Derry's *Imagineering Quarter* & *MediaHub*[*]

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"As I sat here today watching all of the students graduate I thought of the special role held by this University in developing creativity here in the North West. This morning during a visit to the Magee Campus hosted by Professor Jim Allen I was very impressed to hear of the exciting developments and the new technologies in creative arts. I know that the Creative Industries are close to the hearts of Vice-Chancellor Barnett and Pro-Vice-Chancellor Allen and that innovation exists in the core value of this great University... I was happy to see the plaque celebrating the life and work of James MacCafferty, the renowned Derry musical director and pianist; James was a dear friend of our family...

My message for the graduates of today is, to think of ways of bringing together concepts from different subjects to create new ideas and products. This is what Nicky, Roma and I have tried to achieve in our own musical team effort, through experiment with sound, lyrics and music. Embracing innovation helps to produce something unique and rewarding. It is your contribution to the world."

Enya (Eithne Ní Bhraonáin) honorary degree (Doctor of Letters, D.Litt.) graduation address, University of Ulster, Magee graduations, Millennium Forum, Derry/-Londonderry, July 10th, 2007 (see Appendix A).

1 Introduction

This submission to the ILEX-URC Sectoral Working Group (SWG) on education is in respect of recognition of the strategic potential, given the proximal spatial relations of 5 neighbouring buildings, for choreographing a Derry *Imagineering Quarter*, focussed on *Creative Arts & Technologies*, comprising 2 buildings (Foyle Arts [MQ], Computing [MS]) on the Strand Road area of the Magee Campus adjoining the 3 Strand Road buildings (Lawrence, Strand, Foyle) for Creative Arts and Technologies of the North West Regional College (NWRC). Consideration could also be given to establishing an international research and business innovation centre (*MediaHub*) within the Quarter with potential funding from, e.g., Integrated Development Funds (IDF) or Invest Northern Ireland. The Nerve Centre and Verbal Arts Centre

could be engaged in bringing the activities of the Quarter and MediaHub to within the city walls. Furthermore, engagement with Letterkenny Institute of Technology (LYIT), nearby in Co. Donegal, also having an intensive focus on Creative Arts & Technologies and Computer Science, is recommended.

This is all in the context of the City of Derry's long history of performance in the Creative Arts and more recently, Technologies, i.e. the Creative Industries. Derry/Londonderry cannot afford to lose out on the opportunities presented by this *Imagineering Quarter* and *MediaHub*.

2 Background

On the subject of integrating scientific and artistic knowledge and how it should be seen, Pirsig (1974) says,

> "But we know from Phaedrus' metaphysics that the harmony Poincaré talked about is not subjective. It is the source of subjects and objects and exists in an anterior relationship to them. It is not capricious, it is the force that opposes capriciousness; the ordering principle of all scientific and mathematical thought which destroys capriciousness, and without which no scientific thought can proceed. What brought tears of recognition to my eyes was the discovery that these unfinished edges match perfectly in a kind of harmony that both Phaedrus and Poincaré talked about, to produce a complete structure of thought capable of uniting the separate languages of Science and Art into one." (p. 263)

Here, Pirsig stresses that the Sciences and Arts must come together at some point in the whole tower of knowledge which links back to what Newman (1852a,b) says about the inseparability of knowledge and interdisciplinary thought. Of course, Renaissance man Leonardo Da Vinci, already had this calling in the 1400s (Herbert 1998). Mc Kevitt (1998a,b) argues that creative technologies are an obvious discipline where the arts, (computer) science and engineering come together. On the discussion of reductionism and interdisciplinary thought, Pirsig (1974) notes,

> "In terms of analogy, Classic Knowledge, the knowledge taught by the Church of Reason, is the engine and all the boxcars. All of them and everything that's in them. If you subdivide the train into parts you will find no Romantic Knowledge anywhere. And unless you're careful it's easy to make the presumption that's all the train there is. This isn't because Romantic Knowledge is nonexistent or even unimportant. It's just that so far the definition of the train is static and purposeless. This was what I was trying to get at back in South Dakota when I talked about two whole dimensions of existence. It's two whole ways of looking at the train." (p. 276)

