SCIENCE GALLERY

GAME

THE FUTURE OF PLAY

ISBN: 978-0-9558957-8-4

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PUBLISHED BY SCIENCE GALLERY

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GAME

THE FUTURE OF PLAY

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THE FUTURE OF PLAY

MICHAEL JOHN GORMAN—DIRECTOR, SCIENCE GALLERY

LYNN SCARFF—PROGRAMME MANAGER, SCIENCE GALLERY

WHAT IS IT THAT DRIVES US TO PLAY?

Should we use gameplay to remodel the reward systems and user-interfaces of every facet of human experience, from medical care to education? Or is our passion for video games isolating us socially, desensitizing us to violence, and potentially damaging our brains and bodies? Is the everyday world becoming more playful or are games becoming more serious?

Jane McGonigal, author of *Reality is Broken* and a leading advocate of of the concept of 'gamification', has noted that "[Game players] are people who believe they are individually capable of changing the world... The only problem is they believe they are capable of changing virtual worlds and not the real world". There is a growing belief that by harnessing what game developers have learnt about optimising human experience, we can potentially use games to tackle some of the biggest problems of the 21st Century.

It may seem foolish to think that a computer game can have such a universal impact on human behaviour but the average game players have changed significantly over the last ten years—no longer the stereotype of a solitary teenage boy, game players are now as likely to be women in their mid-thirties playing on their smartphones. In an industry that is expected to reach $70 billion in sales in 2013 and overtake all other entertainment industries, it would seem opportune to consider the huge opportunities that game play opens up to a wide range of interests and applications.

GAME: **THE FUTURE OF PLAY** takes a close look at the future direction of gaming. It explores everything from intriguing emergent interfaces to the components of a great game, speculates on how we might play in the future, and even offers visitors an opportunity to become game developers themselves. Featuring work by world-renowned game designers such as Eric Zimmerman and architect Nathalie Pozzi, and hacks on old favourites like *Lunar Trails* by Seb Lee-Delisle, **GAME** will offer you numerous opportunities to get directly involved in some compelling game play.

Complimenting the exhibition and delving into some of the big themes of **GAME** is a full programme of events and workshops. **GAME**: **What's next?** will showcase some of the cutting edge technology coming down the pipeline such as Project Holodeck, which uses Oculus Rift technology to transport you to a virtual play space. The Irish Game Indie Night will offer a platform to the wealth of indigenous talent and opportunities in Ireland in the games industry and our Friday night socials will give you a chance to break out a board game or two and rediscover what makes a classic game. In addition to talks from game creators and designers Eric Zimmerman, Mary Flanagan, and Phil Campbell, and in depth Unity workshops in our studios, our events and workshops will give you the chance to hear from the experts as well as build on your own gaming expertise.

The genesis of **GAME**: **THE FUTURE OF PLAY** came from Science Gallery Leonardo and Swrve, Havok and Kore co-founder Steve Collins who with fellow curators Mads Haahr [School of Computer Science in Trinity College Dublin] and Dylan Collins [founder of Fight My Monster] have given generously of their time, networks and ideas in helping us bring together the exhibition and events programme.

Like all of our exhibitions at Science Gallery, we are especially interested in contributions from you the visitor. From our in-gallery game, **WE, THE RESISTANCE**, a game of stealth and wits using RFID technology that takes place throughout the gallery to our **GAME DESIGN LAB** where you can realise your own game ideas, **GAME** offers plenty of opportunities for you to get directly involved. Whether it's to visit the exhibition, come along to an event or take part in a workshop, we hope **GAME** will inspire you to come out and play!

HOW I LEARNED TO STOP WORRYING AND LOVE THE GAME

STEVE COLLINS — CURATOR, GAME

I played my first computer game when I was 12. Before I played it, I had to type in the code for the game, transcribing from a hobbyist magazine. The computer was a Sinclair ZX80 with less than 1000 bytes of RAM [your iPhone 5 has 1,073,741,824 bytes]. It used a TV as a display and anytime something moved on the screen the whole TV shuddered and flickered. It was black & white and had no sound.

THE GAME WAS A VERY SIMPLE VERSION OF A VERTICAL CAR RACING GAME, WHERE YOU STEERED LEFT AND RIGHT DODGING BIG BLOCKS THAT WOULD ADVANCE DOWN THE SCREEN.

The game was a very simple version of a vertical car racing game, where you steered left and right dodging big blocks that would advance down the screen. Your car was represented by the letter 'H'. But I was hooked. There's something magical about the combination of high technology [ok, the ZX80 was possibly never high technology] and art, the intersection of software engineering, computer graphics, state of the art computer hardware, and the creativity of artists, working on graphics, audio and design. I've spent my career exploring and exploiting computer games, writing my first computer game which was published in 1988, going on to do a PhD in computer graphics, researching the latest techniques for creating realistic worlds in computer games, and then helping to build three different companies creating technology for computer game development. It's now my great pleasure to introduce the computer game in all its glory to hopefully a new generation of players and creators, through Science Gallery's **GAME** exhibition.

The industry and science of computer games has evolved incredibly. We're light years away from the ZX80 now, with the current generation of game consoles and the explosion of games onto mobile devices like the iPhone. In 1982 when I played my first game it was only two years after Pacman was first released in Japan, and a gamer was either someone like me, very likely a young male, and even more likely a young male without a girlfriend, who was prepared to roll up their sleeves and write code, or a slacker teenager spending too much time in dark and dingy arcade halls.

TODAY IT'S DIFFERENT. GAMES ARE GLOBAL. THEY ARE MASS MARKET.

Today it's different. Games are global. They are mass market. The term gamer is starting to lose relevance in just the same way as we no longer talk about computer users. We are all users now, and increasingly we are all gamers. The world's most popular games are not being played on a Playstation console, or on a souped up PC, they're being played on iPhones, on Kindles and on Facebook. They are being played by people of all ages, gender and location. Our definition of what is a game is changing, being stretched and pulled as countless game developers explore the challenge of entertaining the billion players of the world.

Right now is an incredibly exciting time for the game industry, so it's a really opportune time to take a step back and explore where we've come from and challenge our current thinking about what a game is, who plays games, and how the nature of games and gameplay is going to change in the near future. **GAME** features a mind-bending exhibition where you will get to re-discover the classic Pong with *Re-Pong* from Nicolas Myers [UK] and Nitipak Samsen [UK], see the evolution of game design and art through Jun Fujiki's [JP] *Game Border* project or actually experience what it's like to be inside a game world with *Outerbody Maze* from Jason Wilson [US]. We also have a great lineup of exhibits from local companies and developers. Throughout the show we'll be running events where you can learn how to create a game, or find out about how the music for games is created, or meet and talk to famous game developers. I'm pretty sure we won't have a ZX80 on display, but I guarantee, like me, you'll be hooked.

IN THE MIDST OF A REVO-LUTION

MADS HAAHR — CURATOR, GAME

I encountered my first computer game in 1982 when I hung out in a bookstore in a suburb of Copenhagen. I was 13 years old, and the game ran on a ZX Spectrum "home computer" that the bookstore was selling. The game was called The Hobbit and was a text-based adventure game where you typed commands ["go north"] to control what your character would do and read descriptions about what happened in response ["Thorin sits down and starts singing about gold"]. I was mesmerised. I played the game in the store until they kicked me out [they later hired me to sell games] and got hold of a book on how to program in BASIC and then taught myself programming. For a few painful months, before I had saved enough money to buy the Spectrum, I committed my code to pages in a notebook. When I finally got the coveted machine, I looked at my notebook and realised I'd learned so much from programming on paper that I could now write the games much better. So I dumped the notebook and wrote new games from scratch—variations of Pac-Man and Robotron 2084—but chiefly text adventure games, like The Hobbit. Despite the crude interface of on-screen text and rubber keyboard, I was fascinated by the worlds that could be created and brought to life in the machine, by the characters that could be programmed to act and do things on their own and in response to the player—in short to create a story.

While stories have remained the focus of my interest in games, the medium has come a long way since The Hobbit. The first things to improve were graphics, sound and game character behaviour, but it took until the Nintendo Wii in 2006 to kick off a revolution in the interfaces that we use to interact with games. At the moment, we are in the midst of this—an extremely creative exploration of game interfaces in which everything is up in the air. It is my view that this revolution in interfaces is timely, and even necessary, for games to mature as a medium, to become what they have the potential to become. The ideas that are tested now and within the next few years will shape the medium of games for years to come. The selection of works in **GAME** captures this exceptionally well. *Angry Birds* by Evan Roth [US] explores the smartphone touch interface, which only started becoming popular in 2008 but which is now so pervasive that we forget how new it is. *Are You a Good Localiser?* by the Audio and Acoustics Research Group [IE/PL] gives a glimpse into the sophisticated technical work that goes on behind the scenes to improve the audio interface and which is crucial to an immersive play experience.

Many of the exhibition's pieces use the latest camera-based interfaces for a variety of purposes, either for new types of collaborative games, such as *Renga* by WallFour [UK] and *Lummoblocks* by Mar Canet, Carles Gutierrez, Jordi Puig, Javier Lloret [ES], or by borrowing interactions that we know from elsewhere, such as drawing in *Doodle Defense* by Andy Wallace [US] or climbing a ladder in *Re-Pong* by Nicolas Myers and Nitipak Samsen [UK], and use them to reinvent well-known game mechanics.
At their core, interfaces are the means that humans use to transcend or negotiate boundaries, and many of the works in **GAME** play with the various boundaries that are important to games. The interface in *Bionic Roshambo* by Kieran Nolan [IE] isn't picked up but worn with a view to blurring the boundary between the gamer's body and the game controller, and *Relax to Race* by Galvanic Ltd [IE] blurs the same boundary through the use of a biofeedback interface. *Game Arthritis* by Matteo Bittanti [US] and IOCOSE [UK] also addresses the body/controller boundary and at the same time the boundary between reality and fiction through its images of deformed body parts, human controllers collided with game controllers. My own project *Bram Stoker's Vampires* is likewise designed to blur the boundary between the real world and the fictional game world but for a different reason—to improve player immersion in the game itself. Granny's Back Yard by Tim Garbos [DK] questions the boundary between the role of player and creator of games, and perhaps most ambitiously, *Game Border* by Jun Fujiki [JP] breaks down boundaries of time, seamlessly connecting different eras of game technology in a fashion that mirrors game development itself: You take something old and move it up through time until you find yourself asking—where next? And that is of course what **GAME** is all about: the future of gaming. Come help us make it.

GAME: PLAY

YOU CAN'T CALL AN EXHIBITION GAME AND NOT OFFER SOME GENUINE OPPORTUNITIES TO PLAY! FROM OUR GAME DESIGN LAB WHERE YOU CAN TURN YOUR GAME IDEAS INTO A REALITY TO THE SOCIAL, MULTIPLAYER EXPERIENCE OF WE, THE RESISTANCE, GAME WILL OFFER A NUMBER OF OPPORTUNITIES FOR YOU TO CREATE AND PLAY.

GAME DESIGN LAB — VICKY LEE

HAVE AN IDEA FOR A COMPUTER GAME YOU WOULD LIKE TO SEE BECOME A REALITY? OUR GAME DESIGN LAB WILL TAKE YOU THROUGH A SERIES OF STEPS TO DESIGN A GAME IN SCRATCH AND CONSTRUCT2. FOLLOWING OUR TUTORIALS YOU WILL BE EQUIPPED WITH THE BASIC TECHNIQUES TO REALISE YOUR OWN CREATIONS, WHICH YOU CAN THEN UPLOAD ONTO OUR GAME LAB PCs FOR OTHER VISITORS TO ENJOY!

