# Application for Participation in the Future Wireless Cities Workshop

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I would appreciate the opportunity to participate in the Future Wireless Cities Workshop, as my team is engaged in a number of projects addressing concerns that I believe to be of interest for this workshop community. The Trinity Future Cities research centre is focussed on sustainability – essentially trying to provide a platform for autonomous systems that make decisions to make better use of constrained city resources. The Centre itself is multi-disciplinary (computer science, statistics, information systems, engineering, natural sciences, social science, chemistry, arts, nursing and midwifery, business and law), but as my own research team are computer scientists, it is from that perspective that I write this application. The mission for the Centre is *"supported by the application of sensor, communication and analytical technological solutions to sustainability concerns in urban infrastructure such as energy, water, waste management and transportation systems."*

To date, we have worked with a number of techniques to achieve autonomous systems, including multi-agent systems and adaptive systems. We have applied these to residential energy demand-side management, and intelligent transportation systems, with promising results. We are also exploring challenges in middleware for Internet of Things, with particular focus on the "edge" of the cloud, where mobile devices and WSNs may be both software service producers and consumers, and therefore addressing concerns related to mobility and the resource constraints associated with WSNs. We have also built a platform for citizens to engage with information relevant to the management of the city (e.g., drains are blocked, so there may be a risk of flooding). *In short, our focus is on the edge of the cloud network, using localised, real-time data from mobile devices and WSNs to make better decisions and close the control feedback loop for city resource optimisation.*

Some of the open research questions we are current exploring, and which may be of interest, are:

- How do we efficiently and reliably learn optimal system behaviours in urban-scale dynamic, uncertain environments?
- How do we predict and manage conflicts arising from different stakeholders' goal priorities that change over space and time?
- How do we predict and manage emergent behaviour in interacting city services?
- How do we ensure security with pervasive urban sensing?
- How do we manage unreliable, noisy, intermittently connected, potentially malicious sources of data?
- How do we identify, amongst the vast amount of available data, relevant information for city services?
- How do we balance privacy with pervasive urban sensing?
- How can we provide quality of service guarantees related to large-scale autonomous urban services?
- How do we enable city-scale, reliable context dissemination?
- How do we provide elastic, demand-driven provisioning?

(note: I have also applied to attend the Software Defined Exchange Workshop. Though it would be nice, I do not require funding)