intelligence, he worked for several years as an independent graphic and type designer with a specialisation in web development. His work has been awarded national and international design prizes and has taken him around the globe, from Germany to Spain, Venezuela, México and Japan. Currently, Sebastian is a teaching fellow at Queen Mary University of London.

## SEBASTIAN BERNs

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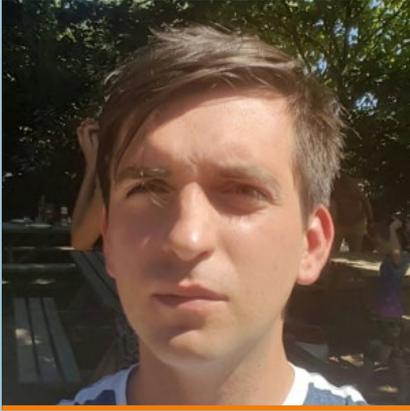
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## HIGH-FIDELITY DIVERSITY IN DATA-DRIVEN GENERATIVE SYSTEMS

We consider data-driven generative systems for the production of video game assets and artefacts for visual arts. These systems consist in a deep generative model that approximates a given data distribution. The model can be queried with a variety of search methods to find artefacts that satisfy the requirements of an application.

We quantify the limitations of such statistical models with respect to the diversity and the fidelity of artefacts they can represent and produce. For this, we study ways to adequately measure the different notions of diversity in the context of generative deep learning. We further research changes to generative modelling that can increase the diversity of a model's output and the fidelity of minority features.



## SOKOL MURTURI

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**Skills:** Neural Networks, TensorFlow, Reinforcement Learning, Statistics, Programming: C#, C++, Java, JavaScript, HTML, Game Engines: Unity 3D, Unreal4

## AI FOR GAME DESIGN: LEARNING FROM DESIGNERS

For my PhD I am investigating how AI can help developers by learning to generate content in a similar fashion to the developers themselves. I envision a framework based on reinforcement learning, where an AI can learn a design policy for some content domain (e.g., FPS maps or platformer levels) by observing human designers. The AI would learn to take particular design actions in certain kinds of content states. Recent research into reinforcement learning has shown it is a powerful framework for developing complex agent behaviours and I believe there is a lot of potential to apply this work to game design.

How would a human and artificial designer interact? Assume that an AI has learned to design a specific kind of content, such as a house, by observing human designers at work. A human designer could then partially develop some new content, and ask the AI to suggest some variations on it, with both AI and human iterating on the design in a mixed-initiative interaction. The AI could learn from feedback from both the human designer and playtesting. As human feedback may not produce enough data for effective learning, the AI could perhaps extend this with data from simulated playtests.

Game design decisions are often made with an expectation of how the player will react, and I could also look at how player models could be incorporated into the AI designer. In a reinforcement learning approach, the state could represent content+player, and the AI could learn to take design actions aimed a specific types of player. Developers could use this framework to develop content targeted at an individual player's style. Moreover, if the AI has learned something about how the human designer creates content, it can then be used live during the game to modify game elements in response to player interaction. Developers could set up modular levels, giving the AI the ability to adapt certain areas with content generated specifically to match the player.



## STEPHANIE CARTER

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**Skills:** second language learning, empirical data analysis, game design and design patterns

## BIOGRAPHY

Stephanie is a MA Psycholinguistics graduate from the University of York with several years of experience in language teaching. During her master's programme, she specialised in second language learning and bilingualism, as well as advanced phonetic and phonology. Stephanie became interested in gamification during her involvement with the WEAVR project – an esports broadcast companion app – and the Arena Research Cluster. Her interests extend to a diverse range of digital and board games, from casual and relaxing games to competitive esports.