Pirsig's distinction between *Classic* and *Romantic* Knowledge is useful, and he points to reductionism as destroying Romantic Knowledge, which goes back to Newman's (1852a,b) point about all knowledge forming one whole. Interestingly, these interdisciplinary matters have also been recognised by The University of Ulster (UUResearchPlan 2002),

> Arts, Science & Technology:
> "This activity [biotechnology, information and communication technologies, functional materials and environmental technology] must be complemented by high-level thinking and practice in the fields of the Arts. All levels of cultural activity,

> from the nuances of language to visual representation and from the design of products to the understanding of heritage, are both informed by the profoundest histories and philosophies and enhance the most common of our day-to-day activities. Without the complementary of an understanding of the dynamics of these relationships both locally and globally, industrial, technological, and economic advances would remain mechanical. It is the task of a modern university to provide such complementarity and to promote understanding and synergies between the arts, the sciences and technology." (p. 5)

The *Creative Industries* are a multi-billion Euro industry worldwide and account for 7.9% of UK GDP, contribute £14 billion to the UK balance of trade and are growing at an average rate of 6% per annum and 10% globally, i.e. the fastest growing sector in the UK, growing at twice the rate of the overall economy. The creative industries employ 1.8 million people in the UK and 43% of them have degrees or higher level qualifications as compared to 16% of the workforce as a whole (DCAL 2000, 2001, 2004, 2008; DCMS 2001, 2006, 2008, 2009; NESTA 2006; Stutt and Burns 2007; InvestNI 2007). The computer games industry alone is a multi million Euro industry worldwide. Computer Games recruitment sites (e.g. DocmIlo 2010) list numerous employment opportunities. The recent Chinese Government 5-year plan (2006 - 2010) lists creative industries on virtually every page (ChinaPlan 2006). Digital Britain is a UK government initiative with the ambition of securing the UK's position as one of the world's leading digital knowledge economies (DCMS 2009). Florida (2002) describes the *Creative Class* as 40 million workers – 30% of the U.S. workforce, and breaks the class into two broad sections, derived from standard Standard Occupational Classification System (SOC) codes data sets: *super-creative core* and *creative professionals*, and the smaller group of *Bohemians*.

A subfield of creative industries is *Creative Technologies* which includes digital (media, art, music, design, drama, dance, film, storytelling), multimedia and computer games. Example Creative Technologies software systems include: *MemoryLane*, a mobile digital storytelling companion for older people which presents bespoke multimodal stories (audio, text, images, video) on the fly from life-cached memory data (e.g. poems, songs, music, sounds, photos, home videos) (Mc Carthy et al. 2009); *SceneMaker*, a mobile digital application which automatically converts natural language film/drama scripts into multimodal 3D animation productions (Hanser et al. 2009) scaffolded on our Confucius software (Ma and Mc Kevitt 2003, 2005, 2006; Figures 1, 2); *SoFI (Song Form Intelligence)*, which automatically detects and replaces large packet loss dropouts in streaming music across bursty wireless networks (Doherty et al. 2005, 2009; Appendix A); and *TeleMorph*, a software architecture for multimodal presentation which automatically adapts multimodal presentations (text, audio, images, video) with respect to fluctuating bandwidth (Solon et al. 2007). Computer forensics and security is an exciting new area which has come to the fore with television series such as Crime Scene Investigation (CSI), hacking, breaches of data security, information hiding, digital watermarking and steganography (Bailey and Curran 2005; Cheddad et al. 2009a,b,c, 2010a,b; Appendix D).

