



# The Dream Machine

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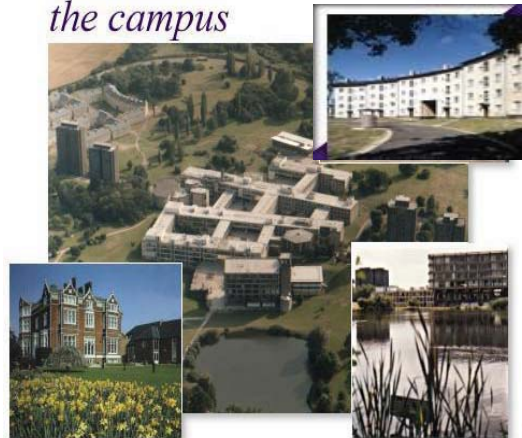
Presented at Creative Science 2013,  
29th November 2013, King's College London

## About Me

- ▶ Professor of Computer Science at Essex University
- ▶ Member of Intelligent Environments Group and Digital Lifestyles Centre
- ▶ Worked in avionics (aircraft) before joining university system
- ▶ Specialist in robotics and artificial intelligence (founded Robotics at Essex in late 80's, IE in late 90's)
- ▶ Current research focused on Embedded-Agents, End-User Programming, Affective Computing & Mixed Reality.
- ▶ Part of organizational team for numerous conferences, workshops, journals



### *the campus*



<http://victor.callaghan.info>

- Parkland of 200 acres
- Royal Charter in 1965
- 12,240 students
- 27% post graduates
- 40% overseas (130 countries)
- Ranked 9<sup>th</sup> in UK for research
- Ranked 2<sup>nd</sup> for student satisfaction



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## Overview of Talk

*“Hypothesizes that dreams may be akin to a ‘natural immersive education system’, having an important role in learning (whether they are a primary mechanism or secondary artefact is deliberately obscure, as are roles of dreams in our current lives)” ; in this world we are, effectively, “Dream Machines” .*

- ▶ Section 1 – about inspiration
- ▶ Section 2 – about the science
- ▶ Section 3 – about the story
- ▶ Section 4 – reflections



## The Inspiration

- ▶ The Singularity .... *the moment machine intelligence exceeds human intelligence* (around 2050 according to Kurzweil)

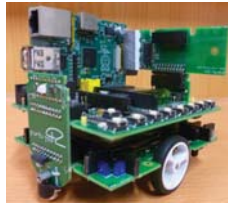


A fascinating futurescape!

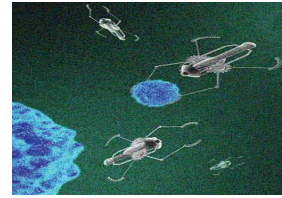
## About the Science



**Blended Reality** – mixing real and virtual activities

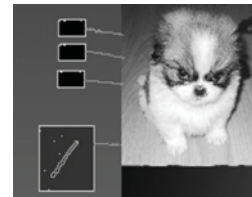


\* **Plug & Learn** – creating appliances by plugging together functions



**Nanobots** – in-body nano size robots for medical work.

- **Blended Reality** - “xReality interactions within an immersive blended reality learning space”, Immersive Education 2013, London, 28-29 November 2013
- **Plug & Learn** - “Bespoke Appliances for the Digital Home”, Intelligent Environments 2008, Seattle, 21-22 July 2008
- **Nanobots** - “A Collaborating Team of Spiking Neural Network Based Robotic Agents for Inaccessible Fluidic Environments”, Proc IEEE Int'l Conf on Systems, Man and Cybernetics, Taipei, Taiwan, October 2006
- **iSkin** - “Using an amorphous computer for visual display applications in intelligent environments”, Intelligent Environments 2008, Seattle, 21-22 July 2008



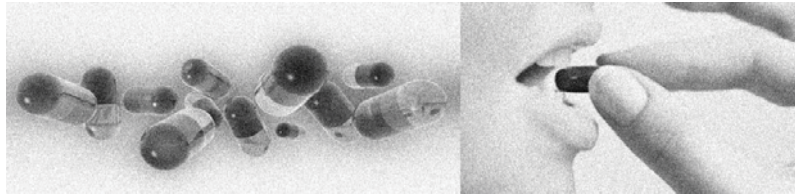
**iSkin** – spray-on surface based nano-computer systems

## About The SFP

- ▶ “based in a post-singularity world (2046+) and speculates on how technological developments, in the form of transhumanism, might change the nature of future education”.
- ▶ At its root, it imagines:
  - The *technological singularity* has been reached, and machine intelligence and bioelectronics has equaled or surpassed the capabilities of people.
  - *Dreams* are regarded as a ‘*natural immersive education system*’ and this SFP explores their relationship to learning.
  - Imagines brains can be augmented or ‘adjusted’ via plug-ins, uploads and nanobot surgery!
- ▶ Imagines these approaches can deliver ‘*learning-free education*’ for a variety of scenarios.