## SECOND LANGUAGE LEARNING THROUGH IMMERSIVE GAMING

This interdisciplinary project seeks to close the methodological gap between education, psycholinguistics and HCI research by gamifying psycholinguistic data collection methods and implementing them into immersive language games. Within education, second language learning games have been developed with largely positive outcomes; however, critiques of current literature highlight flaws with study design resulting in low internal validity and, consequently, reliability. Psycholinguistic research on second language learning presents high internal validity, but current research largely lacks ecological validity, which limits the application of conclusions outside of a laboratory setting. By gamifying current data collection tools, the theoretical findings of this project will inform the development of language games to be used in instructed contexts and could facilitate more ecologically valid psycholinguistic research methods.



## SUNNY THAICHAROEN

**Queen Mary University of London**

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**Skills:** Player analytics, Game data, Metagame analysis

## BIOGRAPHY

Sunny is a passionate esports enthusiast, with a love of MOBA games. His background is in engineering and entrepreneurship, with a Master of Technology Entrepreneurship degree from University College London. He is the creator of YGOscope, a statistical game data platform for a competitive card game, Yu-Gi-Oh. Sunny is an avid player of competitive Dota in his spare time, and is also a keen theme park enthusiast. He is interested in modelling metagames of MOBAs through game data and player research, particularly how players adopt the most effective strategies when changes to the stable gameplay state occurs.

## “WHAT’S THE NEW META?”: METAGAME PROPAGATION AND STRUCTURE IN COMPETITIVE MOBA AND ESPORTS.

The project focuses on how the META - most effective tactics available - of MOBA games shift during disruption (usually through gameplay updates) between states of ignorance and stability within the player space of these games, to deepen our understanding of how players adapt to the changes that these gameplay updates cause, and why. There is a large degree of variability in how new METAs develop, and currently there is little research on the meta and metagame front. Available research so far has been based on defining the phenomena and resulting effects of gameplay updates, but little modelling has been done to attempt to bring these fragmented pieces of knowledge together and attempt to structure them. The study and structuring of this phenomena can be an ideal starting point in understanding how effective strategies develop not only in MOBAs or video games, but any other competitive games such as chess, trading card games or sports.



## TARA COLLINGWOODE- WILLIAMS

**Goldsmiths, University of London**

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**Skills:** Unity Development, C#, Character  
Animation

## BIOGRAPHY

Tara has always had a keen interest in immersing people into creative worlds. Whether through theatre, creative writing and now virtual 3D environments. She graduated with a Bsc in Creative Computing, which introduced her into the world of Virtual Reality. Over the years, her interdisciplinary profile has enabled her to work as a Technical Support and Researcher with many organisations in relation to her research, such as UCL, Great Ormond Street Hospital, George Mason Serious Games Institute in the United States where she also co-lectured an XR Games Module and, more recently as a Lecturer in Goldsmiths University teaching Unity-based XR experience development.

## THE PSYCHOLOGICAL IMPACT OF CONFIGURATION OF SELF- REPRESENTATION IMMERSIVE VIRTUAL REALITY

With the rise in demand for Head-Mounted Displays (HMDs), so is the need to create Embodied Shared Virtual Environments (ESVE) where users may experience authentic social interactions. Tara's research presents an exploratory examination of Embodiment - meaning the subjective feeling of owning a virtual representation in VR, and specifically Consistency in Embodiment - relating to how we prioritize and synchronise objective attributes of embodiment (i.e avatar representation) in order to create ESVEs which support more intuitive social interaction. The goal is to understand how different technical setups could have a psychological impact on participants' experiences in ESVE. This research hopes to inform the development of successful social interaction in a variety of applications in VR, ranging from training to gaming.



## TERENCE BROAD

**Goldsmiths, University of London**

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**Skills:** Machine learning research and in production development. Languages: C++, Python, Javascript

## BIOGRAPHY

Terence Broad is an artist and researcher based in London. He is currently completing his PhD at Goldsmiths, University of London. His work has been exhibited worldwide, at venues such as Ars Electronica, The Barbican and The Whitney Museum of American Art.