Maslow (1971), a pioneer in humanistic psychology, categorises creativity into different levels with the highest level being, *integrated creativity*, which is the source of the great works of art, philosophy and scientific discoveries. He argues that this creative integration is characteristic of the lives of self-actualized, healthy human beings. There has been much work in the fields of Artificial Intelligence and Cognitive Science on computers and creativity

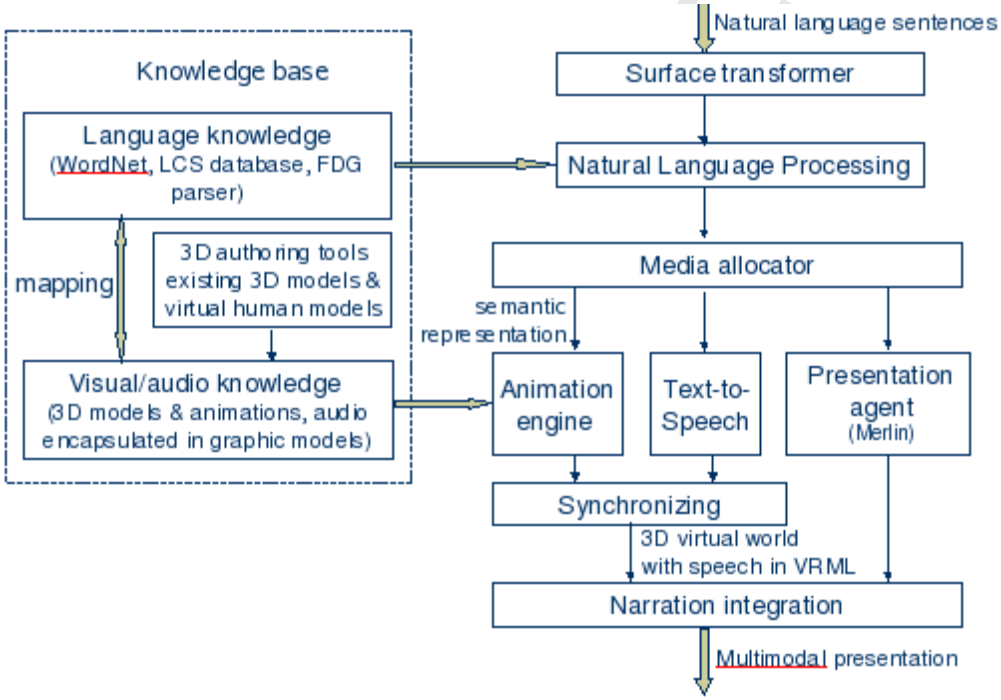

Figure 1: Architecture of Confucius software

Figure 2: Robyn McNutt, Minhua (Eunice) Ma and Paul Mc Kevitt deploy Confucius software (courtesy Trevor McBride)

(Boden 1990, 1996; Dartnall 1993; Partridge and Rowe 1994). Mc Kevitt (1986, 2000), in assessing computational creativity within Aritficial Intelligence, argues that creativity can never be understood in formal terms. Mc Kevitt et al. (2002), inspired by Hofstadter (1979), investigate creativity within the context of language, vision and music modalities. The puzzle of creativity may lie in reconciling the world of contraries in a complementary way (Kelso and Engstrøm 2008). Nachmanovitch (1990) discusses the meaning of creativity and improvisation and how we have gone, and can go, about them. Whilst discussing music in the introduction, he shows how Mozart relied on improvisation, but also how the formal concert halls of the nineteenth century put an end to improvisation – a sort of move from Romantic to Classic! He focuses very much on the creative process, but also on how people can learn to get in touch with their own creative possibilities and abilities. He talks of the creative process being a spiritual and adventurous path, an emergent property of *free play* where one is freely playing without shackles and he bases much on the literature of Zen and the writings of William Blake. Nachmanovitch (1990) says,

> " "Play" is different from "game." Play is the free spirit of exploration, doing and being for its own pure joy. Game is an activity defined by a set of rules, like baseball, sonnet, symphony, diplomacy. Play is an attitude, a spirit, a way of doing things, whereas game is a defined activity with rules and a playing field and participants. It is possible to engage in games like baseball or the composing of fugues as play; it is also possible to experience them as *lila* (divine play) [his italics], or as drudgery, as bids for social prestige, or even as revenge." (p. 43)

