Event Report

The IEEE Symposium on Technology and Society 2010 (7-10 June): The Social Implications of Emerging Technologies

Katina Michael, University of Wollongong, Australia

The Institute of Electrical and Electronics Engineers (IEEE) Society on the Social Implications of Technology (SSIT) runs an annual symposium which began in 1989 (http://www.ieeessit.org/conferences.asp?Level2ItemID=23) (Table 1). In June 2010, the symposium was hosted by the University of Wollongong, NSW, in Australia (http://www.uow.edu.au/index.html). It was the first time that the Symposium had been hosted in the Southern Hemisphere. Other host cities have included Toronto, Amsterdam, Rome, and Glasgow. The theme of the Australian-based symposium was "The Social Implications of Emerging Technologies" (http://www.uow.edu.au/conferences/2010/ISTAS/index.htm). The best papers from the symposium have traditionally been published in a special issue of the *IEEE Technology and Society Magazine* which was established in 1982, presently edited by Professor Keith Miller of the University of Illinois, Springfield. The annual symposium attracts between 80-100 delegates and publishes on average about 50-60 peer reviewed papers, although the readership of the proceedings is much wider upon publication. The delegates typically have diverse backgrounds including engineering, computer science and information technology, and other areas in education and law, business and communications, and in the arts.

The call for papers (CFP) for the 2010 symposium covered topics related to the social implications of the following emerging technologies: (i) automatic identification- especially with respect to RFID tags and transponder implants in people and animals and the use of DNA as a biometric identifier; (ii) location-based services- for the tracking and monitoring of objects and

DOI: 10.4018/jcit.2011040106

Table 1. Past IEEE symposia on technology and society (1989-2011)

Year	Place	Country	Theme
2011	Illinois	USA	Overcoming Social Barriers With Computing
2010	Wollongong	Australia	Social Implications of Emerging Technologies
2009	Phoenix	USA	Sustainable Development
2008	Fredericton	Canada	Citizens, Groups, Communities and Information and Communication Technologies
2007	Las Vegas	USA	Risk, Vulnerability, Uncertainty, Technology and Society
2006	New York	USA	New York Disaster Preparedness and Recovery
2005	Los Angeles	USA	Weapons and Wires: Social Implications of ICT and Global Security
2004	Worcester	USA	Globalizing Technical Education
2003	Amsterdam	The Netherlands	Crime Prevention and Security
2002	Raleigh	USA	Social Implications of Information and Communication Technology
2001	Stamford	USA	Ethical and Social Issues as Criteria in Academic Accreditation
2000	Rome	Italy	The University as a Bridge from Technology to Society
1999	New Brunswick	Canada	Women and Technology: Historical, Societal and Professional Perspectives
1998	South Bend	USA	Wiring the World: The Impact of Information Technology on Society
1997	Glasgow	Scotland	Technology and Society in a Time of Sweeping Change
1996	Princeton	USA	Technical Expertise and Public Decisions
1993	Washington	USA	Technology: Whose Costs? Whose Benefits?
1991	Toronto	Canada	Preparing for a Sustainable Society
1989	Los Angeles	USA	A Delicate Balance: Technics, Culture and Consequences

subjects; (iii) social networking and social media; and (iv) nanotechnology. The program committee was especially interested in papers that addressed privacy, security and human rights issues with respect to these technologies, related applications, and case examples and scenarios that could demonstrate the risks, benefits and costs (Table 2). The inspiration for the topics came from the Michael's co-authored volume on *Innovative Automatic Identification and Location Based Services: from bar codes to chip implants*, a 500 page reference volume which was published in March of 2009 (Michael & Michael, 2009).

The general chair of the conference was Dr. Mark Gasson from the University of Reading who brought with him a great deal of expertise on emerging technologies given his involvement in the Cyborg 2.0 project with Professor Kevin Warwick. The organizing chair was Dr. Holly Tootell from the University of Wollongong who along with Dr. Greg Adamson (SSIT Australia Chapter Chair) who established the SSIT Australian chapter in 2005/06. The program chair was Associate Professor Katina Michael who spearheaded the call for papers and hand-picked the internationally renowned keynote, plenary and invited speakers for the event. Together with M.G. Michael, she managed the review process which was particularly rigorous. The event itself lasted four days between 7-10 June 2010. The first three days were dedicated to the symposium