## LEARNING REPRESENTATIONS OF AESTHETICS FOR GUIDING GENERATION AND DESIGN

The aesthetic qualities of a game are crucially important to the player experience. Encompassing the look and feel of the game, they make a significant contribution to the emotional experience of the player. If machine learning can learn robust representations of aesthetic qualities, tools utilising these could give designers aesthetic control over generative systems, or make games that adapt the game aesthetics in real time.

In the existing literature, learning aesthetics is commonly treated as assessing photographic quality. However, the range of possible aesthetic experiences is much broader than simple image quality. There are a wide range of aesthetic qualities and aesthetic tastes that could be learned. In my research, I will expand the learning of aesthetics beyond images to multi-media representations, to include text, audio, video and 3D scenes.

After expanding approaches to learning aesthetics that better fit the player experience in games, I will then explore how these can be used to control generative processes, and integrated into tools to assist game designers.



## TIMEA FARKAS

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**Skills:** Player research, qualitative and quantitative data analysis, digital art, game design

## BIOGRAPHY

Timea is a researcher striving to understand how people engage with technologies—broadly defined—in their everyday lives, and how new technologies can enhance people’s experiences of play, creative expression, and beyond. She has always been drawn to learning new things, with a background ranging from creative arts through games to science, which allows her to apply an interdisciplinary outlook towards research. She holds an MA in Sonic Arts from the University of Sheffield and has graduated with a First Class (Hons) degree in music composition and technology with a special award for outstanding achievement and collaboration.

## EXPLORING AND DESIGNING IMMERSIVE EXPERIENCES IN BOARD GAMES

This research project centres around understanding board game players’ relationship with the immersive capabilities of hybrid board games - board games with a digital component - through finding novel interactions which strengthen the sensory elements of tabletop games . By focusing on physical board game pieces as alternative input devices to touch screens, the goal is to explore the design space of analogue-digital hybrids with a player-centric approach.



## TOBY JORDAN BEST

**Queen Mary University of London**

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**Skills:** Artificial Intelligence, C#, Python, Unity Game Engine, TTRPG Enthusiast and Strategist

## BIOGRAPHY

Toby has always held video games as an integral part of his livelihood, ever since catching his first Pokémon on the Game Boy Color. The ever-developing evolution of technology, from the humble NES and R.O.B. preventing the video game market crash in 1983, to the Wii's motion controls, to augmented and virtual reality today, has been a key inspiration, and one of the reasons why he studied Mathematical Computation at University College London. He also has a keen interest in tabletop roleplaying games, such as Dungeons & Dragons and Pathfinder. His research interests involve the potential of combining roleplaying games' collective storytelling and interactive narrative with the power of artificial intelligence and deep learning.

## GAME MASTER AI FOR TABLETOP GAMES

Artificial Intelligence is the field of creating digital agents capable of decision-making and rational thought to fulfil a core goal or aspect. For tabletop and video games, an implemented AI would attempt to 'solve' the game by finding optimal winning strategies.

However, tabletop role-playing games (TTRPGs) are driven by the power of collective storytelling and interactive narrative, as opposed to set rules, and therefore have a more open-ended goal

- maximising player enjoyment for all participants. This involves a Game Master (GM) player as both narrator and referee, controlling the non-playable characters (NPCs) and the campaign behind the screen, whereas players usually control one player character (PC) each to interact with the world. There is no 'failure' state compared to traditional games, as campaigns can continue until players lose interest or the narrative is 'complete'; even all PCs dying (known as a total party kill) can drive the narrative in a new direction.

This project aims to study and piece together the different elements that would go into a Game Master AI, building on current state-of-the-art game-playing AI, such as Director AIs in games such as Valve's 'Left 4 Dead', and studying the implications of such developments for players and game designers alike. For example, whether it could replicate the playing experiences of a human GM as a replacement, or enhance the experience by working with a human GM.



## TOM WELLS

**University of York**

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**Skills:** Perception, psychophysics and neuroscience

## BIOGRAPHY

Tom has an interest in niche alternative and indie games which evoke strong emotions and are narratively immersive. He studied Experimental Psychology as an undergraduate in Oxford, specialising in conscious brightness perception in specific optical pigments. His Masters was in Computational Neuroscience, Cognition and AI from Nottingham, and focused on Computer Vision (specifically facial recognition) and Visual Attention. He enjoys heavy metal, strength sports and literature.