Papert (1993) notes the importance of play in the development of computer technology such as the *Logo* programming language and *LEGO mindstorms* for child learning and creativity based on the psychology of learning (Piaget 1955, Vgotsky 1967). Hyndman et al. (2009) are developing a software platform (*AmbiLearn*) and *Treasure Hunt* software application (*TreasureLearn*) for investigating how computer games can catalyse collaborative learning by children on the Nintendo DS games computer. Likewise, Munõz et al. (2009) are investigating, with the *PlayPhysics* on-line software system, how computer games can be used to teach Physics to first year undergraduate Physics students at three universities (Queen's University Belfast, Trinity College Dublin and Instituto Technológico de Estudios Superiores de Monterrey (ITESM), Mexico). PlayPhysics models the emotions of the student during interaction, builds a student model and modifies its emotional responses based on student performance. Callaghan et al. (2009) discuss the integration of virtual worlds with virtual learning environments for online education.

Mc Kevitt (2003, 2007) discusses the importance of creative arts and technologies for Derry/Londonderry and the North West as do Hutton (2006, 2010a,b,c) and U4D (2009). There has already been a wealth of activity around here in recent years (e.g. CreativeIndustries 2006, CreativePotentials 2006, CreativeInspiration 2007, SeriousGamesAwakening 2007, ACEAwakening 2009, ImagineCreate 2009, XNAFest 2009, EmergentGameSummit 2009, BarCamp 2009, ImmersiveWorlds 2009) involving the University of Ulster, North West Regional College (NWRC) (NWRC 2010), Interactive Computer Entertainment Incubator (ICE Cube 2010), Digital Media Works (DigitalMediaWorks 2010), Northern Ireland Business Innovation Centre (NORIBIC) (NORIBIC 2010), The Nerve Centre (NerveCentre 2010), Verbal Arts Centre (VerbalArtsCentre 2010) and DigitalCircle (2010). Creative Youth Partnerships (CYP 2010) are bringing awareness to children. This is all in tune with the University

of Ulster's *University Vision* and at least one of the five core strategic aims of the University (UUCorpPlan 2006),

> *Strategic Aim 4*:
> "Establish the University as a sector leader in promoting creativity and innovation" (p. 1 & p. 7)

with the following *Key Supporting Objective*,

> "To develop further programmes of study, research and knowledge and technology exchange activity, which support the development of the creative industries." (p. 7)

and furthermore, could help to hasten progress on this core strategic aim (McAlister 2009),

> "However progress towards establishing Ulster [sic: University of Ulster] as a sector leader in promoting creativity and innovation has been slower although the University has, through its 2009 annual staff conference, refocussed its activities in these areas and key targets will be made explicit in the new Corporate Plan 2011/12 - 2015/16." (p. 1)

3 Opportunities for student growth and research

It is very clear that there is a wealth of opportunity for growth of student numbers in Creative Technologies (MultiMedia, Computer Games, Arts Computing). This has also been recognised by Barnett (2009a,b) where Creative Technologies is earmarked as one of four areas (STEM [Sustainable Technologies], Creative technologies, Professional qualifications [Business, Law] and Health & Wellbeing [Nursing, Psychology]) for at least MaSN student number growth at the Magee Campus. There are opportunities for computing at Magee Campus to deliver joint programmes with all of these subjects. Furthermore, there is already a long history of collaboration between Magee computing and the Magee School of Creative Arts at undergraduate and postgraduate levels on the courses, M.Sc. Computing & Creative Technologies (previously M.Sc. Computing & Design), B.Sc. (Hons.) MultiMedia Computing & Design (previously B.Sc. (Hons.) Interactive Multimedia & Design), and more recently, the B.A. (Hons.) Creative Technologies. The Magee School of Creative Arts also has healthy numbers in Music, Drama and Dance.