Table 2. Topic areas in the call for papers for ISTAS10

Emerging ICT	Topic Areas
Automatic Identification	Automatic identification technologies including biometrics (DNA), RFID
	Surveillance, dataveillance, sousveillance, anti-surveillance, uberveillance
	National security, emergency response, border control, e-tollways, e-passports
Location Based Services	Geographic information systems, digital mapping, geotagging, street view, CCTV
	Location-based services, global positioning systems (GPS), tracking, monitoring
Social Networking	Social networking applications, blogs, glogs, cyberstalking, collaboration
	Data collection, data merging, data matching, data mining, disclosure
	Mobile comms, wearable computing, ubiquity, context-aware applications
Nanotechnology	Microchip implants, biomedical solutions, diagnostics, drug delivery
	Nanotechnology, bionics, transhumanism, artificial intelligence, robots, cyborgs
Privacy and Security	Cyberethics, privacy, data protection, trust, control, consent, transborder flows
	Security, law enforcement, covert/overt policing, laws, regulations, public policy
	Social implications, registers, human rights, intellectual property, social equity

proper, and the fourth day was dedicated to a special topic workshop on the *Social Implications of National Security (no. 5)*, with an emphasis on the use of location-based services (http://www.uow.edu.au/conferences/2010/ISTAS/workshops/index.htm). This workshop was co-hosted on the University of Wollongong's Innovation Campus in conjunction with the Centre for Transnational Crime Prevention (CTCP) in the Faculty of Law.

On day one, Professor Gordon Wallace Director of the Intelligent Polymer Research Institute, University of Wollongong and the Executive Research Director of the Australian Research Council Centre of Excellence for Electromaterials Science (http://ipri.uow.edu.au/people/UOW001346.html), delivered an eye-opening keynote address on how nanotechnology will revolutionise health care (http://www.youtube.com/watch?v=La0bEXC1vts&feature=relmfu). On the same day Dr. Katherine Albrecht the director of CASPIAN (http://www.nocards.org) delivered a keynote address entitled: "Tumours, Tracking, and Tyranny: The Downside to the Implantable Microchip" (http://www.youtube.com/watch?v=CS13kFWQIYM&feature=relmfu). At the last moment Dr. Albrecht replaced renowned nano-ethicist Professor John Weckert from the Centre for Applied Philosophy and Public Ethics, Charles Sturt University who was to present on the defense of the "precautionary principle" (http://www.cappe.edu.au/staff/john-weckert.htm). She was dynamic in her delivery despite the short time frame she had to prepare. A plenary session by Professor Rafael Capurro completed the first day of major addresses. Professor Capurro from the University of Wisconsin-Milwaukee and Steinbeis-Transfer-Institute Information Ethics (http://www.capurro.de/home-eng.html) presented a stimulating talk on the "Ethical Aspects of ICT Implants in the Human Body (Opinion no. 20): European Group on Ethics in Science and New Technologies" that he was responsible for co-drafting in 2005.

On the second day of the conference, two plenary sessions and an invited talk were delivered. Dr. Mark Gasson, from the Cybernetic Intelligence Research Group at the University of Reading presented a groundbreaking talk on human enhancement (http://www.reading.ac.uk/sse/about/staff/m-n-gasson.aspx). He proposed that people could become infected with a computer virus on the devices embedded within their bodies and went on to provide evidence of