WE, THE RESISTANCE —HILARY O'SHAUGHNESSY , [MAKE AND DO], BEN GAULON [RECYCLISM HACKLAB] AND LOURENS ROZEMA [EMBED ENGINEERING]

THIS IS A MULTIPLAYER GAME THAT TAKES PLACE THROUGHOUT THE EXHIBITION USING RFID TECHNOLOGY . YOU NEED YOUR WITS AND A CERTAIN AMOUNT OF STEALTH TO NEGOTIATE THE VARIOUS TASKS AND LEVELS . AND TO KEEP YOU ON YOUR TOES JUST WHEN YOU THINK YOU 'VE GOT THE HANG OF IT —THE GAME WILL CHANGE AGAIN.

GREEN VS WHITE—RUSSELLWORKS

AT GAME, YOU'LL GET TO PLAY WITH THE DESIGN OF THE SHOW. SWIPE ANY OF THE LIGHTS AND THEY WILL CHANGE COLOUR FROM GREEN TO WHITE OR BACK AGAIN. IF YOU'RE MARKED AS THE GREEN TEAM YOUR TASK IS TO MAKE THE WHOLE GALLERY SPACE GREEN. IF YOU'RE ON THE WHITE TEAM THEN YOU MUST CHANGE THE GALLERY TO WHITE. SOUNDS EASY? TRY GETTING YOUR WAY WHEN THERE ARE LOTS OF VISITORS! MAYBE YOU CAN TEAM UP AND RECRUIT SOME OTHER BODIES TO YOUR CAUSE?

CURATED GAME LOUNGE—VARIOUS

TAKE TWO ANDROID TABLETS, TWO IPADS, TWO COUCHES AND A HEAP OF SUGGESTIONS FROM THE SCIENCE GALLERY COMMUNITY AND YOU HAVE OUR CURATED GAME LOUNGE. THIS IS THE SPACE WHERE WE FEATURE A NUMBER OF GAMES THAT OUR CURATORS AND AUDIENCE HAVE RECOMMENDED. IF YOU KNOW A GREAT GAME THAT YOU WANT TO SHARE THEN DROP US A LINE. SETTLE IN WITH A COFFEE ON THE COUCH, KICK BACK AND ENJOY THE SELECTION.

GAME:

FEATURING WORK BY A HOST OF WORLD-RENOWNED GAME DESIGNERS, ARTISTS AND DEVELOPERS, **GAME** OFFERS A CHANCE FOR YOU TO EXPLORE THE FUTURE OF PLAY ON EVERY LEVEL.

EXHIBITS

INTERFERENCE

Multi-player game installation, 2012

NATHALIE POZZI [IT] & ERIC ZIMMERMAN [US]

Playing Interference across the wall
Maxime Dufour Photographies

www.ericzimmerman.com
www.nakworks.com

Interference is a game that was commissioned by and premiered at la Gaîté Lyrique in Paris in 2012. The core of *Interference* is a simple strategy game. The twist is that at each turn you must steal a piece from another game going on between other players. Five suspended, super thin steel walls act as vertical game boards and create the space of play. The organic patterns of the boards resemble cell walls and tissue samples, underscoring the organic, controlled chaos of the gameplay.

The game is played by pairs of opponents [there needs to be at least two pairs of players]. Each pair plays only on a small section of one of the walls—a "cell colony" which is centred on a special black piece. Your goal is to have more of your colour pieces in each of the cells of your colony than your opponent. Complicating this simple strategy game is the fact that at each turn, you take pieces from other colonies—the active games of other players. And they are doing the same to you, creating chaos in your game as you are playing. Typically, *Interference* players begin to metagame heavily, striking deals with players in other pairs, and telling them which pieces to remove.

The result is a game that is at once satisfyingly strategic and maddeningly manic—both highly logical and highly social. A crowded game becomes a beehive of activity, as players race around to visit games on other walls, strategising with and against each other, becoming allies and enemies with strangers.

BIO: Nathalie Pozzi is an Italian architect who collaborates with American game designer Eric Zimmerman on the creation of large-scale game installations. Their work has been exhibited in Paris, Berlin, Los Angeles, San Francisco, Atlanta, and New York City. *Interference* is their fifth project together. Nathalie's work as an architect includes the design of residential buildings, as well as collaborations with artists and designers in Japan, Finland, and the US. Eric's work as a game designer includes award-winning games both on and off the computer. He is the co-author of Rules of Play, the standard textbook on game design and is a founding faculty at the NYU Game Center.

— Nathalie Pozzi & Eric Zimmerman:
"*Interference* is a genuinely fun game that simultaneously questions many of our assumptions about games and play. Normally when we play a game, we enter a separate space that is protected from the outside world—and what's yours is yours. But in *Interference*, your game is constantly being altered by other players, even as you change the games of others yourself. While each game takes place in a local area of one of the walls, the games themselves can move across the walls—and games even collide with each other as they drift across the walls. *Interference* encourages players to negotiate, argue, and scheme with and against each other, across physical space, social space, and the spaces between games."

LUNAR TRAILS

Game installation, 2012

SEB LEE-DELISLE [UK]

Image:© Seb Lee-Delisle

www.seb.ly/lunar-lander
@seb_ly

Created in 1979, *Lunar Lander* was one of the of the very first arcade games. The display didn't use scan lines like a normal television at the time, instead, the cathode ray moved around to make shapes, the same way that laseriums made pictures with lasers. Sadly, *Lunar Lander* had a fairly limited lifespan and was quickly superseded by perhaps the most famous vector game ever, Asteroids. In fact, most of the early *Lunar Landers* had their insides unceremoniously ripped out and were converted to Asteroids cabinets.

A few years ago, as a tribute to the early pioneers of arcade gaming, Seb Lee-Delisle decided to recreate *Lunar Lander* in Flash and in both 2D and 3D with much of the physics and collision detection working. For **GAME**, Seb is bringing this concept from the internet into reality, complete with a full size arcade cabinet and a 3-metre wide drawing machine that produces artwork on paper in real time as you play *Lunar Lander.*

The players' trails will build up throughout the course of the exhibition to produce several large scale artworks. The game is available to play online at www.moonlander.seb.ly and online players will also be shown on screen, producing digital images that will be posted to Twitter on the @LunarLander account.

BIO: Seb Lee-Delisle is a creative coder, speaker and teacher, working across platforms including JavaScript, Processing and openFrameworks. He works to bring people together with large scale installations like PixelPhones, interactive firework displays, or glow-stick voting systems. His work has pushed the boundaries of what is possible both on and off the web, and won two BAFTAs with Plug-in Media, the agency he co-founded in 2004.

—Seb Lee-Delisle: "I've long been intrigued by *Lunar Lander.* I'm not entirely sure why, I think there's something about its difficulty, pace and aesthetic that really appeals to me. It's a slow game, and you're quietly floating around for ages but the tension builds and builds as you get closer to the landing zone. To express my love, I made an homage to the game in HTML5 and JavaScript, and, as a test of multi-user technology, adapted it to broadcast players' positions. My app monitors each player's progress and draws trails as they move. After leaving a test running overnight I woke up to see a beautiful trails image. As with most of my work, it's nothing without the active participation of the public."

GAME ARTHRITIS

Photographic prints, 2011

MATTEO BITTANTI [US] AND IOCOSE [UK]

3D Optical Disorder
Matteo Bittanti and IOCOSE, 2011
'Game Arthritis'
C-Print, 50 x 66 cm

www.gamearthritis.org
www.matteobittanti.org
www.iocose.org

In 2011, IOCOSE and Matteo Bittanti worked together to create *Game Arthritis*, a staged photographic documentation of deformities induced by video gaming. What are the real effects of digital gaming on our fingers, hands and bodies? *Game Arthritis* is an ongoing project that imagines a future where the conformity of interfaces on everyday devices is beginning to produce real physical consequences for the users. These pathologies—labelled collectively "game arthritis"—were exhibited at the Venice Biennale 2011 and at the Fabio Paris Art Gallery.

Matteo Bittanti and IOCOSE have imagined a scenario in between scientific truth and apocalyptic narratives, factual and fictitious information. According to the artists, research on such deformities has been conducted for some time in clinical laboratories across the globe—however doctors and researchers are seldom willing to share their findings with the general population. Although evidence of new technologically-induced diseases is now becoming known outside of the scientific community, "game arthritis" is not officially "recognised".

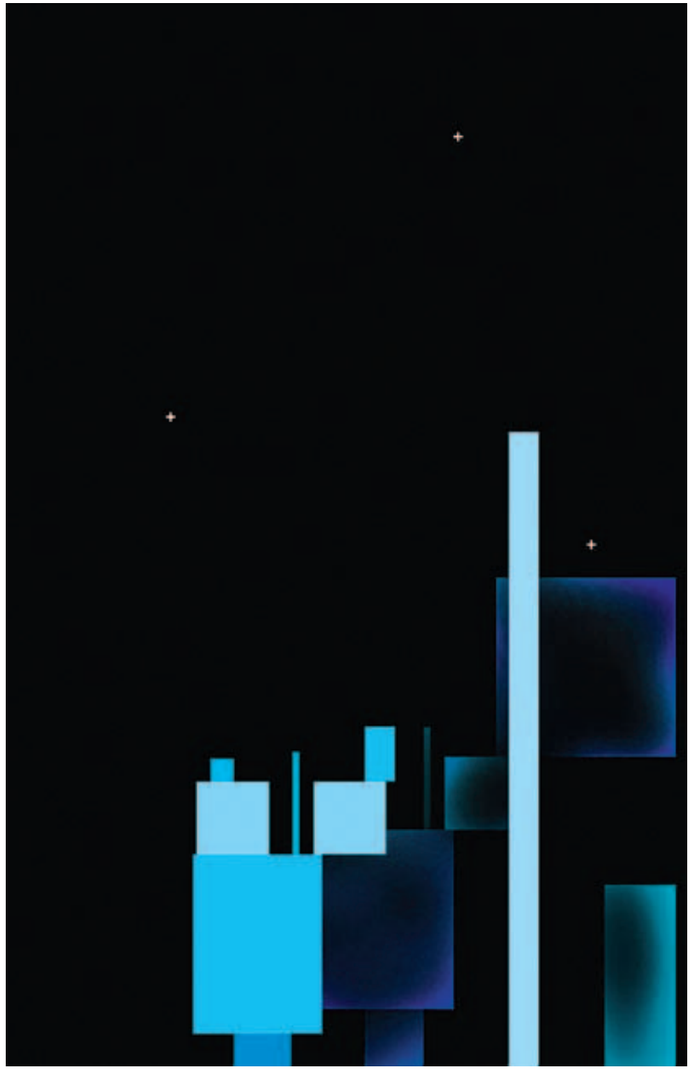
BIO: Matteo Bittanti is Senior Adjunct Professor in the Visual Studies and in the Visual & Critical Studies programs at the California College of the Arts in San Francisco and Oakland. He writes about technology, film, games, and popular culture for various publications, including WIRED, Rolling Stone, Saturno, and LINK, is the co-editor of Ludologica, and the editor in chief of Gamescenes. The artist group IOCOSE was founded in 2006. Its mission is to subvert ideologies, processes and practices of identification and production of meanings. IOCOSE works with camouflage, mimicry, fakes and pranks, mostly based in news, social and mass media. Among its works, IOCOSE has hijacked an exhibition at Tate Modern, invented a spam campaign for the Italian Democratic Party and designed a religious hi-tech product based on electric shock. IOCOSE has exhibited, amongst others, at the Venice Biennale [2011], Tate Modern [2011], Jeu de Paume in Paris [2011] and FACT in Liverpool [2011].

— Matteo Bittanti/IOCOSE:

"*Game Arthritis* investigates the narratives which attempt to understand the relations between body and media technologies, and their relevance for medical and scientific research. *Game Arthritis* was the general term used to refer to the negative physical effects of digital games on the body of video game consumers. Allegedly supported by scientific research, the disease has been 'factual' for over a decade, since the early '90s and '00s. It emerged in several circumstances in mainstream and specialised media, with reports of real cases of gamers permanently deformed by prolonged use of video games. A series of changes in the social and shared perception of digital games as not dangerous or even positive tools has caused a disappearance of this disease. Thousands of players feel real pain in their bodies. Affected subjects are not delusional. Photos and images are beginning to circulate on the internet in which the effects of game arthritis are visible. We have collected a few samples."