There are other institutions focussing on Creative Technologies, such as: University of Postsmouth, School of Creative Technologies (Portsmouth 2010); De Montfort University, Institute of Creative Technologies (DeMontfort 2010); University of Bradford, Department of Creative Technology (Bradford 2010); Glasgow Caledonian University, Department of Computing & Creative Technologies (Caledonian 2010); University of Abertay Dundee, School of Computing & Creative Technologies (Abertay 2010); University of Southern California (USC), Institute for Creative Technologies (USC 2010) and, of course, Massachusetts Institute of Technology (MIT), Media Laboratory, founded in 1985 (MediaLab 2010).

More recently, there is the serious advantage of the proximal spatial relations of the Creative Arts (MQ) and Computing (MS) buildings, shown in Appendix B, to choreograph a Derry *Imagineering Quarter* focussed on *Creative Arts & Technologies* (shown in Appendix C), on the Strand Road area of the Magee Campus adjoining the three (two new) Strand Road

buildings (Lawrence, Strand, Foyle) for Creative Arts and Technologies of the North West Regional College (NWRC) with the potential to stimulate multiple meme[1] transmission. Such a quarter manifests the significance of creative arts and technologies for Derry/Londonderry and the North West as discussed in Mc Kevitt (2003, 2007), Hutton (2006, 2010a,b,c) and U4D (2009). Consideration could also be given to establishing an international research and business innovation centre (*MediaHub*) within the Quarter with potential funding from, e.g., Integrated Development Funds (IDF) or Invest Northern Ireland. Furthermore, Letterkenny Institute of Technology (LYIT) (LYIT 2010) nearby in Co. Donegal, also having an intensive focus on Creative Arts & Technologies and Computer Science, could be considered for joint collaboration. The Nerve Centre and Verbal Arts Centre could be engaged in bringing the activities of the Quarter and MediaHub to within the city walls.

This is all in the context of the City of Derry's long history of performance in the Creative Arts and more recently, Technologies, i.e. the Creative Industries, and its bid to win UK City of Culture, 2013 (see CityOfCulture 2010). This spatial opportunity for choreographing an *Imagineering Quarter* has emerged more by accident than by design, although some universities have designed such spatial relations deliberately, e.g. in 1997 Aalborg University, Denmark built its new 'sprog' (language humanities) building directly opposite its engineering and computing complex on Frederick Bajers Vej (Road) to stimulate such cross-fertilisation. However, some would argue that spatial proximity does not matter that much when there is a 2 millisecond delay. Project Kelvin (Kelvin 2010) is a new secure high capacity submarine communications cable network with direct connection to North America and Europe going live in March, 2010 where Derry/Londonderry, Letterkenny, Coleraine, Belfast, Armagh, Strabane, Omagh, Monaghan and Dundalk are Points of Presence on the network. The delay between the Points of Presence is 2 milliseconds.

4 Conclusion

The ILEX Sectoral Working Group (SWG) on education could consider the significance of choreographing a Derry *Imagineering Quarter* (Appendix C) focussed on *Creative Arts & Technologies* comprising 2 buildings (Foyle Arts [MQ], Computing [MS]) on the Strand Road area of the Magee Campus adjoining the 3 Strand Road buildings (Lawrence, Strand, Foyle) for Creative Arts and Technologies of the North West Regional College (NWRC). Consideration could also be given to establishing an international research and business innovation centre (*MediaHub*) within the Quarter with potential funding from, e.g., Integrated Development Funds (IDF) or Invest Northern Ireland. Furthermore, engagement with Letterkenny Institute of Technology (LYIT), nearby in Co. Donegal, also having an intensive focus on Creative Arts & Technologies and Computer Science, is recommended. The Nerve Centre and Verbal Arts Centre could be engaged in bringing the activities of the Quarter and MediaHub to within the city walls.

This is all in the context of the City of Derry's long history of performance in the Creative Arts and more recently, Technologies, i.e. the Creative Industries. Derry cannot afford to lose out on the opportunities presented by this *Imagineering Quarter* (Appendix C) and *MediaHub* in a manner which is readily avant garde.

[1] A *meme* is a postulated unit of cultural ideas, symbols or practices, which can be transmitted from one mind to another through speech, gestures, rituals or other imitable phenomena (see Dawkins 1976).

