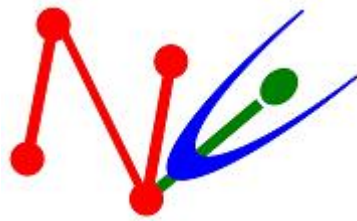


Rince: Network Innovations Centre



[NIC Home Page](#)¹

*Dr. Conor Brennan*², *Dr. Martin Collier*³, *Dr. Jennifer McManis*⁴,
*Dr. Gabriel-Miro Muntean*⁵, and *Dr. Xiaojun Wang*⁶.

The [Network Innovations Centre](#)⁷ (NIC) is one of three major research centres within the [Rince Institute](#)⁸ (a PRTL1 1 funded national centre for excellence in Information and Communications Technology (ICT)).

The mission of the Network Innovations Centre in RINCE is to contribute to the emergence of the next generation of networks and network applications by engaging in relevant research and promoting its findings.

Context

Ever-increasing consumer interest in novel services such as Voice over IP and IPTV fuels the demand for next generation networks offering greater bandwidth as well as better support for real-time services and user mobility, enhanced reliability and integrated/converged network architectures. The development of these networks is supported by continuing growth in computing power, increased efficiency in the exploitation of radio spectrum, and advances in optical fibre solutions, as well as ongoing developments of traditional network technologies.

Key Expertise

The centre staff has significant expertise in switching theory, routing protocols, protocol implementation and network security, quality-oriented and power-aware adaptive multimedia delivery, quality of experience aware adaptive hypermedia systems, performance of wireless and mobile networks, numerical modelling of electromagnetic wave scattering and radiation problems, hardware description languages and low-power electronics.

Postgraduate and postdoctoral opportunities

Energy-efficient networking:

We are hiring a postgraduate student and postdoctoral fellows to work on the energy-efficient design of wired IP networks, as part of the EU-funded ECONET Integrated Project. Further information available from [Dr. Xiaojun Wang](#)⁹ or [Dr. Martin Collier](#)¹⁰.

7. <http://wiki.eeng.dcu.ie/nic/>

8. <http://www.rince.ie>

9. <http://www.eeng.dcu.ie/~wangx>

10. <http://elm.eeng.dcu.ie/~collierm/>

Large-scale interconnects:

We are seeking, in conjunction with IBM, a postdoctoral fellow to work on the design of a large-scale switching system to interconnect supercomputer subsystems. The successful candidate will be recommended to the [IRCSET Enterprise Partnership Scheme](#)¹¹. Further information available from [Dr. Martin Collier](#)¹².

Key Projects

Currently our main research projects are funded by SFI Research Frontiers, Enterprise Ireland Commercialisation Funds (Proof of Concept and Technology Development), SFI Secondary Teacher Assistant Researchers (STARs) Programme, SFI China-Ireland Science and Technology Collaboration Research Fund, DCU-CSC PhD Scholarships and the IRCSET Embark Initiative (postgraduate and postdoctoral).

Current and recent projects include:

- [ECONET](#)¹³ - low Energy CONsumption NETworks FP7 (<http://www.econet-project.eu>)



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- Cross-layer Power Saving Solutions for Multimedia Data Transmission in Heterogeneous Wireless Environments
- Telecommunications Graduate Initiative (TGI) (www.tgi.ie)¹⁶
- Research on Radio Resource Management Technology in Heterogeneous Network
- Cooperative Communication and Resource Management in Cognitive Network
- Network Resource Management of Next Generation Networks
- High Performance Hardware Accelerators for Deep Packet Inspection with Low Power Consumption
- Efficient Utilization of a Heterogeneous Collection of Computer Systems
- Agile Methodologies for the Development of Multimedia Based Interactive e/m-Learning Systems User-Centric Access Network Selection Strategy ([UCANS](#))¹⁷
- Quality-oriented adaptive cluster-based spectrum reuse for multimedia streaming
- Best Route Selection based on Existing Road Traffic Conditions via Mobile Ad-hoc Wireless Networks
- Efficient implementation of large-scale switching networks using a multistage repackable topology
- Prioritised In-Home Adaptive Multimedia-based Service Delivery Scheme
- Prioritised Adaptive Multimedia Streaming Scheme
- Cost-effective Quality-oriented Delivery of Multimedia Content over Heterogeneous Wireless Networks
- Efficient wide band analysis of electromagnetic and acoustic wave-scattering problems
- Efficient integral equation techniques for modelling scattering from complex perfectly conducting bodies
- Wireless Sensor Networks
- Modelling Ultra wide band communication systems with a 3D ray tracing propagation tool
- Performance Optimisation of Components
- Automated Performance Analysis of EJB (Enterprise Java Beans) Application Servers