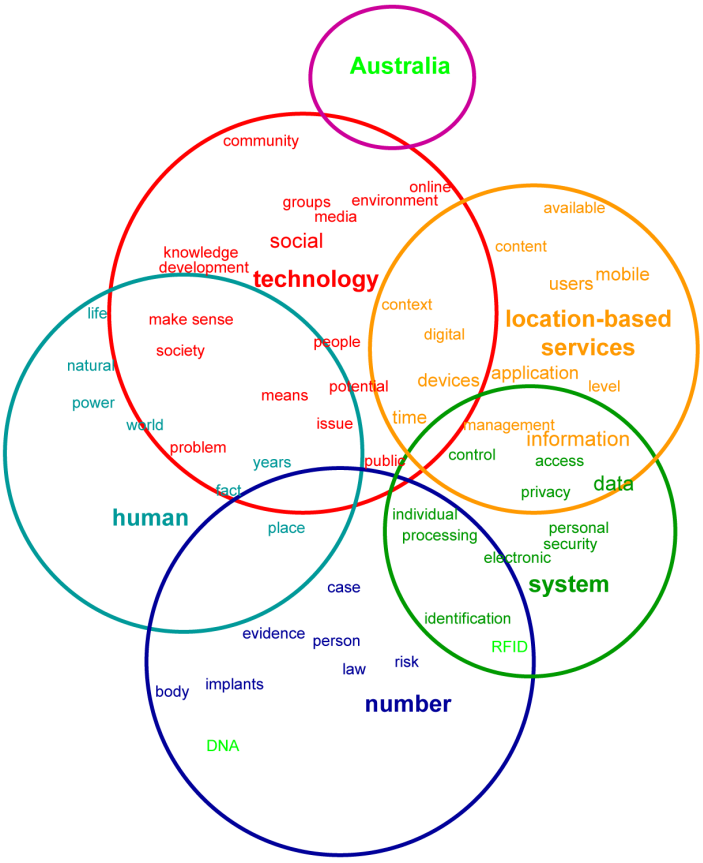
an experiment he performed which received international attention (http://www.youtube.com/watch?feature=player_embedded&v=IgPSfdw4Mnw). This talk was immediately followed by an invited paper delivered by Mr. Amal Graafstra who elaborated on his experience of being a 'do-it-yourselfer RFID implantee,' and discussed the benefits and challenges related to implanting people (http://amal.net/). His thought-provoking commentary challenged the idea of commercial implants for people that were controlled by third parties agreements and not by the owner/bearer (http://www.youtube.com/watch?v=kraWt1adY3k&feature=player_embedded). The second plenary session of day two was delivered by Visiting Professor Roger Clarke of Xamax Consultancy who postulated on the rights of cyborgs (http://www.rogerclarke.com/). A topical presentation which received wide media attention, also posed the question whether cyborgs could in fact compete in able body sports event like the Olympic Games. The dinner session which also had a lot of Q&A was presented by Professor Kevin Warwick (http://www.kevinwarwick.com/) via Skype from England. This session proved to be one of the crowd favourites based on feedback received by delegates. Warwick who had first demonstrated how the location tracking feature of RFID implants could be used, provided his personal journey and first hand experience of research in the domain of microchipping people.

The third day included two invited talks. First, Professor Colin Bennett from the Department of Political Science at Victoria University in Canada presented in defense of the privacy concept (http://web.uvic.ca/polisci/people/faculty/bennett.php). Colin is a member of the *New Transparency Project* and provided food for thought on why privacy as a concept is not yet dead. Second, Dr. Carole McCartney from the University of Leeds gave a presentation on the retention of DNA in the United Kingdom for forensic purposes (http://www.law.leeds.ac.uk/about/staff/mccartney/). A visiting fellow at Bond University, Dr. McCartney has been heavily involved in the Nuffield Council on Bioethics. In all some 65 papers from authors residing in 19 countries were chosen, including Australia, Bangladesh, Belgium, Canada, Germany, India, Indonesia, Italy, Japan, Malaysia, New Zealand, Nigeria, Spain, Sri Lanka, The Netherlands, United Arab Emirates, United Kingdom, United States of America, and Zimbabwe. The review board which selected the papers consisted of more than 130 people. The papers represented a broad area of technologies, systems and corresponding "problems" or controversies impacting on individuals, groups (e.g., online communities and businesses) and society at large (Figure 1).

The symposium received a great deal of media coverage, internationally, including in the United States and United Kingdom. Nationally in Australia, and locally in the Sydney-to-Illawarra region, topical stories ran daily highlighting new research being presented. The British Broadcasting Corporation (BBC) was first to cover the story on human microchips and the prospect of embedded computer viruses (Fildes, 2010). The Australian Broadcasting Corporation (ABC) did a prime time television segment on *The 7.30 Report* where it interviewed members of the roundtable session (Dikeos, 2010). *The Sydney Morning Herald* did a page 4 story on human microchipping and cyborgs (Walters, 2010). All in all there were over fifty pieces of individual media coverage on television, radio and newspaper on topics delivered at the Symposium to do with implanting humans, cyborgs and cyborg rights, identification and nanotechnology, social networks and privacy, and tracking applications and trust (http://www.uow.edu.au/conferences/2010/ISTAS/media/index.htm).