GENERATIONS

Mobile gaming app, 2012



Screenshot of an early prototype of the game.
Image: One Life Remains, 2012

www.oneliferemains.com
@oneliferemains

Can we bequeath a save file in the same manner we bequeath a masterpiece or a family photo? Can we have fun playing the game with the objective of allowing a distant heir to see the end of the game?

Unlike a conventional video game, it is impossible to finish a game of *Generations* in your lifetime. The player decides to whom the game will be passed on and if one day they want someone to be able to reach the top of the level. Thus, the work raises at the same time a notion of digital heritage and the player's capacity to build their performance with long term strategies.

Designed on smartphone, *Generations* also raises the question of the obsolescence of particular digital media. Designed for use with today's technology, it asks what happens in the future when the digital medium itself may seem unfamiliar. What will be the answers brought to this problem by the heirs of a game? Will they choose to export the save files to a new medium? Or will they prefer instead to consider the game and its current hardware as an integral whole, giving it a status of relic? The whole issue of the game is to leave these questions wide open to allow each visitor to take a stand on those issues.

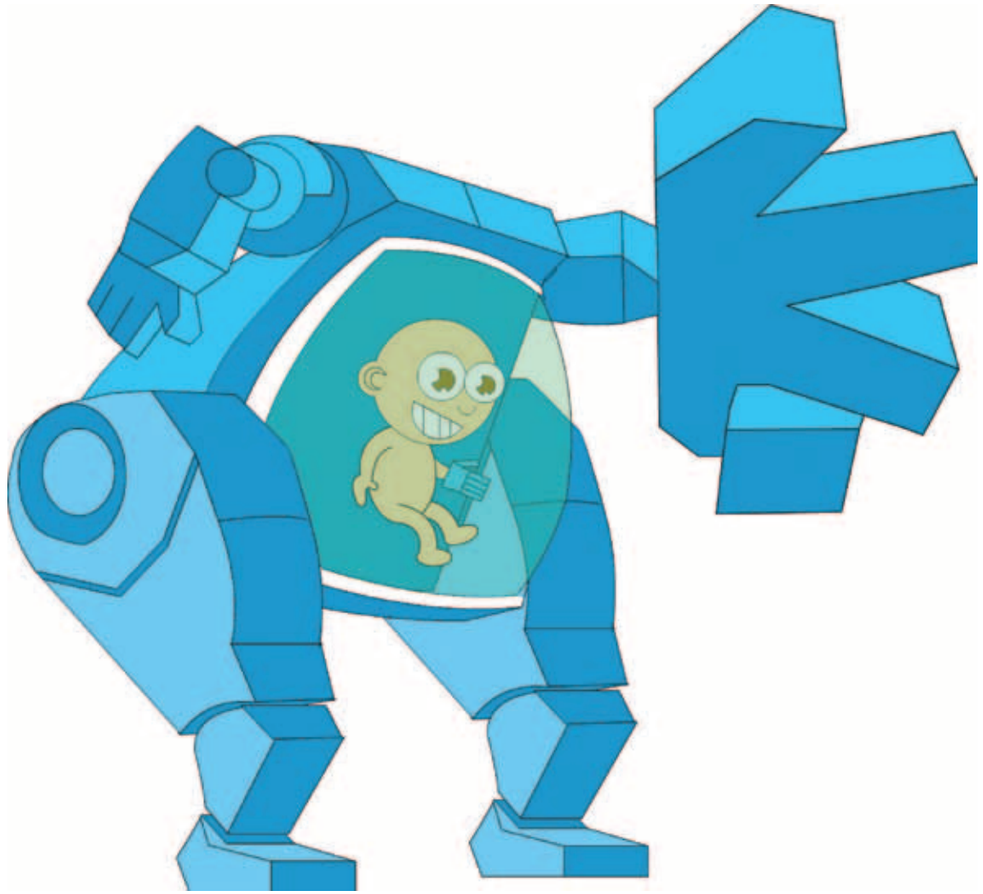
BIO: One Life Remains is an eclectic French indie collective comprising of a game theorist, a prototype developer specialist, a pro gamer, a sound heckler, and even an illusionist. They live and work in Paris sharing a common flat which is used as a headquarters where they work, meet, sleep, play, cook, create experimental games, give live performances and organise events such as exhibitions, game jams, play parties and conferences. Their work attempts to reach beyond the gaming community, engaging a broad range of people in the cultural and digital art scenes through video game events.

—One Life Remains: "We're mainly focused on experimental gaming, because as game designers we believe in the strong potential of this media. *Generations* is one of the most conceptual games we've produced to date, as it invites player to rethink how they play games not just in the short term [as you can generally find in mainstream video games industry], but also in the long term. It also asks the player to consider their gameplay as a personal artefact, something of their own heritage which could be passed to someone else just like any other personal object. By designing and developing the project, we thought we could be able to provide a new perspective on the media not just for game developers and the player community, but also a non-player audience."

BIONIC ROSHAMBO

KIERAN NOLAN [IE]

Two-player arcade game, 2012



Bionic Roshambo screengrab
Image: Kieran Nolan

www.kierannolan.com
www.bionicroshambo.com
@kierannolan

"He watched the kids stand in front of the machines, their bony arms like umbilical cords joining human and machine. He asked the kids questions about what made a good game. Arawaka realized the most successful games had something that players couldn't articulate. The words used to describe them were usually reserved to describe forms of intimacy between people. It was as if the players and the game itself had somehow merged." [1]

Bionic Roshambo was built in 2002 as the practice based element of Kieran Nolan's MA in Interactive Media thesis. It explored the symbolism of the hand as a link between humans and machines, drawing upon a number of influences, including science fiction notions of human-machine hybridity, and custom arcade cabinet design. Essentially, it's a version of 'Rock, Paper, Scissors' that is controlled by hand gestures, providing the user with the sensation that they are truly interfaced and 'at one' with the machine.

The project was initially focused more on technology than usability, but over time developed into the tailoring of an interface solution for a specific task, where the technology ended up enabling the idea, rather than overly influencing it. It uses a prototype arcade cabinet featuring a pair of custom-built glove controllers and runs on a standard PC. The controller interface is a hacked PC keyboard, modified to capture the three iconic hand gestures of 'rock', 'paper' and 'scissors'. The glove controller cords form a symbolic umbilical link between the game players and the arcade cabinet.

What was achieved was a two-player arcade experience that takes a culturally transcending game concept, and translates it to the arcade gaming domain. The end result is an original approach to video gaming, and an engaging experience for users.

BIO: Kieran Nolan is a lecturer, researcher, designer, and educationalist. He teaches at the Section of Creative Media at Dundalk Institute of Technology's School of Informatics and Creative Arts, and is a PhD researcher with the Arts Technology Research Lab at Trinity College Dublin. He spent half his childhood playing Commodore 64 games, and the other half waiting for them to load. His research and teaching work mixes design theory alongside creative lab work sessions. He views all media forms as fair game for creative use, and uses methods and mediums such as hardware hacking and vintage computer systems alongside paper based concept development, to explore issues including interface design, digital aesthetics, and video game culture.

— Kieran Nolan: "Arcade coin-operated gaming has been dealt a major blow by the home gaming market, but the spirit lives on. The situated play environment of the games arcade has had a lasting effect on the current generation of digital creatives, influencing cultural movements such as the pixel art and chiptune scenes. *Bionic Roshambo* is a direct homage to the cyber future foretold by Nintendo's ill-fated Power Glove, and the rawness of low bitrate audio and graphics. As a DIY take on the medium of arcade gaming, it intends to open up discussion on the possibilities of human machine interfacing, bespoke gaming peripheral design, and the future of arcade video gaming in public spaces."

[1] Page 83, 'Game Over–Nintendo's battle to dominate video games', David Sheff, 1993, Coronet Books

LUMMOBLOCKS

Two-player game experience, 2011

LUMMO: MAR CANET, CARLES GUTIERREZ, JORDI PUIG, JAVIER LLORET [ES]

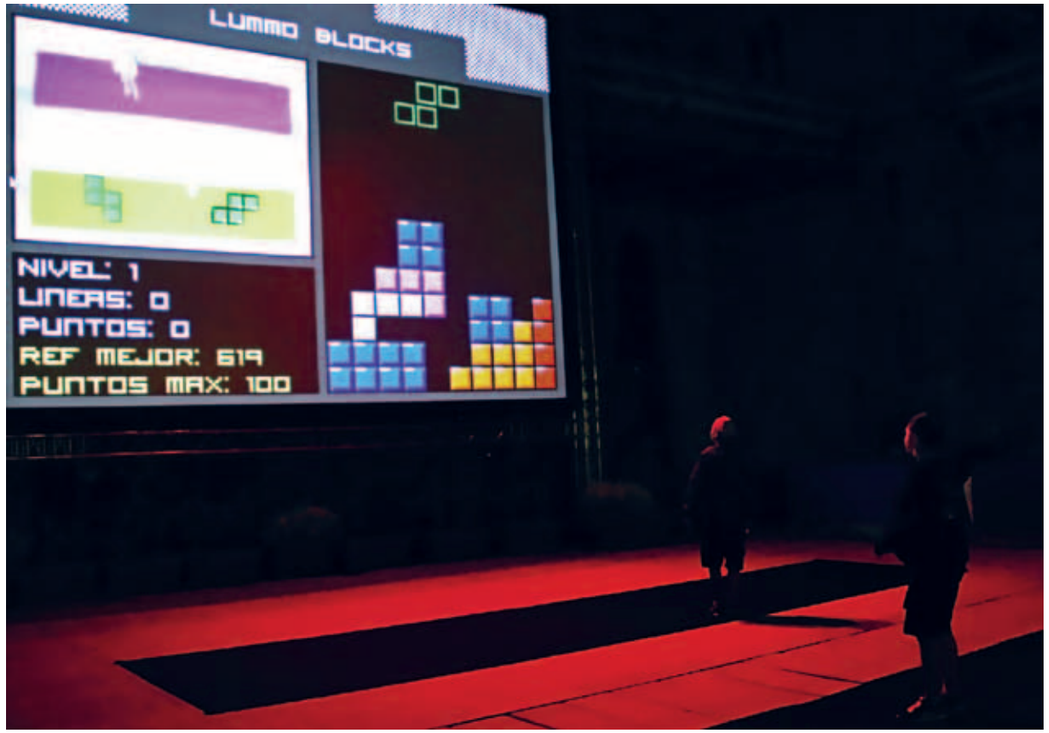


Photo: Lummo

www.lummo.eu

Lummoblocks is a new version of the legendary *Tetris*. Designed to create a playful and interactive, space-located experience in open urban settings, it's a social game that encourages uncontrolled and spontaneous interaction from the public. It was first visualized and tested on the digital LED facade of Media Lab Prado in Madrid and subsequently shown from February 2010 to February 2011, where it was shown to have a positive impact on by-passing pedestrian traffic.

The mechanism is similar to the one of the original *Tetris*; players must create as many lines as they can before any piece gets to the top. The game is designed for two players, one is in charge of moving the *Tetris* piece and the other one changes its orientation. It starts automatically when players are located on the game area. When no players are in the game area or the game is over, an idle video is played in loop in order to explain how to play.

The software is made in C++, OpenCv and Openframeworks, and uses computer vision techniques in order to track players. The tracking system uses an IR camera and two symmetric lights of 1000 Watts with red IR filter. The system is designed to work during the night.

BIO: Lummo is a collective created by Mar Canet, Carles Gutierrez and Jordi Puig in 2009 that aims to create immersive and interactive experiences. Lummo work on multidisciplinary projects at the intersection of different fields such as art & technology, media architecture, interactive installations, computer games, urban screens, and interactive facades.