11. <http://www.ircset.ie/Default.aspx?tabid=58>

12. <http://elm.eeng.dcu.ie/~collierm/>

- High Performance Low-Power Hardware Accelerators for Deep Packet Inspection (DPI)
- Power Efficient Caches for High Performance Network Processors
- Low Power, Parallel Compiler Optimization for High Performance Network Processors
- Performance Optimization Techniques for Caching Mechanism in Network Processors
- Architecture and Compiler Optimization for Power Reduction in High Performance Network Processors
- Energy Efficient Network Processor Design
- Architecture and Compiler Optimization for Power Reduction in High Performance Network Processors
- Research on Optimized Processing in Network Processor Units for High- performance Routers

Selected Academic Linkages

Dr. Koen Van Dongen, Delft University, The Netherlands
 Prof. Alexandra Cristea, University of Warwick, UK
 Dr. George Ghinea, Brunel University, UK
 Dr. John Murphy, University College Dublin, Ireland
 Dr. Liam Murphy, University College Dublin, Ireland
 Dr. Cristina Hava Muntean, National College of Ireland, Ireland
 Prof. Pascal Frossard, L'Ecole Polytechnique Federale de Lausanne, Switzerland
 Dr. Dan Pescaru, Politehnica University of Timisoara, Romania
 Prof. Liu Bin, Tsinghua University, Beijing
 Prof. Wojciech Kabacinski, Technological University of Poznan, Poland

Selected Industrial Linkages

Recent collaborations have involved Eircom, Industria and Vilicom.

Educational/Outreach Programme

The staff from the Network Innovations Centre are involved in a wide range of educational and outreach programmes including:

2nd Level:

- **SFI Secondary Teacher Assistant Researchers (STARs) Programme**

3rd Level:

- **EE552: Broadband Networks** - major focus is on QoS support in networks (Dr. Martin Collier)
- **EE562: Network Programming** - addresses programming issues across all network layers (Dr. Martin Collier and Dr. Gabriel-Miro Muntean)
- **EE545: Data Network Protocols** - reviews basic networking and covers specialised topics in switching, wireless networking, optical networking and queuing (Dr. Jennifer McManis)
- **EE561: Wireless Networks** - covers topics in mobile and wireless networking (Dr. Jennifer McManis and Dr. Gabriel Muntean)
- **EE558: Advanced RF Circuit Modelling** – presents basic concepts from physical layer modelling such as electromagnetic theory, plane waves, reflection from planar boundaries as well as concepts from RF circuit theory (Dr. Conor Brennan)
- **EE540: HDL and High Level Logic Synthesis**– Cover VHDL hardware description language and synthesis algorithms (Dr. Xiaojun Wang)

Summer Internships:

Working in our research labs over the summer months allows undergraduate students to gain research experience.

- **SFI UREKA project - Online Dublin Computer Science Summer School in Ireland** ([ODCSSS](#)¹⁸). The theme for ODCSSS 2009 "Technologies for bridging the digital-physical divide: sensing the environment". Each ODCSSS student is engaged in a research project with a faculty member and mentor which provides them an opportunity to experience research. The selection of interns is highly competitive but we encourage anyone interested in research who is eligible to apply. See the [ODCSSS](#)¹⁹ [website](#)²⁰ for further details.
- **John Holland Scholars** - The main aim of this scholarship programme is to allow second and third year engineering students to gain some experience in how a research project is carried out. Students selected under this scholarship programme work closely with a member of academic staff (and possibly their postgraduate students) or a post-doctoral researcher in agreeing a research topic, designing a solution, and implementing that solution. [link](#)²¹
- **French Interns** – Every year, we host a number of french interns from a number of different universities in our labs at the [Network Innovations Centre](#)²².

Graduate Education:

- **MEng in Electronic Systems - Major in Network Implementation** This Major will prepare graduates for career opportunities in the burgeoning fields of wireless networking, mesh networks, peer-to-peer networking, sensor networks, GMPLS and their successor technologies.
- **IRCSET PhD Scholarships**
NIC hosts a number of PhD students funded by the IRCSET Embark Initiative

Contacts:

- [NIC Home Page](#)²³
- Head of Centre: [Dr. Gabriel-Miro Muntean](#)²⁴
- Research Officer: [Dr. Olga Ormond](#)²⁵

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