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About the author

Professor Paul Mc Kevitt is from Donegal (Dún Na nGall), Ireland on the northwest of the European Union (EU) and was born in the Year of the Dragon. He is Chair in Intelligent MultiMedia at the School of Computing & Intelligent Systems, Faculty of Computing & Engineering, University of Ulster, Magee, Derry/Londonderry, Northern Ireland. Previously, he was Associate Professor (Senior Lecturer) in the School of Computer Science, The Queen's University of Belfast, Northern Ireland. He has been Visiting Professor of Intelligent MultiMedia Computing in the Institute of Electronic Systems, Aalborg University, Denmark and a British EPSRC (Engineering and Physical Sciences Research Council) Advanced Fellow in the Department of Computer Science, University of Sheffield, England. The Fellowship, commenced in 1994, and released him from his Associate Professorship (tenured Lectureship) for 5 years to conduct full-time research on the integration of natural language, speech and vision processing. He completed a Master's degree in Education (M.Ed.) at the University of Sheffield in 1999, his Ph.D. in Computer Science at the University of Exeter, England in 1991, his Master's degree in Computer Science (M.S.) at New Mexico State University, New Mexico, USA in 1988 and his Bachelor's degree in Computer Science (B.Sc., Hons.) at University College Dublin (UCD), Ireland in 1985. He has published numerous papers in international conferences, research books and journals. His primary research interests are in Natural Language Processing (NLP) including the processing of pragmatics, beliefs and intentions in dialogue. He is also interested in Philosophy, Creative Technologies and the general area of Artificial Intelligence.

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Appendices

A Enya visit to Magee Campus

The following photographs are from Enya's (Eithne Ní Bhraonáin) visit to the Magee Campus on July 10th, 2007, the morning of her honorary degree (Doctor of Letters, D.Litt.) graduation at the University of Ulster, Magee, Millennium Forum, Derry/Londonderry, Northern Ireland. In Figure 5 Enya is viewing our SoFI (SOng Form Intelligence) software demo. SoFI performs automatic detection and replacement of large packet losses on wireless networks when receiving time-dependent streamed audio (music).

Figure 3: Enya with parents Leo and Baba (courtesy Alastair Nevin)

Figure 4: Enya Magee Campus group photograph (courtesy Alastair Nevin)

Figure 5: Enya views SoFI (SOng Form Intelligence) software demo (courtesy Martin Doherty)

Figure 6: Enya escorted to Foyle Arts building (MQ) by Anton Hutton (courtesy Martin Doherty)

Figure 7: Enya views dance rehearsal at Foyle Arts Building (MQ) (courtesy Martin Doherty)