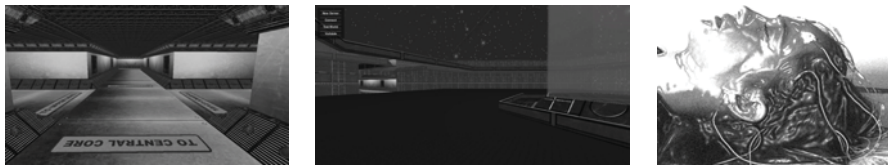
## About The Stories – “The Education Pill”



- ▶ Group of Mexican scientists (in company called ‘*Addictive Technology*’) invent an “*education pill*” (*ePill*)
- ▶ Each *ePill* contains millions of programmed nanobots that can restructure the brain’s neuron connections and weights.
- ▶ Taken overnight, the *ePill* gives people new knowledge & skills (programmed into nanobots) providing “*learning-free, education*” (with dreams being artefacts of brain restructuring)
- ▶ Used in a futuristic integrated job & training agency; *JOBS+* which provide a “*skills on demand job service*”.
- ▶ Story has humorous twist where *JOBS+* employee tries to use *ePill* to get himself a girlfriend (which goes wrong!).
- ▶ Explores an *in-body type of immersive educational experience*



## About the Stories – “Plug & Learn”



- ▶ The HEX University – a new (& somewhat controversial) type of university where people attend for brain-augmentation (implants, uploads, upgrades etc); as part of a new “*learning-free, education*” offering.
- ▶ University is a converted Spacestation; a quiet environment where students have induced sleep, experiencing spurious images fleeting their minds, so-called ‘*electric dreams*’.
- ▶ an altered reality is generated from within the mind (an *in-body immersive reality experience*).
- ▶ This SFP takes the form of written notes from a press conference where VC explains and defends this controversial type of education.



# Reflections

- ▶ I remember as a young student being fascinated by how a 'pile of electronic components' could be connected one way to make an amplifier (say), and another way to make a synthesizer (say); the same heap of bits, just a different connections!
- ▶ There was no explicit program or knowledge, just connections; the same way as the brain is mostly connections – a "hardware & software duality". Can education be reduced to being equivalent to changing physical structure; a type of "educational entropy"?
- ▶ Dreams are seen in this SFP as being somewhat similar to immersive reality; could they be induced to produce similar experiences to the benefit of education.
- ▶ Is there a prospect of 'learning-free, education'?
- ▶ What kind of changes will the *singularity* bring to education; super intelligent artificial tutors at one extreme, super intelligent augmented people at another?
- ▶ Will autonomous technological developments sweep us into some accidental future, or can we orchestrate our own future; and how?



Kevin Warwick implants chips into his own arm  
<http://content.time.com/time/magazine/article/0,9171,2050030,00.html>

# Upcoming Creative Science Events

[www.creative-science.org](http://www.creative-science.org)



## 21st Century Robot - A 'Maker' Event

<http://intenv.org/?q=conferences/ie14/robot>



Maker activities (crowd sourced) aim at moving people away from being just consumers of technology, to creators of technology & include activities such as 3D printing, virtual appliances & customisation are often seen as the forerunners of these processes.



Intel Labs Pittsburgh



CREATIVE SCIENCE FOUNDATION  
[www.creative-science.org](http://www.creative-science.org)

- Two workshops:
- Creative-Science 2014
  - Imagine 2014



## The Singularity Hypothesis: A Pragmatic Approach.

Springer edited volume in The Frontiers Collection.  
 The Singularity - Point where AI transcends the limitations of peoples brains

## References in this Presentation

- ▶ Hagaras H, Pounds–Cornish A, Colley M, Callaghan V, DeSouza G, “*A Collaborating Team of Spiking Neural Network Based Robotic Agents for Inaccessible Fluidic Environments*” Proceedings of the IEEE International Conference on Systems, Man and Cybernetics, Taipei, Taiwan, October 2006
- ▶ Johnson B, Callaghan V, Gardner G “*Bespoke Appliances for the Digital Home*”, IET International Conference on Intelligent Environments 2008, Seattle, 21–22 July 2008.
- ▶ King, A.M.; Callaghan, V.; Clarke, G, “*Using an amorphous computer for visual display applications in intelligent environments*”, IET International Conference on Intelligent Environments 2008, Seattle, 21–22 July 2008nt Environments 2008, Seattle, 21–22 July 2008.rt Environments, IOS Press, Netherlands, 2009.
- ▶ Anasol PEÑA–RIOS, Vic CALLAGHAN, Michael GARDNER· Mohammed J. ALHADDAD “*xReality interactions within an immersive blended reality learning space*”, Immersive Education 2013 (*iED'13*), King's College London, 28–29 November 2013



University of Essex



# That's it!



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