—Lummo: "*Lummoblocks* makes use of the familiar *Tetris* game to introduce a totally new gaming experience. The game does not require sharp or fast responses from the user so anyone can play, from young kids to elderly people. Moving the body right to left for few metres is enough to control the position of the *Tetris* piece. The player is no longer focused on solving the puzzle with the smartest geometrical solutions, but instead has to aim at communicating well with their partner to achieve smooth cooperation."

ARE YOU A GOOD LOCALISER?

Game-driven experiment, 2012

Image: Marcin Gorzel

Are You a Good Localiser? is a scientific experiment held within the context of an immersive 3D game based solely on sounds. The aim of the experiment is to investigate auditory perception in the absence of other cues such as vision. More precisely, it examines the net effect of enhancing the auditory information that players heavily rely upon.

The comparison is based on the performance of two different concurrent audio rendering systems, both designed to present audio over headphones. The first system makes use of the state-of-the-art 3D audio rendering technology commonly used in video games. The second system provides enhanced audio localisation cues. The enhancements concern parameters such as sound field stability, spatial resolution, reverberation and distance rendering. The code name of this prototype system is THRIVE [Tracking Headphones Realise Immersive Virtual Environments] and it has been the focus of this team's research for the past 2 years.

THRIVE explores the delivery of spatial audio to individual listeners using headphones. Research into simplification of the synthesis has provided novel interpolation and synthesis algorithms as well as new insights into the perceptual properties of spatial audio. The THRIVE system consists of signal processing and physical prototypes that utilise head-tracking for real-time rendering of audio over headphones. The developed prototype provides the listener with the experience of an audio source that is spatially associated with a video display, regardless of their listening orientation. The system has commercial potential in the video game industry, by enabling the creation of personal immersive 3D audio and video presentations with accurate associations in space and time.

BIO: The Audio and Acoustics Research Group—Frank Boland [IE], Marcin Gorzel [PL], Ian Kelly [IE], John Squires [IE] and Brian O'Toole [IE]—has been actively involved in the development of algorithms and solutions for realistic spatial audio for the past 5 years. Their work explores the problems associated with designing filter functions that are required to model acoustic transmission paths, and the design and implementation of methods for evaluating the listener's perception of synthesised sources. The ultimate goal is to deliver to the listener the perception that the audio source is at a specific relative physical location, with true depth and directionality, as well as the acoustic perception and timbre of the environment in which the source is located. Their research seeks to efficiently satisfy these spatial audio requirements. The solutions to the problems identified and addressed in this work have many applications in areas such as game audio, home entertainment, digital cinema and e-learning.

—The Audio and Acoustics Research Group: *"Are you a Good Localiser?* challenges you to localise and eliminate enemies as quickly as possible. There is a triggering device acting as a handgun and a tracking system that will follow your arm's motion. However, there is a catch—there are absolutely no visuals [to ensure that, you will be blindfolded] and to survive it is necessary to rely completely on what you hear. The key component in this experiment is the audio system used for rendering the all-around-you sound field. In some scenarios audio is produced in a traditional way and 3D sound will be presented over a pair of standard headphones. However, in other scenarios, the audio will be enhanced and stabilised using face-tracking technology."

HOW TO BABYCASTLES

Workshop & indie games arcade, 2012

BABYCASTLES [US]

QWOP bear crowd surfs
www.armanipradagucci.com

www.babycastles.com
@babycastles

GAME: THE FUTURE OF PLAY

How to Babycastles was a three-day workshop that combined independent games from local game developers in Dublin with large stuffed animals, netbooks, chef knives, colourful duct tape, assorted blinking electronics, and the virus-writing windows scripting software "AutoHotkey". The result of the workshop is a new independent video games arcade installation at **GAME**.

For nearly 10 years, academic institutions in New York City including Columbia University's Computer Science department, Parson's School of Design, the NYU Game Center, and the NYU-Poly Game Innovation Lab pioneered an independent game community. In more recent years, Come Out & Play Festival and Games For Change furthered New York City's identity by championing specific forms of game culture in New York, focusing on games that interact with city geography, or games as social activism. Babycastles joins these efforts by establishing a public, extremely accessible, all-ages, non-academic institution for exhibiting and promoting independent game artists in New York City.

Bringing the workshop to Dublin, Babycastles intended to teach and empower participants on how to create, maintain and learn about independent arcades. The all-ages class required no prerequisite skills and began with a series of lectures on independent games and their significance in social contexts such as music venues, galleries, and museums. Participants also learned how to solder, code and craft.

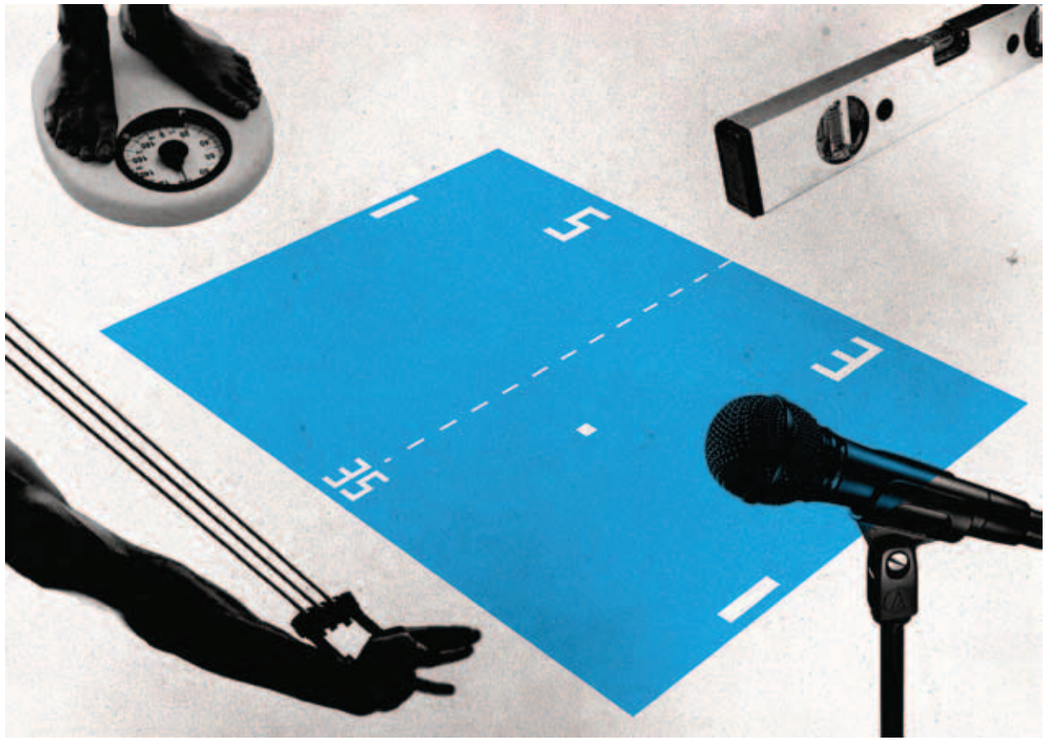
BIO: Babycastles is an ongoing effort to increase New York City's engagement with independent video game development. Babycastles has reinvented the arcade as a public gallery for independent game art and an overall social space for game culture. By encouraging and facilitating spaces to play independent games in New York museums, galleries, bars, music venues, parks, and other public places, Babycastles aims to build attention, accessibility, relevance, publicity, conversation, and economic support for independent video games activity in New York, establishing games as a mainstream and visible part of New York City's art and music culture.

—Babycastles: "Since the inception of Babycastles in 2009, we have hosted exhibitions that celebrate independent video games and the culture surrounding them. We have worked to make games a significant part of New York City's culture and in 2012 have pursued that mission on a international scale. We were incredibly happy and excited to facilitate a week of workshops at Science Gallery that culminated in an independent arcade installed at **GAME**. An arcade built by Dubliners to be played in Dublin, the exhibit has a unique and very specific feel that will make it unlike anything Babycastles has shown before."

RE-PONG

Experimental game, 2012

NICOLAS MYERS [UK] & NITIPAK SAMSEN [UK]



Concept drawing of the installation

www.studiomyers.co.uk
@nikkholaas

In the short history of video games, most evolution has centred around better graphics, better sound and storytelling. In comparison, the controllers have little changed over the years and are becoming more and more standardised. Even with the emergence of innovative new controllers in the past five years, such as the Wii or the Kinect, none really explore the full potential of mechanical and physical interaction.

Can we imagine games that give more importance to the controller? Can we imagine a context where the controller becomes the game itself?

Re-Pong considers how the design of controllers are central to the game experience, exploring how unusual and even difficult to use controllers could become games themselves. In the form of a game experiment, the project offers five identical games of the classic Pong, attached to five uniquely designed controllers exploring different physical challenges. With the game controller being the only varying factors between each version, the visitor can experience the importance of the physical interface in video games.

BIO: Nicolas Myers's work, greatly influenced by his studies in graphic design and computer sciences, investigates the implications of digital technology through the filter of design. In a context where almost all physical objects, living organisms and phenomena are described in a digital manner his projects question the neutrality of these representations, while focusing on aesthetic and visual representations and interactive experiences. Nitipak Samsen is an interaction designer who has been exploring everyday life's paradoxes through his projects. He prefers his projects to offer questions rather than answers. He hates capitalism but he works for it. He wants to save the world but the world doesn't really need it. During his MA, he discovered his inner geek and developed various skills including the design and fabrication of both physical objects and the software that bring them to life.

—Nicolas Myers & Nitipak Samsen:

"Video games have dramatically improved over time but the way we interact with them is becoming more and more standardised. Could the fun and pleasure of a video game emerge from the physical design of controllers? In *Re-Pong* the controller is the game. Through a series of five experimental video game controllers, our installation explores new ways to play the classic video game Pong. While the objective and aesthetic of the on-screen game remains the same, each controller offers a unique challenge: how will you use a spirit level or a microphone to win over your opponent?"

GAME BORDER

Multi-console game, 2011

JUN FUJIKI [JP]

Image: Game Border, Jun Fujiki **www.jun-fujiki.com**

Nintendo launched the *Game & Watch* in 1980. Featuring a single handheld game to be played on an LCD screen [in addition to a clock and an alarm], 43.4 million copies of the 59 games were sold worldwide between 1980 and 1991. It's fitting therefore that *Game & Watch* forms the departure point for players of *Game Border,* a trip through the 30-year journey of console gaming from a novelty to a social phenomenon.

Consisting of several TV monitors and game controllers arranged sequentially, the player guides the *Game Border* character seamlessly from one screen to the next. The player's goal is not to successively reach higher and higher levels, but to skip through the "borders" between each of the worlds composed of the point where each successive monitor lines up to each other. It imparts the feeling of jumping from one game device to another and thus overcoming the boundaries of both hardware and perception.

Game Border was most recently exhibited by Fujiki at the Ars Electronica Festival 2012, where it received an honorary mention in the Hybrid Art category.

BIO: Jun Fujiki was born in 1978, and has a doctorate in design. He is a researcher for both the International Media Research Foundation, and PRESTO [Precursory Research for Embryonic Science and Technology]. In his work, Jun looks for new relations between expression and principle, examining both the laws of human behaviour and of physics. Jun has participated in Ars Electronica CyberArts in 2008 and 2012, Japan Media Art Festival in 2008, 2011 and 2012, SIGGRAPH ASIA Art Gallery in 2008 and SIGGRAPH Art Gallery in 2007. His awards include Prix Ars Electronica 2012 [Hybrid Art Division Honorary Mentions], Japan Media Art Festival 2011 Entertainment Division Excellence Prize, Prix Ars Electronica 2008, Interactive Art Division Honorary Mentions at Japan Media Art Festival 2008 and Art Division Excellence Prize.

—Jun Fujiki: "*Game Border* is an attempt to seamlessly connect the borders of different games, inspiring people to cross not only physical and social borders, but also borders of perception."