## USING MACHINE LEARNING TO ESCAPE THE UNCANNY VALLEY

With the rise of digital art, Uncanny Valley has emerged from an esoteric robotics concept into an infectious memetic phenomenon, with specific memes such as ‘Uncanny/Canny Mr. Incredible’, or more generally uncanny faces being used as reaction images for humor. Critics and players will now refer to specific media being ‘Uncanny’ rather than using more general words as ‘off-putting’, demonstrating uncanniness cementing itself in the public consciousness as examples increasingly abound; ergo digital artists should be aware of evoking the uncanny even with modern rendering technology, as audiences become increasingly discerning of the Uncanny.

This is most pertinent in videogames, where rendering is performed in real-time, meaning rendering constraints must be implemented. This potentially confines characters to the Uncanny Valley, as it may not be possible to increase graphical fidelity, thus artists may be left to either accept the uncanny or demaster their work (both undesirable options).

This project aims to learn about the Uncanny Valley pertaining to modern skin rendering techniques, using artificial intelligence (specifically GANs) to directly map skin rendering parameters onto user assessments of uncanniness and realism. This can then be reverse engineered to provide automated tools for generatively rendering realistic non-uncanny skin, and predicting audience responses to skin realism, expediting QA testing. The primary experimental stage is to generate a face database with photorealistic skin to be assessed using psychometrics by participants. This is additionally one of few studies looking into the novel phenomena of training AI’s to generate human-oriented psychologically salient content.



## VALERIO BONOMETTI

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**Skills:** Python, SQL, Analytics, Experimental psychology

## BIOGRAPHY

I obtained my bachelor degree in Psychological Science and my master degree in Clinical Psychology at Padova University (Italy). During my academic path I acquired knowledge in general psychology, cognitive psychology, psychophysiology, neuroscience and research methodology. After my master degree I spent a considerable amount of time as a research trainee, both abroad and in my country, always investigating the reward process and its effects in various contexts. During this period I worked on various projects across different fields ranging from psychophysiology, player research and game analytics. In my free time I enjoy practicing indoor climbing and travelling, I like figurative art in general and more specifically I'm a huge cinema and graphic-novel enthusiast.

## GAME ANALYTICS AND PLAYER PSYCHOLOGY: CREATING RELIABLE MODELS OF PLAYER MOTIVATION

Motivation can be loosely defined as a process of the brain and the mind, capable of driving and deeply shaping human behaviour. Motivational processes are embedded in many everyday life situations, exerting their effects via a wide range of incentive mechanisms and objects. Understanding this process in a videogame context, however, requires a more holistic

approach considering not just the incentive properties of the game but also the player personal characteristics.

My project aims to create reliable crossgames models of player motivation taking into account the contribution of natural inter individual variability. This will be accomplished linking in-game behavioural data and psychological models via a hybrid approach, where findings from small scale experimental studies (hypothesis-driven) will guide the realization of large scale (data-driven) applications for predicting players' characteristics, future behaviour and motivation evolution.

Being able to model player motivation and predict the trajectories of its evolution could possibly lead to personalized and dynamic engagement strategies able to adapt accordingly to the player characteristics and in-game behaviour. Achieving a similar goal would be of pivotal importance in industrial and gamification contexts.



## YOUNÈS RABII

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**Skills:** System Design, Narrative Design,  
Procedural Content Generation,  
Automated Game Design

## BIOGRAPHY

Younès is an awarded game designer and generative AI researcher.

Their current research is concerned with the relationship between a game's rules, its narrative, and how to build AI systems that can understand these relationships, manipulate them, and invent new ones.

Younès also has been a game developer for the past 10 years. They specialize in crafting new forms of play and making it accessible for their peers. Their work has been previously exposed in the French embassies and international conferences like the Game Developers Conference, the Gamedevs of Color Expo and the A MAZE Festival.