The feedback provided by delegates was that the meeting encouraged genuine discussion on controversial topics to do with privacy and security and the evolution of computing for humancentric applications. This was demonstrated during a live roundtable session that came together to debate the social implications of radio-frequency identification for a range of consumer, business and government applications (http://www.youtube.com/watch?v=dI3Rps-VFdo&feature=player_embedded). The roundtable was chaired by Mr. William Herbert, Deputy

Figure 1. Concept map of ISTAS10 papers generated using Leximancer content analysis software



Chair of New York State Public Employment Relations Board (for identification purposes only). Herbert has written papers from a legal perspective on technologies like RFID, GPS and more recently social networking (http://works.bepress.com/william_herbert/). Herbert began the roundtable by describing the importance of bringing people together to have meaningful dialogue on complex issues. His well-considered comments typified the spirit of the event as a whole. It had been the hope of the organizers that a group of conscientious scholars, industry and government representatives and community members could come together to openly share their research outcomes, opinions and beliefs and leave the event the wiser for knowing a little more about the position of particular stakeholders. And by an overwhelming consensus this was achieved.

In this section abridged portions of the roundtable are provided, giving the reader a first hand view of ISTAS10. The balanced roundtable chaired by William Herbert, also included Katherine Albrecht (RFID anti-chipping activist), Roger Clarke (eBusiness consultant and privacy advocate), Rafael Capurro (ethicist), Mark Gasson (systems engineering researcher and member of Cyborg 2.0 team) and Amal Graafstra (community member and RFID implantee).

Herbert began the discussion by stating: "We have over the past two days been very fortunate to hear very diverse viewpoints on the issue of RFID. And I thought it was appropriate that we try to bring those diverging voices together in seeking to bring some degree of bridging of these different ideas aiming towards some degree of harmony about a given perspective, or at least the first steps towards that perspective… there is a need for this kind of dialogue and I think this will be a very good first step or second step in that process." To open the roundtable he posed the question: "[c]an societies develop a balanced response to RFID?" Clarke was given the first opportunity to respond to this question and he elaborated that the vast majority of information technologies did not possess inherent evil, or indeed inherent good. He emphasized: "…it's what we do with them and it's the framework, the context, the value systems that make them good or evil". Clarke continued by stating that he had no problem with RFID in the supply chain, even up to the retail shelf but admitted that from the retail shelf onwards, he had grave concerns and primarily because of the "data surveillance" (i.e., dataveillance). Capurro agreed with Clarke, that information technologies, like RFID, were a "product of relations between humans and the world… and were dependent on context." In addition, Capurro agreed with Clarke that as the number of RFID tags rise, so will the need for some type of legal regulation to support the emerging infrastructure be required.

Gasson was then given the opportunity to provide an initial response, and he began by highlighting that RFID received a great deal of "bad press". One urban legend he presented to the panel was that of the capability of RFID to globally track an end-user or product. He said: "[t]he idea that you can globally track someone through an implanted RFID tag is fiction. You could put a reader by a doorway, and if I had an RFID tag and I walked through that doorway, you could read a number. Well, okay... You could potentially collate information about when that tag walked through that door, passed through that door, at certain periods during the day. You could collate that information over months, but actually what use is that data? It certainly doesn't necessarily link explicitly to me. You may be able to data-mine to some degree in order to work out it's me, but actual, what actual value is there to that?" Gasson went on to elaborate in identifying the many physical limitations of RFID technology. He then correctly pointed out that potentially problems with unobtrusive devices come about when function creep sets in. Gasson continued: "It's when the RFID tag isn't disabled and then it goes out and is used by the people, it may be in their clothing or in their shoes, because it's then a legacy. It's left in there from its previous use. So that sort of function creep phenomenon isn't unique to RFID, but certainly there are valid privacy concerns which do need to be addressed, but they need to be addressed in the context of what the reality really is."

Albrecht described her involvement in the civil libertarian movement by stating that she had been "there" when 40 or so organizations met to develop a position paper on RFID back in 2002-04. The position paper stated: "Go ahead, use it [RFID] in the back room. Use it in the warehouse. Use it in a supply chain. But when it gets to the point of human beings, that's where the line needs to be drawn." When questioned on whether her stance had changed since the position paper had been written, again she categorically reiterated: "RFID is dangerous for use on human beings." When asked by the moderator whether her own views had changed she stated that they had not, but that it seemed that proponents of the technology kept shifting the bar, initially saying that they would not implant, and then going right ahead and doing so, or at least pushing the idea that they had products ready for humancentric implantation.