MY LIFE WALKTHROUGH

Therapeutic game prototype, 2012

JOANNA MCHUGH [IE], EAMONN NEWMAN [IE],
DES O'MAHONEY [IE] & LEE TOBIN [IE]

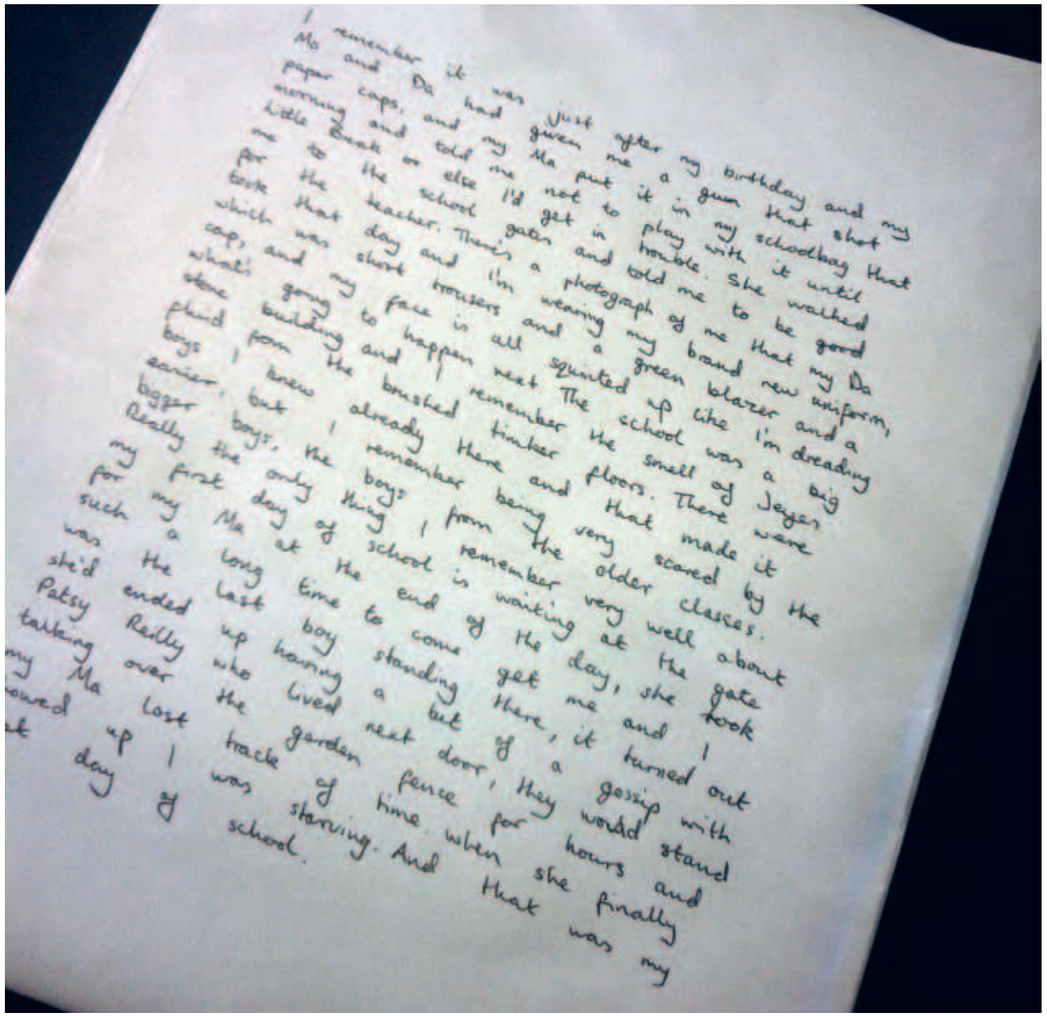


Photo: Ruža Leko

@joannamchugh

My Life Walkthough is a platform adventure game version of the popular lifebook format used in reminiscence therapies for older adults with dementia. Reminiscence therapy is a format which acknowledges that older adults with dementia may not remember the recent past, but their retention for early life is good. Building upon recall of early events has been shown to improve communication and mood among older adults with dementia, and can even improve their memory of later life events. This type of memory is known as autobiographical memory.

This project aims to improve autobiographical memory among older adults with dementia by creating an interactive, video game version of the traditionally paper-based lifebook. Research shows that anything that increases processing at the stage of input also ultimately improves the recall of that input later on. We aim to involve the older adult with dementia as much as possible with MyLife, since they have to respond to multiple questions about their life and provide details.

A form of rehearsal will then take place when the game story has been generated, where the person will have the opportunity to roam around the 2D platform world of MyLife, interacting with other characters [their loved ones], and experiencing major life events [e.g. the birth of their children, their workplace]. This will be achieved by creating a toolbox of potential parameters for the individual's life story.

At prototype stage, the game is a simple but interactive, fun and rewarding opportunity for people to engage with memory. This format also promotes intergenerational interactions, since children and grandchildren will be eager to involve themselves in the video game format.

BIO: Joanna McHugh is a postdoctoral psychologist at Trinity College Dublin currently working in the Dem@Care project, a European Commission funded project investigating the use of sensor technologies in prolonging independent care for older adults with dementia. Eamonn Newman is based in DCU and works as a postdoctoral researcher in CLARITY, investigating sensor technologies in connected health projects, including Dem@Care. Desmond O' Mahony is a current PhD student at the School of Psychology, Trinity College Dublin. He also works as a part time research assistant on the Dem@care project. Lee Tobin studied in the School for Improvisational Music in New York and has composed scores for several short films, in addition to composing for and leading several jazz ensembles in Dublin. His compositional style can be said to range from Bartok to Black Sabbath, and orchestration range from guitar to Gameboy.

—Joanna McHugh: "The work at hand is an originally developed game with a serious purpose; to improve communication and reinforce autobiographical memory in older adults with dementia. This work represents one of the many functions that a game can fulfil, and future directions in using games to improve cognitive functioning. We hope that the display of this game prototype in Science Gallery will alert the general public to the important cognitive benefits of video games, in particular to an unlikely and hitherto overlooked cohort: older adults."

ANGRY BIRDS

Multi-touch painting series, 2012

EVAN ROTH [US]

Angry Birds, Level I-1
[Multi-Touch Painting series], 2012
Evan Roth

www.evan-roth.com
@fi5e

Angry Birds is a new piece by Evan Roth that comments on the rise of casual gaming, identity and our relationship with mobile devices. Consisting of 315 sheets of tracing paper and black ink, it's a visualisation of every finger swipe needed to complete the popular mobile game of the same name. The gestures exist on a sheet of paper that's the same size as the iPhone on which it was originally created.

Angry Birds is part of a larger series that Roth has been working on over the last year called Multi-Touch Paintings. These compositions are created by performing simple routine tasks on multi-touch handheld computing devices [ranging from unlocking the device to checking Twitter] with inked fingers. The series is a comment on computing and identity, but also creates an archive of this moment in history where we have started to manipulate pixels directly through gestures that we were unfamiliar with just over 5 years ago. In the end, the viewer is presented with a black and white representation of the gestures that have been prescribed to us in the form of user interaction design.

BIO: Evan Roth is an American artist based in Paris who applies a hacker philosophy to an art practice that visualises transient moments in public space, online and in popular culture. Roth's work is in the permanent collection of the Museum of Modern Art NYC and has been exhibited at various institutions, including the Centre Pompidou, the Kunsthalle Wien, the Tate, the Fondation Cartier, and the front page of Youtube. In 2012, Roth was awarded the Smithsonian's Cooper-Hewitt National Design Award. Roth is also co-founder of the Graffiti Research Lab and the Free Art & Technology Lab [F.A.T. Lab], a web based, open source research and development lab. To find Roth's work online, just google "bad ass mother f***er".

—Evan Roth: "With over 1 billion downloads, some have argued that *Angry Birds* will soon trump Mario Brothers and Mickey Mouse in cultural pervasiveness. Beyond visualising the game, the piece also aims to make apparent the amount of time and repetitive gestures required to "win" the game. The resulting visualisations contrast the excitement that happens in the gaming environment with the monotony that actually takes places in the physical world. Ultimately, the piece aims to glorify and critically question this new kind of gaming interaction that never leaves our pockets."

KINECT2SCRATCH

Interactive game installation, 2012

STEPHEN HOWELL [IE]

Photo: Courtesy of Stephen Howell

www.scratch.saorog.com
@saorog

Kinect2Scratch allows data from a Microsoft Kinect controller be sent to Scratch, an intuitive programming language for young coders developed by the MIT Media Laboratory. *Kinect2Scratch* was developed in Ireland by Stephen Howell, is free, and with thousands of downloads, is now used in schools, colleges and universities all over the world.

For **GAME**, *Kinect2Scratch* developer Stephen Howell worked with a group of young adults from Bridge21 to develop their own kinetic games. These games are similar to games played with a traditional video game controller, except that the player's body is the controller. The Microsoft Kinect is a depth camera that can sense where objects are in a room by analysing infrared patterns it emits and receives as the light bounces around the room.

Kinect2Scratch was developed using the Microsoft Kinect SDK v1.5 and can track two people simultaneously, meaning Scratch coders can write two-player Kinect games without having to know any complex programming languages such as C++ or C#. It runs on Windows 7 and Windows 8 and can use both Kinect for Xbox and Kinect for Windows equipment.

Bridge21 participants include mentors Kevin Sullivan and Clare McHugh and students Daniel Devoy, Alex Hillerby, James Hynes, Cameron Hazell, Jonathan Noble, Alannah Mullins, Eva Balfe, Luke Dowdall, Niamh Ellis, Heather McLoughlin, Keith Kenny, Stephen Quinn, Kate Maloney and Luke Foley. Bridge21 is a joint venture of Trinity College Dublin and Suas Educational Development. They have a number of programmes that offer new models of learning and can be adapted for use in Irish secondary schools.

—Stephen Howell: "With *Kinect2Scratch*, a programmer can create a Space Invaders game that responds to a player throwing their hands in the air to launch a missile rather than simply pressing a button. This makes gameplay more interactive, as the player must equate a physical action to a game action. This goes beyond the traditional control schemes, which tend to be simply pressing a button or pulling a trigger. To create these games, the workshop took students through the process of creating a game in Scratch, adding kinetic controls and finally adding two player capabilities."

BIO: Stephen Howell is a Computing lecturer with the Institute of Technology Tallaght, Dublin, where he lectures on Interactive Media & Software Development. Prior to joining IT Tallaght, Stephen was a lecturer in Dublin City University and a software engineer at IBM Ireland. Stephen is a proponent of teaching children the 3 Ds of software; design, develop and debug; in schools from an early age. To encourage this model, he developed free educational software [*Kinect2Scratch*] that allows children to program games with the Microsoft Kinect motion capture controller in the Scratch language from MIT. This software is used in schools and universities internationally and has been presented at the Art && Code Conference in Carnegie Mellon University, Pittsburgh, Scratch@MIT 2012 Conference and nationally multiple times.

RELAX AND RACE

Biosensor-based game, 2012

GALVANIC LTD. [IE]

The Relax and Race video game

www.scratch.saorog.com
@faustgar

Relax and Race involves the use of a novel biosensor [called the PiP] in a simple racing video game that runs on an Android tablet. The PiP is a biosensor that accurately measures a person's galvanic skin response [GSR], a known biological signal that changes when a person is experiencing stress. When a person gets stressed, blood rushes to the periphery of the body to activate the sweat glands in anticipation of the body needing to be cooled if it overheats.

This is known as the 'fight or flight' response that is driven by what is known as the sympathetic nervous system in the human body. The conductivity of the skin changes quite dramatically during this physiological response. Through what is known as a biofeedback loop, a person can learn to control this response and essentially learn to manage stress.