## KEEPING PLAYERS ON THEIR TOES: TOWARDS LIVE AUTOMATED GAME DESIGN

Younès' research goal is to bring to video games some of the most interesting properties of roleplaying games: their ability to trust every player with building a part of the game, and their ability to generate both new narrative and gameplay on the fly. Younès is working both on the AI techniques needed to allow that, and how to design the social spaces around those games in a way that won't hurt players or abuse creators. During their PhD, Younès will likely design a prototype in that new genre, counting among the first games to contain a form of Live Automated Game Design.



## YU-JHEN HSU

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**Skills:** Game AI, Data Science

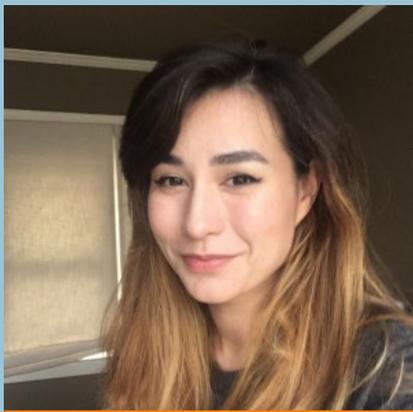
## BIOGRAPHY

I have always been interested in automation specifically within strategy games, starting from civilization 5. I have a background in Artificial Intelligence with a Master of Science degree from Queen Mary University of London, with a focus on Game AI, Computer Vision and Machine Learning/Deep Learning. My research interests involve Game AI improvement in real-time turned-based games with the help of data science techniques.

## AUTHORIAL CONTROL OF MONTE CARLO TREE SEARCH AGENTS IN GAMES

This project has two goals. Firstly, to improve the performance of MCTS (Monte Carlo Search Tree) implementation. Secondly, the goal is focused on building an AI agent that is able to win the game but also provide feedback information/data about it's decisions to the players and designers.

In order to achieve the goal, the plan of the project is to use different data science skills to enable the game AI agent to understand the utility of different actions and decrease the time needed for making decisions. The data collected can also help the game AI agent explain its behaviors, hence provide useful information/data for its users and designers.



## BIOGRAPHY

Zoë O'Shea is an Irish freelance games designer and artist, working on her thesis in game design and player psychology. Her previous qualifications include 3D Generalism, and an MA in Digital Game Design and Theory. She is endlessly curious about the meaning and value that technology can bring to the world, exploring the human experience as a core principle of her work. She firmly believes in the importance of creating a more joyful and inclusive world.

## TEND & BEFRIEND: STRESS RESPONSE IN DIGITAL GAMES

An exploration of game design and player psychology, focusing on an alternative theory of Stress Response, "Tend & Befriend Theory". Tend & Befriend offers insight into the rising popularity of "cozy" games which emphasise social connectivity, customisation and relaxing play.

## ZOË O'SHEA

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**Skills:** Game Design, Player Psychology,  
XR and Immersive Technology



IGGI ALUMNI

## IGGI ALUMNI

Congratulations to all our IGGI alumni!

### FROM OUR 2014 COHORT

<b>Athansios Kokkinakis</b>	(University of York)
<b>Christian Guckelsberger</b>	(Queen Mary University of London)
<b>Daniel Berio</b>	(Goldsmiths, University of London)
<b>David Gundry</b>	(University of York)
<b>Joe Cutting</b>	(University of York)
<b>Joseph Walton-Rivers</b>	(University of Essex)
<b>Memo Akten</b>	(Goldsmiths, University of London)
<b>Mihail Morosan</b>	(University of Essex)
<b>Piers Williams</b>	(University of Essex)
<b>Tom Cole</b>	(Goldsmiths, University of London)

### FROM OUR 2015 COHORT

<b>Chris Madge</b>	(Queen Mary University of London)
<b>Dino Ratcliffe</b>	(Queen Mary University of London)
<b>Jen Beeston</b>	(University of York)
<b>Sha Li (Lisa)</b>	(University of York)