Graafstra began his opening remark by emphasizing the 'body integrity laws in the European Union'. Having discussed these with Gasson he reflected: "…I think they're interesting, that a human has a right to do whatever they want with their own body." Contra Albrecht, Graafstra believed that RFID had a lot of great uses for humans and not just for non-living things. He said:

"I think people should be free to experiment with their bodies in much the same way there are piercing artists or tattoo artists…" On the topic of regulating the process of human microchip implantation, Graafstra was supportive of regulation and Albrecht was not. The discussion then swung towards the ability to collect data from RFID tags. Clarke admitted to having difficulty with the Gasson and Graafstra position in relation to the proposition that global tracking with RFID was "fiction". He pointed out: "Well, by itself, the technology doesn't achieve global tracking. That's quite clear. For starters, you've got to have readers. But there's a very simple structure whereby RFID tags do provide a global, a widespread tracking mechanism. You have got to look at the technology within a context of other technologies, within a context of other social institutions, within a context of other existing databases."

Capurro summed up the roundtable which went for over one hour and provided for a very stimulating and educational presentation by saying: "I don't think this [RFID] is a universal technology that can be applied, or should be applied equally in all societies, because people are different and the settings are different and the risks are different, of misuse and so on." He underscored that it was clearly a "complex issue." He also pointed out that it was a "question of regulation, not just a question of legality… It is also a question of morality… If the law allows it, the decision to accept or reject embedded RFID is a personal question." Capurro's expert summation was able to bring together the various voices in the roundtable toward some harmony in acknowledging that emerging technologies were surely going to test our societal responses and by no means were these going to be easy subjects to debate and to decide and to legislate upon. "And so it is a question of how much freedom we can allow for ourselves in our societies because the reality is that there is no absolute freedom for anything. So it is a question of how free individuals in society want to be and what they are willing to trade for this freedom. In consideration of the risks, of the issues of control, of surveillance, of "bad guys" or whatever, it is what we are observably confronted and have to deal with…"

This is exactly what ISTAS10 and its delegates helped to substantiate and bring to light, which supports and confirms (especially the tremendous post World War II work on the political and social implications of an 'unfettered' technology), that the complexity in decision-making is growing as much as our propensity to innovate complex technology is increasing.

REFERENCES

Dikeos, T. (2010, June 15). *The 7.30 Report: The human micro-chip is it going too far?* Retrieved April 18, 2011, from http://www.abc.net.au/7.30/content/2010/s2927784.htm

Fildes, J. (2010, May 26). *RFID chip implanted into man gets computer virus*. Retrieved April 18, 2011, from http://www.bbc.co.uk/news/10159315

Michael, K., & Michael, M. G. (2009). *Innovative Automatic Identification and Location-Based Services: From Bar Codes to Chip Implants*. Hershey, PA: Information Science Reference.

Walters, C. (2010, June 5). The key to the future lies in this man's hands. *Sydney Morning Herald.* Retrieved April 18, 2011, from http://www.smh.com.au/technology/technology-news/the-key-to-the-future-lies-in-this-mans-hands-20100604-xklu.html

Katina Michael (MIEEE'04, SMIEEE'06) holds a Doctor of Philosophy in Information and Communication Technology (ICT) from the Faculty of Informatics at the University of Wollongong, NSW, Australia ('03); a Master of Transnational Crime Prevention from the Faculty of Law at the University of Wollongong ('09) and a Bachelor of Information Technology from the School of Mathematical and Computing Science, NSW, Australia at the University of Technology, Sydney ('96). She is presently an Associate Professor at the University of Wollongong in the School of Information Systems and Technology ('02-'11) in Australia, and has previously been employed as a senior network and business planner at Nortel Networks ('96-'01). She has also worked as a systems analyst at Andersen Consulting and OTIS Elevator Company. Michael has published several edited books, but more recently co-authored a 500 page reference volume: Innovative Automatic Identification and Location Based Services: from Bar Codes to Chip Implants *(Hershey, PA: IGI, 2009). She has published over 90 peer reviewed papers. Michael researches predominantly in the area of emerging technologies, and has secondary interests in technologies used for national security and their corresponding social implications. In 2007, Michael was awarded an Australian Research Council Discovery grant for the project: "Toward the Regulation of the Location-Based Services Industry: Influencing Australian Government Telecommunications Policy.*