In the *Relax and Race* game each player holds a PiP and real-time GSR measurements are streamed over bluetooth to an Android tablet. Each player controls a different coloured dragon. As the players relax their dragon flies higher—the higher the dragon gets the faster it flies.

The objective of *Relax and Race* is to relax more than your competitor in order to win the race. The race does not take long—a typical race lasts just under 2 minutes. One of the key aspects of the game is to demonstrate that a player can practice relaxation anytime and anywhere as long as they have a PiP paired to the game on their smart device.

The game is set in a beautifully rendered 3D world and features an original music score specifically composed for the game.

BIO: Dr. Gary McDarby has a background in Electronic Engineering and Neuroscience. He has a first-class honours degree in Electronic Engineering [UCD 1988], a Master's Degree in Engineering Science [UCD 1995] and an MIT endorsed PhD in Biomedical Engineering [UNSW 2000]. Gary spent four years as Principal Investigator leading the MindGames group in MIT Media Lab Europe, focusing on technology and neuroscience. This group was responsible for notable inventions including the relax to win concept —a novel gaming strategy for stress management, Aura-Lingua—a new way of getting sensory information into the brain, and the Cerebus Brain Computer Interface—the first ever wireless, configurable, portable brain computer interface. He is a director of Galvanic Ltd., a recently established Irish software company specialising in a mobile gaming platform for stress management and owner of the PiP Biosensor IP.

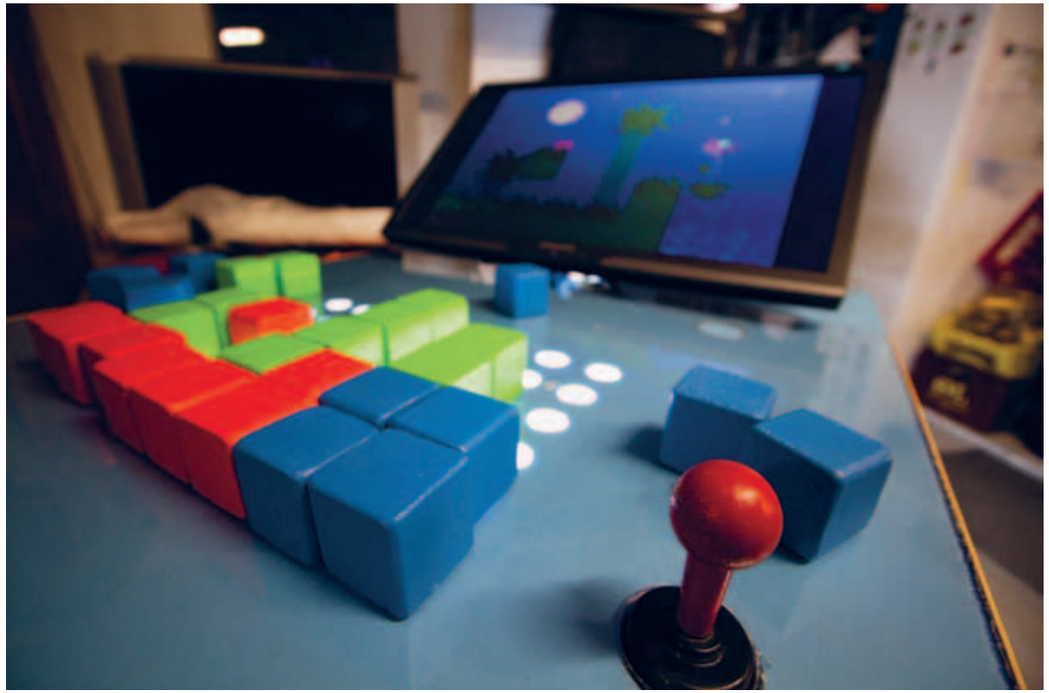
—Gary McDarby [Galvanic Ltd.]:

"Stress is a huge growing problem in the western world. There is more and more evidence to suggest that stress is the underlying cause of many serious illnesses, particularly in the mental health domain. There is a growing need to give people tools to manage stress in a rapidly changing world where the communication boundaries of time and distance have ultimately vanished. A constantly on, constantly connected world can be a very stressful place. *Relax and Race* is a counterintuitive game that can be played anywhere and at any time. Players race against one another, with the person most relaxed winning the race. The key idea behind the game is for players to learn how to manage the stress whilst racing in the video game and then to learn to use these same skills when managing stress in real life."

GRANNY'S BACKYARD

Interactive game installation, 2012

TIM GARBOS [DK]



Granny's Backyard interface

@timgarbos

Granny's Backyard provides a playground that mimics the experience of playing in the dirt, puddles and shrubberies of grandma's garden where your only limit is your imagination. Create, make, jump, swim and play as you watch day turn to night. *Granny's Backyard* is an interactive toy which explores the boundaries between playing games and creating games. When interacting with the installation you can create your own games and play with your friends.

You move the physical blocks around to create the game world that your digital character is living inside. Blue blocks turn into water, green blocks into plants, and brown blocks into ground; you can combine them in any sort of way making trees, clouds, water plants, underwater plants, flying platforms, and so on. The character can be controlled with the arcade gamepad and you can make your own challenges in the game or you can play more people changing the game world as the character moves around.

The user can design his own small games by adding knobs to control in-game variables such as gravity, time of the day and colors. Anybody from kids to adults can play, and you can just play the last game that somebody made, try to modify it or clear the table and start all over.

—Tim Garbos: "Granny's Backyard is designed so that you can also watch other people play and still get some of the experience. It's an installation that explores the boundaries between playing games and creating games. The installation is a game, but it's also a game making tool. You create the game as you play. You build your own digital game world of physical wooden blocks, decide on your own goals and rules while playing. You can not only build your own games, you can also share them with the world and publish them on a webpage so that your friends can play them."

BIO: Tim Garbos currently works in mobile game development, but whenever he finds the time, he explores new ways of interaction with a focus on physical interaction and technology. He is involved in the Copenhagen based maker/hackerspace, Labitat; organises events for game developers such as Nordic Game Jam [the biggest 48-hour game development competition in the world]; and both creates and showcases new and experimental games together with the Copenhagen Game Collective. Copenhagen Game Collective is a multi-gender, multinational, loosely-structured, non-profit game design collective based in Copenhagen, Denmark. They play, exhibit, create, and care about games of all types—digital or otherwise—with a slant towards types of play that the game industry's big boys can't or won't address. The diversity of their exhibits and game projects reflect their belief that creativity breeds creativity.

BELIEVABLE GAME WORLDS USING PHYSICAL SIMULATION

HAVOK [IE]

Interactive demonstration, 2012

Image courtesy of Havok

www.havok.com

The earliest video games were simulations. Tennis for Two [1958] simulated a game of tennis and Space War [1962] simulated a battle between two opposing spaceships. Although not the only possible way of framing the activity in a game [compared with abstract games such as Tetris], it's clear that simulating a believable game world is an extremely effective way of drawing players in.

Simulating a game world involves creating a mathematical description of the game's entities and applying rules which account for how the entities move and interact over time. The ball in Tennis for Two moves realistically according to physical laws which describe air resistance and bounce. In Space War, the spaceships move according to Newton's laws of gravity.

Since those early days, advances in computing power mean that we can simulate many more entities and simulate them to a much finer degree. Stacks of boxes fall over in an unscripted and realistic manner. Characters fall down in a unique and believable way. Characters' cloaks billow behind them realistically.

Traditionally, game characters are rendered using an approach called skinning. However, the troll shown in this exhibit is modelled using state-of-the-art soft-body physics. Here, a physical model is used to give realistic "secondary" motion to the troll's flesh and clothing. Contrasted with the traditional skinning approach, the model has astounding levels of believability and life.

—Havok: "We use mathematics, physics and technology to achieve remarkably believable worlds within video games. This exhibit shows how a physical model of soft flesh and cloth enables us to create a troll model with a remarkable amount of motion and life."

BIO: Havok has over 12 years of experience with games technologies, servicing the technical requirements of customers in the commercial games and entertainment industry. Their technology has been used in over 500 of the best known and award-winning titles including Uncharted 3, Assassin's Creed: Revelations, The Elder Scrolls V, and Skyrim. Havok works in partnership with the world's best known publishers, development studios and developer teams, and their cross-platform, professionally supported technology is available for multiple games consoles, devices and operating systems. Their products have also been used to drive special effects in movies such as Clash of the Titans, Watchmen, Quantum of Solace, Harry Potter and The Order of The Phoenix, and The Matrix. Havok has offices in Dublin, San Francisco, Seoul, Tokyo, Southern Germany, Copenhagen, and Montreal and is an Intel® owned company.

OUTERBODY MAZE

Interactive two-player game installation, 2012

JASON WILSON [US]

Celebrating a shared victory at an Awesome Foundation grantee party.
Photo: Jason Wilson

www.outerbody.org
@outerbodylabs, @feKaylius

Picking up where his 1996 installation *The Importance of the I* [1] left off, Jason Wilson created *The OuterBody Experience Lab* in 2012. Its aim was to further explore, in a more interactive incarnation, the ways disembodied vision can impact our sense of self in the contexts of neuroscience, education, creativity, rehabilitation, and of course gaming. In a world that's trying to understand the balance between the individual and the group, the self and the other, and the borders of ourselves, the Lab has had no shortage of territory to explore.

For **GAME**, Jason will install *OuterBody Maze*, a two-player wayfinding race where navigation is negotiated only through the perspective of a video camera suspended directly overhead. The game pulls your sense of sight out of your body and then points it back at yourself, giving you the illusion that you are either looking at someone else, or that you are not in your own body anymore. It's a video game starring yourself, without any virtual elements, where your own body is the controller but the choreography of even simple movements has to be relearned.

The maze engages two threads of visual cognition. The first is following and remembering potential paths with the eyes to determine their viability. The second is using visual feedback about your position and orientation to successfully steer your body along the intended path all the while remembering which of the two players is you. During these episodes of intense visual engagement the sense of self tends to rely more heavily on these strong visual signals and less so on the other unstimulated inputs [sound, touch, smell, taste]. This results in a sensation that you are not in your own body but rather in an external control space where your gestures and movements act as remote control cues for your distant body to mimic. You become a puppeteer of yourself. The landscape of the body is the new playground of the mind.

BIO: Jason Wilson enjoys feeling confused and hopes you do too. He's a cognitive masochist. As an artist, hacker and entrepreneur he uses information, context and expectation to put your subjectivity into perspective, while imbuing the new world with the freedom to play. His work has taken the forms of art spaces, events, publicity stunts, art gangs, web based communities, ephemera, performance, audio perfume and now as a game platform for disembodied play. His works has been featured at Martial ART, Manifesta Frankfurt, The National Geographic Society, the Lost Horizon Night Market, Burning Man 2011, Life 3.0, ARE2012, DorkBotSF, WhereCampSF, The Singularity Summit and soon at Come Out and Play SF.

—Jason Wilson: "One benefit of this maze format is that there is literally no salient touch data interfering with the visual input. When the visual input is relied on most heavily, and isn't contradicted by other sensory information, there's a higher chance of having the feeling of a classic out-of-body experience. That's the origin of this work, designing a way to see what role the sense of sight has over the location of the sense of self, but from an art history perspective it was also concerned with why visual art was so much more widely lauded and revered as the highest form in western civilisation. If we can pull your sense of sight out of your body will your sense of self follow?"

[1] January 1996—San Francisco Art Institute.
Jason Wilson and Fynn Sloyan immersed themselves for 5 continuous days and nights in what might be the first ever experiment investigating the possibility of creating an out of body experience through the video based relocation of eyesight.