## FROM OUR 2016 COHORT

**Cristina Guerreo Romero** (Queen Mary University of London)

**Raluca Gaina** (Queen Mary University of London)

**Shringi Kumari** (University of York)

## CONFERENCE FOREWORD

This year, the IGGI Conference returns in-person to the University of York to present the state of the art in Games Research. We're delighted to introduce you to the cutting edge developments in the exciting work of the IGGI students, that provide a route for engagement between the Games Industry and Academia. The IGGI students have worked very hard to bring to you their research in the form of talks, posters, panel discussions, demos, and workshops. They are all looking forward to engaging with you in interesting conversations about games and how their research can shape a better future in this vibrant and ever-changing industry.

We sincerely wish that all this, accompanied by our excellent selection of Keynote Speakers, will enable you to enjoy the 2022 edition of the IGGI conference brought to you by the World's largest doctoral training programme in Games Research

**The 2022 IGGI Conference Committee**

# KEYNOTE SPEAKERS

## KEYNOTE SPEAKERS



### RACHEL KOWERT

Rachel Kowert, Ph.D is a research psychologist and the Research Director of [Take This](#). She is a world-renowned researcher on the uses and effects of digital games, including their impact on physical, social, and psychological well-being. An award-winning author, she has published a variety of books and scientific

articles relating to the psychology of games and, more recently, the relationship between games and mental health specifically. Her published works include peer-reviewed books such as [Video Game Debate](#), [Video Game Debate 2](#), and [Video Games and Well-being: Press Start](#), as well as community-focused books such as [A Parent's Guide to Video Games](#), and [Pragmatic Princess](#). Recently, she founded her YouTube channel [Psychgeist](#), which serves to bridge the gap between moral panic and scientific knowledge on a variety of psychology and game-related topics. In 2021, Dr Kowert was chosen as a member of The Game Awards Future Class, representing the best and brightest of the future of video games. Dr Kowert has been featured in various media outlets, including NPR, the Washington Post, the Wall Street Journal, the Atlantic, Wired, and video game publications such as Kotaku and Polygon. In her spare time, she can be found talking about The Witcher (#CavillInfluencer) and playing with her three children.

### MOVING BEYOND THE MMORPG YEARS: A RETROSPECTIVE LOOK AT RESEARCH INNOVATION IN GAME STUDIES

#### Abstract

As a discipline, game studies has been continually growing and innovating. In this talk, we will explore how game studies has evolved as an area of specialization since I began my work in this field at the University of York over a decade ago. From the beginning “MMORPG years”, to the “Gamelab years” of the 2010s, to the “Hybrid years” we now find ourselves in, each point of innovation will be discussed, highlighting how our adaptability as a field has continued to dismantle preconceived notions of games as frivolous (at best) and dangerous (at worst) activities. This talk will close with a celebration of how our persistence (and, honestly, our mere existence) as a field of research has changed both science and society.



## TOM COLE

Tom is Lecturer in Games Development at the University of Greenwich. Until recently he was Lecturer in Computing at Goldsmiths, University of London and before that founded and led the BA Games Design degree at the University for the Creative Arts, Rochester.

Tom was in the very first intake of IGGI in 2014. He obtained his PhD from Goldsmiths in 2020, and has published papers on mixed-affect and reflective gameplay experiences, player agency and the use of grounded theory methodology (including 2 papers at the recent CHI 2022 conference in New Orleans). His research is situated at the boundary of Human Computer Interaction (HCI) and Games Studies, and focuses on how we can broaden and deepen emotional engagement in video games, with a particular focus on the eudaimonic gameplay experience.

He also organises AdventureX - the Narrative Games Convention. The only event of its kind in the world, it's an internationally recognised sell-out event at the British Library Conference Centre.

Before entering academia, Tom worked at Supermassive Games where he was a designer on the BAFTA award-winning horror game Until Dawn and artist on Killzone Shadow Fall.