B Magee Campus map

Figure 8: Magee Campus map

C Magee Campus, NWRC & L/Derry *Imagineering Quarter*

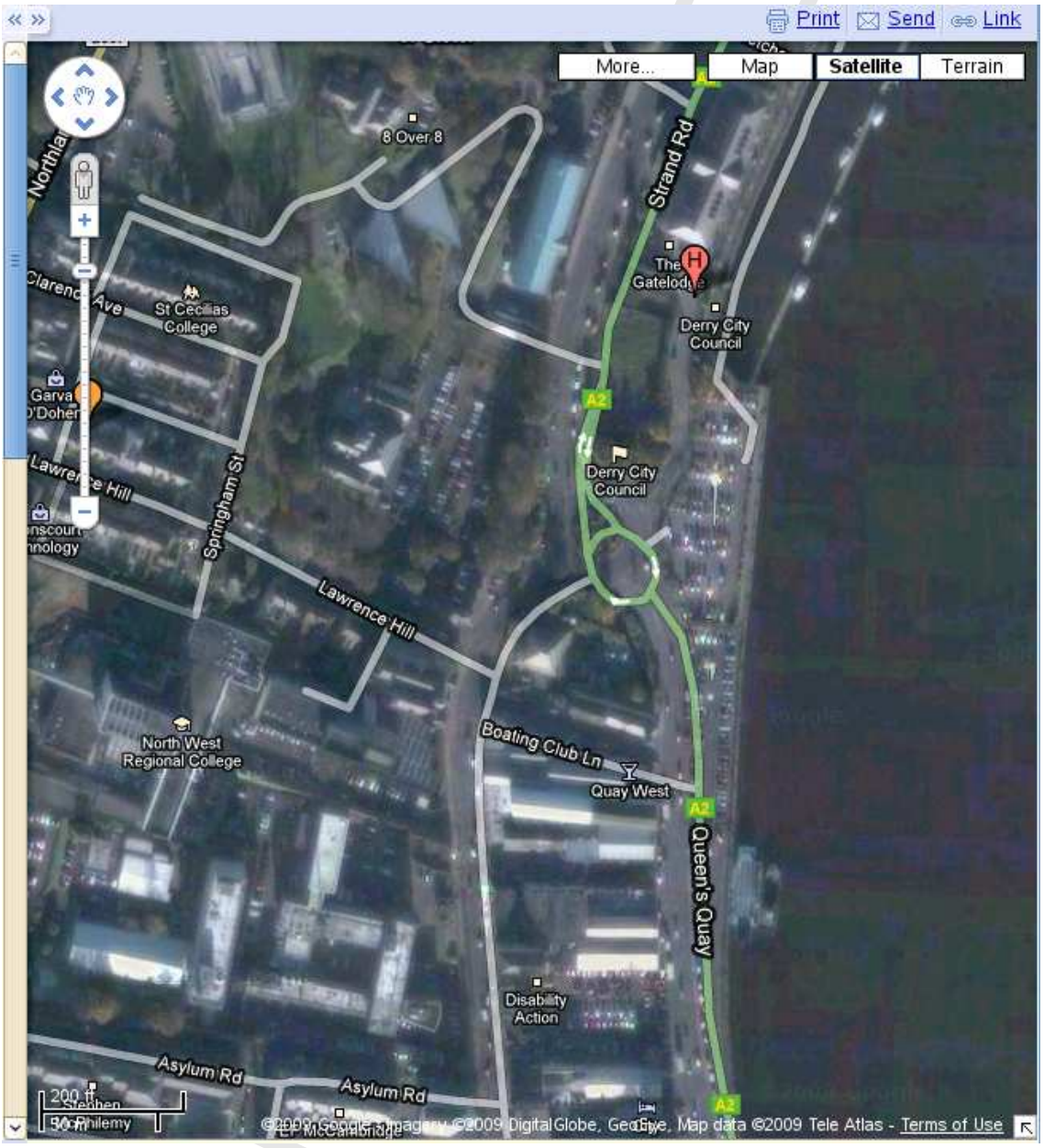

Figure 9: Magee Campus, NWRC & L/Derry *Imagineering Quarter*

D Secure Digital Watermarking (SDW) team win at NISP £25K awards

Figure 10 shows (left-to-right) Peter Devine, Dr. Abbas Cheddad, Dr. Kevin Curran, Dr. Joan Condell and Prof. Paul Mc Kevitt, team members of the Secure Digital Watermarking (SDW) team, receiving the Northern Ireland Science Park (NISP) £25K Award Hi-Tech category award from Hi-Tech category sponsor, Phil Codd (Software Quality Systems, SQS), at the NISP Titanic Dock and Pump House, Queen's Island, Belfast, Northern Ireland, September 24th, 2009. Figure 11 shows the Hi-Tech category award scroll. Secure Digital Watermarking (SDW) is where data is securely embedded directly within image content and is imperceptible to humans but readable by computers. SDW can be applied to help tighten security at airport check-ins and other public access points, to ensure secure transmission of sensitive information such as medical records in hidden messages and as a means of strengthening protection of copyright.

Figure 10: SDW team win at NISP £25K awards (courtesy Roisin Clancy, NISP/BrianMorrison Photography/Morrow Communications)

D SECURE DIGITAL WATERMARKING (SDW) TEAM WIN AT NISP £25K AWARDS

Figure 11: NISP £25K awards Hi-Tech category scroll