DOODLE DEFENCE

Interactive whiteboard game, 2011

ANDY WALLACE [US]

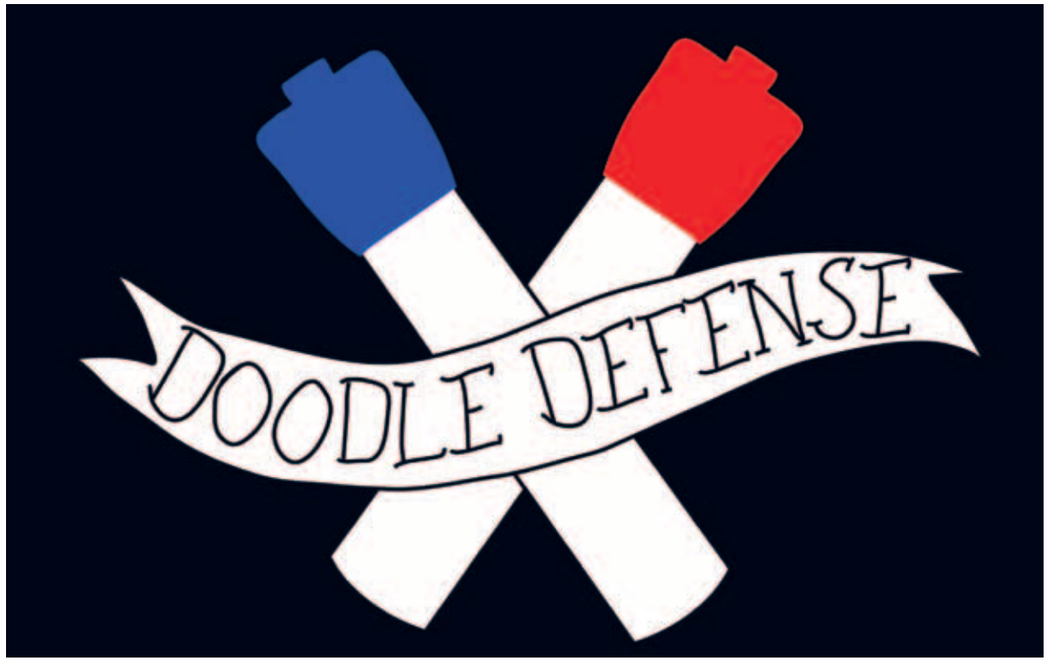


Image: Andy Wallace

www.andymakes.com

Doodle Defense is a tower defence game that explores drawing as a means for game interaction and play. Players draw mazes and towers on a whiteboard with dry erase markers to stop projected foes. Coloured circles represent towers which attack the foes, and black lines represent walls that the player can use to redirect the foes. By allowing players to draw their board instead of just placing towers with a mouse, the game encourages greater creativity and promotes new strategies for players. The experience is enhanced by the magical feeling of seeing projected game elements interacting with real world drawings.

Through this novel interaction, the game strives to foster an inviting environment for new players as well as creating added depth to a well established game genre. The game was created using openFrameworks, and uses any HD webcam and projector to play. Custom colour tracking algorithms are used to interpret the board and convert it into input for the game. Although there are about 10,000 lines of code running the game, the goal of the technology behind *Doodle Defense* is to create a distinctly non-digital experience for the player.

Doodle Defense was deliberately created using only widely available hardware that many people already own in order to allow players to play the game without having to make large investments in hardware or being forced to come to a particular place where it was installed. This modular design goal played a large factor in deciding how to go about tracking the real world elements that contribute to the game.

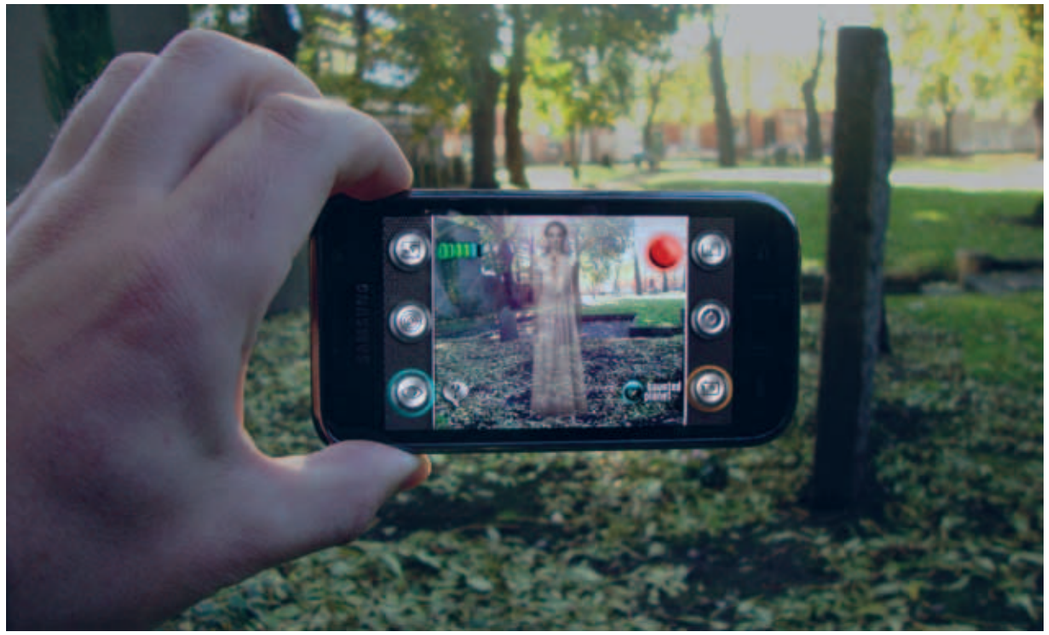
— Andy Wallace: "By relying on the more intuitive mechanic of drawing, *Doodle Defense* removes the interfaces that often intimidate non-gamers, allowing a portal to play and experience tower defence games. For players versed in the genre, *Doodle Defense* presents new mechanics by forcing the player to engage not only their motor skills, but also how scale and shape can affect the things they draw."

BIO: Andy Wallace is a game designer and programmer currently employed as lead designer at Golden Ruby Games in the Empire State Building. He received his MFA from Parsons The New School For Design, and his work has been featured on Gamastutra.com, IndieGames.com, Engadget.com, PC World and CreativeApplications.net. He started coding on his parents' IBM 386 when he was 10 and is showing no signs of stopping anytime soon. He loves the intersection of art and code and the interaction that can result from combining these two fields. Andy lives in NYC and can't wait to move into an apartment that allows dogs. In the meantime, he would love to hear from you, and can be reached at andy@andymakes.com.

BRAM STOKER'S VAMPIRES

HAUNTED PLANET [IE]

Augmented reality mobile game, 2012



Ghost viewer in action [Haunted Planet]

www.hauntedplanet.com
@HauntedPlanet

This location-based augmented-reality game turns players' smartphones into paranormal detection devices using the handset's camera, GPS, compass/orientation sensors, network and audio. Players use the app to move through the city and to uncover a mystery that features historical and fictional characters related to Bram Stoker's "Dracula".

Bram Stoker's Vampires is played through Haunted Planet, a new type of smartphone gaming app that reinvents the traditional Gothic ghost story using modern technologies. While most smartphone games expect players to engage with a game world confined to a tiny screen, Haunted Planet sets the game in the real world and overlays all game content using augmented reality, not only in visuals but also in audio. As players find ghosts and discover their stories, they also explore their physical environment.

The game takes up to an hour to complete, and will take the player around Stoker's old stomping grounds, which included Trinity College Dublin and Dublin Castle. The high-quality visuals and audio ensure maximum immersion into the game. While the best play experience will be in Dublin city centre, the game can also adapt itself to a player's location if they cannot physically make it to the city. To install *Bram Stoker's Vampires* visit www.hauntedplanet.com/stoker.

BIO: Haunted Planet Studios offers a platform for the creation and distribution of location-based augmented-reality games for smartphones. The company was founded in 2010 by Dr Mads Haahr who is also the founder of the Internet's premier true random number service RANDOM.ORG. Their technology combines highly realistic visuals, engaging gameplay and a unique location-based approach to audio with a sophisticated story-driving technology. Haunted Planet's first offering casts players as paranormal investigators in a global mystery adventure. Haunted Planet Studios is building on technology developed within a collaborative project between NDRC [National Digital Research Centre] and researchers at Trinity College Dublin.

— Mads Haahr: "A key idea of Haunted Planet is to blur the boundary between the real [surroundings] and virtual [gameworld]. Augmented reality is great for doing that with visuals and audio, but it requires visuals and audio that blend well with the surroundings. The blurring of the boundary is a technique used traditionally in Gothic literature and also in modern horror films. For example, Bram Stoker's Dracula is presented as a collection of evidence [journal extracts, newspaper clippings and the like], much like Blair Witch Project and the Paranormal Activity films were presented as being real found footage. For the same reason, Haunted Planet does not present itself as a game [although that is of course what it is] but a ghost hunter's app. The idea is that it could be real."

THE SCIENCE OF GAMES

Research game, 2012

A trio of Tiltfactor's "mad scientist" interns plotting their next move
Photo: Sukdith Punjasthitkul, 2012

www.tiltfactor.org
@tiltfactor

Tiltfactor Laboratory will offer visitors to **GAME** [aged 18 and older] the opportunity to participate in an actual game research study at Science Gallery. The first round of research sessions will be held on November 16 and 17, and participants who sign up will have the chance to play a Tiltfactor-designed game before providing their feedback on a post-game assessment questionnaire.

Each study session will last less than one hour, including a thorough debriefing at the end of the session that will give participants the chance to engage in a dialogue with a Tiltfactor researcher about their game design and research methodologies, the psychological principles that helped inform the creation of the game, and the general effectiveness of games at creating significant personal and social change. In addition to conducting the formal game study, members of the Tiltfactor team will also be running on-site game design workshops and offering informal demonstrations of a number of games designed by the lab.

The project primarily aims to engage people in enjoyable, deep discussions about the meaning of games, their role in society, and the ways that scientific research can interact with the everyday experience of games. Through engaging in a cross-cultural dialogue about games research, Tiltfactor hope to make research approachable and accessible to a broad audience.

The research will collect valid, accurate data that adds a significant contribution to the fields comprising the science of games with an eye toward publication of the results in a respected peer-reviewed journal and if possible, to design at least one aspect of the study that is longitudinal [to track both short-term and long-term effects of game play]. This exposé into games research will both help the public understand how research works and also show other researchers the importance of conducting carefully controlled, scientifically valid experimental games research.

BIO: Tiltfactor Laboratory is an innovative design studio dedicated to games for social change. Housed at Dartmouth College, Tiltfactor was founded and is led by Dr. Mary Flanagan. They rely on psychological principles to help inform the design and content of the games, and hope their games will change players' hearts and minds, promoting positive values. Tiltfactor develop board games, card games, sports, urban games, and digital games for a variety of platforms, and publish both qualitative and quantitative research results from empirical studies. Tiltfactor has created unique game design methodologies that promote innovation; these are shared as a resource at www.valuesatplay.org.

—Tiltfactor Laboratory:

"We aim to conduct a full, randomised, experimental game study with patrons [ages 18 and older] who volunteer to participate, with the goal of producing publishable results by the conclusion of the exhibition.
By formally testing the efficacy of one of our games, we not only hope to shed light on factors that influence the ability of games to change people's hearts and minds, but also to engage visitors to the exhibition in a meaningful dialogue about games and game research. The research procedure and materials will be subject to the approval of the ethics committees at Dartmouth and Trinity College Dublin, and participants will be required to give their written consent to take part in the study."