## LOST IN THE WOODS: THE IMPORTANCE AND UTILITY OF GROUNDED THEORY METHODOLOGY AND QUALITATIVE RESEARCH IN GAMES

### Abstract

Using my own research on mixed-affect and eudaimonic emotional experiences in games as a touch point, I will talk about Grounded Theory methodology (GTM), what it has to offer games research, and how qualitative work in general is essential to the health of any research field. In particular, I will highlight how GTM has great potential for opening up new frontiers in research, as well as bringing innovation and novel insights to established domains of knowledge.

**SAHAR ASADI**

Sahar is a research lead at King where she drives AI research for the games. Sahar obtained her PhD in mobile robot olfaction from Applied Autonomous Sensor System, Örebro University. Her passion is to tackle the challenges of bringing research to product and production responsibly, which will be the theme of her talk at the conference. Throughout her +11 years of industry journey, she got to apply research to real problems in many different domains: user experience at Spotify, distributed deep learning at Clusterone, information retrieval and NLP at Meltwater, and product recognition at OculusAI. Sahar is also a co-founder of Women in Data Science, AI & ML Sweden.

## FROM RESEARCH TO PRODUCTION: THE JOURNEY OF CONTENT PRODUCTION AUTOMATION

### **Abstract**

Content is an essential pillar of our games at King. Given the scale and the enormous number of players and levels, an AI solution that enables content production automation is required to keep producing playful and fun-to-play levels. It has been a journey of research, experiments, development, and operations. In this talk, I will discuss some of the research work in this domain, production challenges and how we addressed them in our example use-cases at King.

# CONFERENCE PROGRAMME

DAY 1 – TUESDAY 6 SEPTEMBER 2022 – Ron Cooke Hub

09.00	<b>Registration</b>	<b>RCH Atrium</b>
09.30	<b>Poster session</b>	
10.30	<b>Welcome: Paul Cairns &amp; Peter Cowling</b>	<b>RCH/037 Lecture Theatre</b>
10.45	<b>Opening Keynote: Rachel Kowert</b> Moving beyond the MMORPG years: A retrospective look at research innovation in game studies	
11.30	<b>1 minute Buzz Talks by IGGI Researchers</b>	
11.45	<b>Game Psychology (Chair: Sahar Mirhadi)</b> The lived experience of Internet Gaming Disorder: are we looking at the right thing?: <b>Elena Petrovskaya</b> The nature of gaming in a low mood population: <b>Laura Helsby</b>	
12.30	<b>Lunch</b>	<b>RCH Atrium</b>
13.30	<b>1 minute Buzz Talks by IGGI Researchers</b>	<b>RCH/037 Lecture Theatre</b>
13.45	<b>Game AI (Chair: Younès Rabii)</b> Low cost AI agents for Level Evaluation: <b>Bobby Khaleque</b> Can the AI play worse?: <b>Marko Tot</b>	

<b>14.30</b>	<b>1 minute Buzz Talks by IGGI Researchers</b>	<b>RCH/037 Lecture Theatre</b>
<b>14.45</b>	<b>Coffee break and Poster session</b>	<b>RCH Atrium</b>
<b>15.15</b>	<p><b>Industry Panel (Chair: Susanne Binder)</b></p> <p>The Tortoise and The Hare</p> <p>This panel seeks to investigate the perceived difference between academia-performed and industry-performed games research</p>	<b>RCH/037 Lecture Theatre</b>
<b>16.00</b>	<p><b>Applied Game Design (Chair: James Goodman)</b></p> <p>Seven and a half lessons about designing applied games for an audience that doesn't play games: <b>Prasad Sandbhor</b></p> <p>How do we involve young people in the design of applied games? <b>Michael Saiger</b></p>	
<b>16.45</b>	<b>Coffee break and Poster session</b>	<b>RCH Atrium</b>
<b>17.15</b>	<p><b>Keynote: Tom Cole</b></p> <p>Lost in the Woods: The Importance and Utility of Grounded Theory Methodology and Qualitative Research in Games</p>	<b>RCH/037 Lecture Theatre</b>
<b>18.00</b>	<b>Drinks Reception</b>	<b>RCH Atrium</b>

