Editorial

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Biographical notes: Michael R. Bartolacci is an Associate Professor of Information Sciences and Technology at Penn State University – Berks in Reading, Pennsylvania, USA. He received an MBA and a PhD in Industrial Engineering from Lehigh University. He is widely published in the area of Telecommunications Modelling including his Connectivity Decision Support System (CDSS) concept. He also conducts research in Electronic Commerce Modeling and the Cultural Aspects of Telecommunications and Information Systems.

Katia Passerini is an Assistant Professor and the Hurlburt Chair of Management Information Systems at the School of Management of the New Jersey Institute of Technology. She has published in refereed journals and proceedings, particularly in the area of wireless telecom business models, computer-mediated learning and knowledge management. Her professional experience includes multiindustry projects at Booz Allen Hamilton and the World Bank. She received both MBA and a PhD in Information and Decision Systems from The George Washington University, USA.

To achieve the next level of innovation, we need to extend our current horizons and start 'thinking outside the box'. In today's highly global economy, ideas are refined by sharing with a broader community of experts who may bring ancillary competencies and different perspectives. In the 'Innovation 1.0' era, sourcing ideas from all over the world where key competencies resided was novel. In this era of 'Innovation 2.0' (and Web 2.0), sourcing ideas from different fields and diverse communities is the new imperative.

The concept of 'interdisciplinarity' is not new by any means and we see signs of it all over the academic and practitioner communities. Many new interdisciplinary programmes are flourishing in various institutions, including our own. Biotechnology, biomedicine, computing and business, and many others are just some examples of upcoming degree programmes. With this issue, we are hoping to extend the attention to interdisciplinarity also in highly technical and specialised fields, such as network design.

We are extremely thankful to the editorial team of IJMNDI for welcoming this Special Issue on 'interdisciplinary aspects of mobile networks design and innovation'. As we reached out to various authors working on these multifaceted aspects through our call for papers, we found a great interest. We hope that this issue can spur additional focus considering these viewpoints when designing and innovating in mobile networks and we hope that the readers will find the papers thought provoking.

In this issue, the reader will find a variety of papers from a wide range of researchers including electrical engineers, operations researchers, computer scientists, management information system specialists, applied mathematicians and others whose expertise spans several of these areas.

The paper from DeRango et al. is an example of how multidisciplinary knowledge and cooperation between different research fields can be important for building the next generation communication systems. The authors argue that these systems will need to achieve levels of complexities and self-regulating capabilities requiring new approaches and solutions. They suggest that these new solutions can be inferred from organic computing and nature inspired techniques, such as neural network, molecular computing, cellular automata, genetic algorithms, epidemic propagation strategies and finally swarm intelligence.

The work by Guardiola and Matis is novel that brings in to question, the validity of a large volume of previous research on ad hoc networks with respect to routing efficiency and network performance. Their work questions the use of additional overhead allocated to procedures and approaches for route discovery and maintenance. The basis of their argument, proved through extensive simulation analyses, is that the presence of fading negates most

efficiency gains achieved in extensive route discovery and maintenance. This work combines electrical engineering concepts with an operations research approach that questions overall optimality.

The paper from Gupta, Paul, Jones and Borcea focuses on applications that leverage existing mobile networks location-aware properties and augment them with group and place properties and information. By monitoring the use of smart-phones by faculty and students which were part of a 'Smart Campus' location-aware network at the New Jersey Institute of Technology, the authors tested an algorithm for Group-Place Identification (GPI) and validated it through a simulation. They demonstrated that GPI can identify about 90−96% of group members (with negligible false positives) when at least 50% of participants to a specific event are in attendance.

The paper from Stewart, Xiaoguang, Schormans and Hasib delves into the use of Wi-Fi technologies (IEEE 802.11x) for multihop networking. Specifically it examines tools and techniques used in monitoring quality of service and traffic factors for such types of networks. In particular, the examination of multilayer protocols is addressed with respect to how they can be utilised in such an environment and their impact on network performance.

The paper from Leong and Chu is an excellent example of the interdisciplinary work in wireless telecommunications network design. Their work takes an operations research-oriented approach in the design optimisation of wireless local area networks. Their novel use of space filling curves, an approach borrowed from 19th century mathematicians with great success for very difficult optimisation problems. The authors of this work apply this approach while optimising across a host of network design objectives dealing with such issues as interference and coverage.

One of the authors from the previous paper, Chu, also is a co-author of the second paper with Gu and Liu. This work deals with the modelling of bandwidth competition in 802.11 (Wi-Fi) networks. In particular, the authors utilise a Markov model to better understand the bandwidth competition problem and then formulate a methodology for prediction congestion. Such modelling is very useful in understanding the nuances of quality of service parameters for a Wi-Fi network serving many users.

The final paper of the Special Issue, by Radev and Lokshina, also uses Markov models, this time for analysing self-similarity of certain types of wireless traffic. This in-depth, mathematically rigorous analysis of the nature of wireless traffic is an example of how academics from the business and technology areas of an institution can conduct research often seen in computer science or mathematics journals. This work crosses the boundaries usually reserved for a niche community of researchers.