QRZar

Mobile game platform, 2012

TOPHAT [IE]

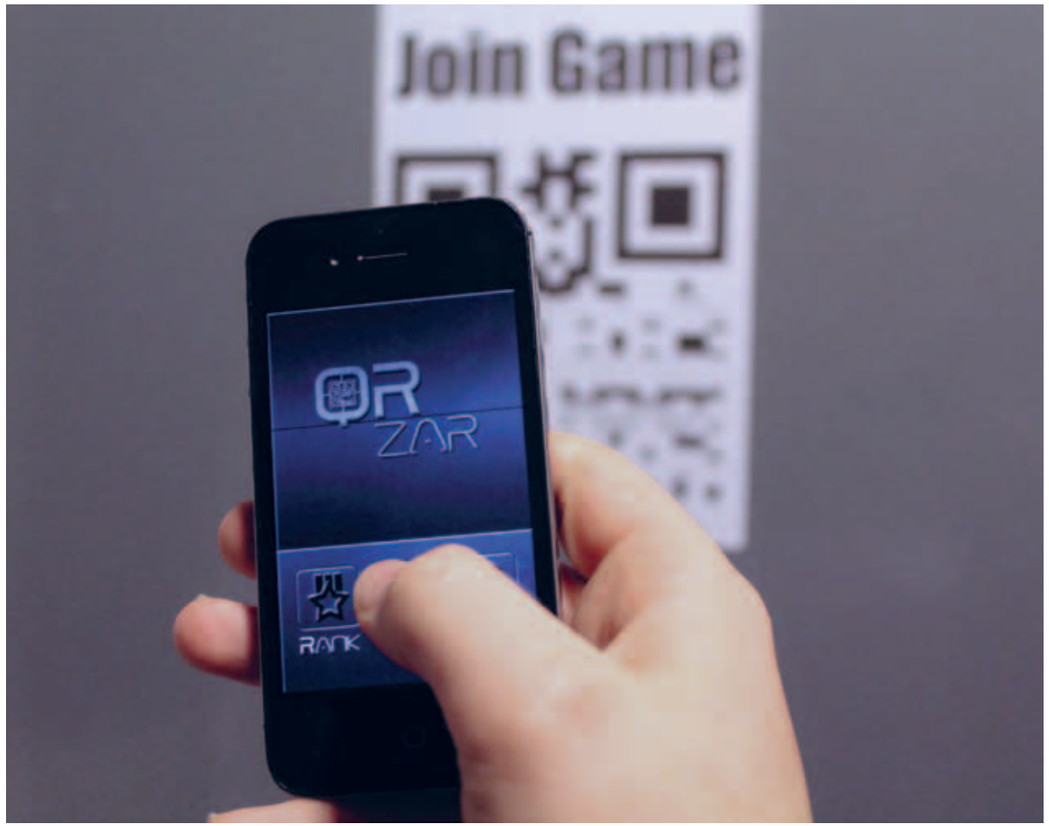


Photo: Tophat

www.tophat.ie

QRZar began as an undergraduate project at Trinity College Dublin, aiming to make games more accessible and to simplify production across the many different platforms of smartphone available today. The games industry has always been a high investment affair and million-dollar companies have ruled the roost for years. That's where *QRZar* comes in. It's an open source game and a complete software platform that anyone can utilise and quickly remake into something completely different, but equally as free again.

QRZar is a person vs person game using location and QR codes. It is a tech-focused remake of the classic Assassin/Tag game where you hunt down 'foes' in real-world scenarios. At the start of the game you are given a unique QR code, on a t-shirt or sticker. The aim of the game is to tag as many people as you can using the application by aiming the phone at the target's chest. When you tag someone it updates your score on a central game server which allows everyone else in the game to see your score, as you score.

The simplicity of *QRZar* and the TopHat platform is that it runs across any platform, either through the system's apps [iOS, Android and Windows Phone] or through the basic "Mission Control" web interface where spectators can watch games live. It can be scaled from a relatively small example, such as *QRZar*, to a potential globe-spanning game with thousands of players at any one moment.

BIO: The core developers formed as a group of university students at Trinity College Dublin. During the Summer of 2012, after the first year of their Computer Science course, the School of Computer Science & Statistics gave members of the core TopHat team internships in Trinity to help develop the TopHat platform. The team includes Kevin Baker, Kevin Bluett, Conor Brady, Ian Connolly, Matt Donnelly, Eoin Flanagan and Colm Vize.

—Tophat: "We felt that considering this project was completely supported by an open, forward-thinking college then this app and all the work we do must benefit more than just our CVs. We wanted sanyone anywhere in the world to be able to start building their particular games [or anything that needs a asynchronous data transfers from mobile devices] from a free highly-developed platform that is completely agnostic to a particular phone or operating system. We are all open source software hobbyists and hope that people start building real applications and games as a result of our work."

RENGA

100-player game, 2011

WALLFOUR [UK]

Renga by wallFour — laser interactive digital projections.

@wearewallfour

For the first few thousand years of their existence, games were live social experiences, but video-gaming has changed the perception of what a game is. While many video games in the past 30 years have had a social element, for the most part they did not involve people in the same space, instead being split into multiple solitary experiences across many separate screens.

This custom installation game for 100 players will be played on a single giant screen multiple times in the opening days of **GAME**. With a compelling dramatic arc and 90-minute running time, *Renga* delivers complex co-op strategy gameplay within a movie-like experience using a highly abstract visual style. The show mixes new technology with adventure drama and a wry sense of humour to bring the audience together and leave them feeling a deep sense of camaraderie.

Renga is about finding a way home. Attacked and left for dead, our hero must carefully marshal their resources to build a new ship, confront their nemesis and finally return home. Only this hero isn't visible on the screen—it's an entire theatre audience, working collectively to control the action using laser pointers. Turning the traditional hero's journey on its head, *Renga* asks the question—what if the ultimate reward can only be grasped by many hands?

BIO: wallFour have created a system that allows 100 simultaneous players to interact with giant projection screens using laser pointers, which they use to produce feature-length collaborative crowd games. Their work is a mix of film, video games and theatre. The company was founded by two British game designers and engineers who think there is a need for more playful social experiences for adults, beyond the intimate setting of home life and close circles of friends. wallFour have toured internationally, speaking and presenting work at Game Developers' Conference San Francisco, SXSW in Texas, the Toronto International Film Festival, and the New York Film Festival, and were recently named as a finalist at the IndieCade festival awards in Los Angeles.

—wallFour: "We felt that there is a growing backlash to our pervasively networked and digital lives. People are beginning to crave something real again with other human beings. However, the type of live social entertainment currently on offer tends to be passive experiences including cinema, theatre and watching sports. Can't there be a wider array of experiences that are more active? The majority of those working on interactive crowd technology are either creating short, toy-like experiences failing to embrace the true power of games, or they are generally heavily influenced by physical activity and party-style games. We are games enthusiasts and believe there is an appetite out there for more substantial forms of group play that are more mentally challenging than physically. *Renga* is our first attempt to address these issues and we are now screening it internationally in cinemas."

CREDITS

ARE YOU A GOOD LOCALISER?
Supported by Enterprise Ireland

DOODLE DEFENSE
Funded on kickStarter

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GAME BORDER
Thanks to: A1, K, Okuoku, Keisuke Ikeda, Tsutomu Ohya, Tomoyuki Suehisa, Keiko Segawa, Yusuke Tsuboi, Akiko, Watanabe, Shoichi Isida, Cezan Iseda, Takuma Hayakawa, Tomoki Hayashida, Takeshi Okuya, Nobuyuki Mukai & Nao Yamawaki

GENERATIONS
Supported by CNC, Fonds Dicréam [Centre national du cinéma et de l'image animée] and Théâtre de l'Agora: Scene Nationale d'Evry.

INTERFERENCE
Commissioned by la Gaîté lyrique, Paris [www.gaite-lyrique.net]
Walls manufactured by Caino Design [www.cainodesign.com]

KINECT2SCRATCH
Dr. Finbarr Feeney, Computing Department, Institute of Technology Tallaght

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Additional Design: Val Head
Production Manager: Becky Stevens
Arcade cabinet monitor donated by Anna Debenham
Made with the greatest respect and love for the original Lunar Lander TM game by Atari

MY LIFE WALKTHROUGH
The MyLife team are researchers working on the Dem@Care project, which is funded by the European Community's 7th Framework programme [FP7/2007-2013] under grant agreement 288199—Dem@Care.

RENGA
With thanks to the Silk Mill Museum, Derby

THE SCIENCE OF GAMES
Supported by the National Endowment for the Humanities, Microsoft Research, the American Council of Learned Societies, and the National Science Foundation.

TILTFACTOR
Supported by the National Endowment for the Humanities, Microsoft Research, the American Council of Learned Societies, and the National Science Foundation.

GAME CURATORS

STEVE COLLINS
Steve Collins is CTO and Co-founder of Swrve, which provides an in-game marketing platform to help online and mobile game developers to optimise their game services. Previously he was CTO and co-founder of Kore Virtual Machines, a company that developed a commercial Lua implementation for console games. Before this he was the co-founder and CTO of Havok and led the technical development and strategy of the company until late 2006. Steve also works with Trinity College Dublin [TCD] as an Adjunct Associate Professor, has lectured on computer graphics and embedded software development and has led a number of funded research projects in physically based animation and global illumination. In 2007 he founded TCD's new MSc programme in computer game technology. Previously he founded the TCD computer graphics group. Earlier still he worked on scientific visualisation software for Hitachi Super Computers and developed Commodore 64 games.

MICHAEL JOHN GORMAN
Michael John Gorman is the Founding Director of Science Gallery. Currently, through a gift of €1M from Google.org, he is developing an international network of Science Galleries in partnership with leading universities in urban centres worldwide. Michael John is also Adjunct Professor of Creative Technologies at Trinity College Dublin, Director of the Idea Translation Lab [in partnership with Harvard University] and PI of the European StudioLab project. Prior to coming to Trinity College Dublin, he has worked at Stanford University where he lectured in science, technology and society, and has held postdoctoral fellowships in Harvard University and MIT. He has authored numerous publications and articles on aspects of the relationship between art and science and history of science. He holds a PhD in seventeenth century history of science from the European University Institute in Florence.

MADS HAAHR
Mads Haahr has been a Lecturer in the School of Computer Science and Statistics at Trinity College Dublin since 2000. He is a true multidisciplinarian with contributions in computer science as well as interactive digital media. Current active research areas are self-organisation in distributed and mobile systems and software support for location-based mobile games. He created the Internet's premier true random number service RANDOM.ORG [1998], co-founded the Crossings Electronic Journal of Art and Technology [2001] and is founder and CEO of the mobile game studio Haunted Planet [2010]. He holds a BSc in Computer Science and English [1996], an MSc in Computer Science [1999], both from the University of Copenhagen, and a PhD in Computer Science [2004] from Trinity College, Dublin. He is a member of the ACM and IEEE.

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PRINT MEDIA SERVICES

THANK YOU
Mark Nagurski of Digital Derry and all at CultureTech, **Katherine Rowlandson** & **Justine Scoltock** from Derry Productions, **Meriem Djazouli** [formerly of PopCap], **Stephen Jacobs** [RIT], **Tuomo Tammenpää**, **Owen Harris** from bitSmith Games, **Dr. Aphra Kerr** and **Jamie Mc Cormick, John Healy, Diarmuid Murphy** and **Emma Lee.**

And finally all the people who attended the **GAME** brainstorm and fed in their ideas and have opened up their networks to Science Gallery.

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Science Gallery at Trinity College Dublin is a dynamic and vibrant cultural space where science and art collide, ideas meet and curious minds connect. Featuring work by both national and international scientists, artists, engineers, designers and technologists, Science Gallery explores broad themes that can be interrogated from a variety of disciplines and perspectives. With a primary audience of young adults from 15 to 25 years old and strong community that visits regularly, Science Gallery provides a lively social space for public engagement with science. Through an ever-changing programme of exhibitions, events and workshops, the space serves as a porous membrane for ideas and connections between the university and the city around it.

Through the generous support of its partners, Science Gallery develops four ground-breaking exhibitions in Dublin every year. Being a partner allows companies, foundations and individuals to enjoy year-round association with Science Gallery and its work to ignite passion and creativity.

If you're interested in joining Science Gallery to inspire the next generation of innovators and build a fresh start for Ireland's future, visit www.sciencegallery.com/support.

GAME

ISBN 978-0-9558957-8-4