DAY 2 – WEDNESDAY 7 SEPTEMBER 2022 – Piazza

09.00	<b>Registration</b>	Piazza Reception area
09.30	<b>Workshop Sessions, 4 Parallel streams</b> <ul style="list-style-type: none"> <li>• Roundtable on competitive gameplay integrity in Collectible Card Games</li> <li>• Qualitative analysis? In MY Excel? It's more likely than you think</li> <li>• Tutorial on Regret Minimization for optimal play in imperfect information games</li> <li>• Accessibility beyond access: Using an APX design approach to tackle real world accessibility issues</li> </ul>	Piazza Seminar Rooms
11.00	<b>Coffee break</b>	Piazza Restaurant
11.30	<b>1 minute Buzz Talks by IGGI Researchers</b>	PZA/103 Lecture Theatre
11.45	<b>User Experience (Chair: Prasad Sandbhor)</b> Changes of user experience in an adaptive game: a study of an AI manager: <b>Francesca Foffano</b> Direct Democracy in Game Updates: The case study of Old School RuneScape: <b>George Long</b> Panel: Designing positive player experiences in multiplayer games: <b>Luiza Stepanyan</b>	PZA/103 Lecture Theatre

12.45	<b>Lunch / Industry Booths</b>	<b>Piazza Restaurant &amp; 'The Box' (PZA/012)</b>
13.45	<b>1 minute Buzz Talks by IGGI Researchers</b>	<b>PZA/103 Lecture Theatre</b>
14.00	<b>Player Decisions and Agency (Chair: Dan Gomme)</b> Tedium, Stagnation, and Disconnection: The Role of Need Frustration in Games: <b>Nick Ballou</b>  "It seemed like a good idea at the time": how players conceptualise decisions in open world games: <b>Nathan Hughes</b>	<b>PZA/103 Lecture Theatre</b>
14.45	<b>Coffee break</b>	<b>Piazza Restaurant</b>
15.15	<b>Creative AI (Chair: Sebastian Berns)</b> Cue-Free Express: <b>Kyle Worrall</b> @artbhot: Towards a Bot with Creative Presence on Twitter: <b>Amy Smith</b>	<b>PZA/103 Lecture Theatre</b>
16.00	<b>Keynote: Sahar Asadi</b> From research to production: the journey of content production automation	
16.45	<b>Closing Remarks</b>	
17.00	<b>Conference end</b>	

## ACCESSIBILITY INFORMATION

The IGGI Conference is being held in the Ron Cooke Hub and Piazza on Campus East.

For people with limited mobility, the buildings have step free-access and lifts. The lecture theatres, in which the main talks will take place, have power assisted doors and dedicated space for people in wheelchairs at the front and back of them.

There are gender neutral toilets in the Piazza building and there are, of course, larger individual toilets which are suitable for people with limited mobility or who use wheelchairs in both Conference buildings.

Both of the Lecture Theatres being used have a Hearing Loop Facility.

A quiet room has been provided on site should you wish to have some time away from the conference. There is a sign on the door of the room and it is marked on the map provided at Registration.

Food provided for the conference is at least 50% vegetarian. Vegan, gluten-free and other specialist diets have been catered for where we are aware of the need.

The accessibility contact for the conference is Tracy Dancer. If you need any further information or need any assistance, please talk to her.

## CONFERENCE COMMITTEE

**General Chairs** ..... **Debbie Maxwell and James Walker**

**Programme Chairs** ..... **James Goodman and Sahar Mirhadi**

**Local Chair** ..... **Francesca Foffano**

**Poster Chair** ..... **Prasad Sandbhor**

**Website/Marketing Chairs** ..... **Michael Saiger and Florence Smith Nicholls**

**Demos Chair** ..... **Michael Saiger**

# IGGI CONFERENCE 2022



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