



## Fundamentals of RF System Design and Simulation

Dr Rowan Gilmore  
University of Queensland, Australia

Conference Centre  
Technology Park Adelaide  
Mawson Lakes SA

### How to register

Please fill out the registration form overleaf if you wish to register for 1 or 2 courses and/or a field trip to the HFSW Radar site.

### Presenter:

#### Dr Rowan Gilmore

University of Queensland,  
Australia



Dr. Rowan Gilmore is an electrical engineer with thirty years experience working around the world in a variety of design and management positions in several industries. He gained his design experience over a number of years at Schlumberger (Houston), where he developed an RF tool for measurement of oil wells, and at Central Microwave (St. Louis), where he designed and developed numerous linear microwave power amplifiers, as well as oscillators and switching components. Subsequently, while at Compact Software (New Jersey), he was responsible for the development of their software suite of computer aided design tools. He was later Vice President at SITA-Equant (Sydney, Atlanta, London, Geneva), operator of the world's most extensive data network, where he worked with a number of airlines and multinationals on their data telecommunications and IT needs. For the past four years, as the Chief Executive Officer of the Australian Institute for Commercialisation, located in Brisbane, Australia, he has worked on establishing liaisons and facilitating technology transfer between universities and industry. He also holds appointments as Adjunct Professor of Electrical Engineering, and in the School of Business, at the University of Queensland.

### Course Fees

- AU\$ 1122 (register by 1 May 2008)
- AU\$ 1320 (register by 25 Aug 2008)

20% discount will be given if registered for 2 courses during Radar Week

Student scholarships available, please enquire.

### About

#### Fundamentals of RF System Design and Simulation

This course will focus on tradeoffs in designing wireless systems, and show how to seamlessly move between both the circuit and system level in radio transceivers and other RF systems. We do this by looking at typical radio architectures, exploring the design tradeoffs, and simulating at both the circuit and system level. The course treats digitally coded signals in RF and IF components, and explores the compromises that are inherent in the design of a radio transceiver. From the RF perspective, the need to minimize interference from nearby unwanted stronger signals and to allow detection of a desired signal in noise is critical. Avoiding corruption of other signals sharing the spectrum is equally critical. Achieving both together is not so simple! In wireless LAN for instance, tradeoffs made to solve one problem, like multi-path reception, have placed tight constraints on other parts of the system, such as the linearity of the power amplifier.

We will interactively simulate a double super-heterodyne, dual-band radio receiver, as well as multiple components. This provides the opportunity to explore 'what if?' scenarios.

*To benefit most, bring your own laptop computer and, prior to attending, obtain a free trial license of the Visual Systems Simulator (VSS) from Applied Wave Research at [www.appwave.com](http://www.appwave.com).*

### Brief Course Outline

**Introduction to Radio Systems and Digital Communications:** Revision of Coding and Modulation Formats; Baseband Filtering; Typical Receiver System Architectures; Direct conversion, superheterodyne, dual conversion superheterodyne;

**Characterization and Measurement of Receivers:** Noise in Receivers; Selectivity, Sensitivity and Minimum Detectable Signal; Nonlinearities and Third-Order Intermodulation Distortion; Reception in the Presence of Interferers; Dynamic Range and How to Improve It With AGC;

**Characterization and Measurement of Transmitters:** Power and Harmonic Distortion; Spurious Products; ACPR, Spectral Regrowth and Linearity; Efficiency;

**Simulation of a Dual-band Superhet Radio Receiver:** Spreadsheet-based Linear Systems Analysis; Calculation of Sensitivity and Dynamic Range; Systems Simulation; AGC to Increase the Dynamic Range; Effect of Changing the Gain, Intercept Point, and Filtering;

**System considerations for Amplifiers, Mixers, and Oscillators:** Design Tradeoffs between Linearity, Power, and Efficiency; Classes of Amplifier Operation; Simulation of Spectral Regrowth with Different Modulation Formats; Phase Noise in Oscillators; Calculating Allowable Phase Noise from System Specifications; I-Q Modulators and the importance of quadrature.

Further information is available from  
[www.nicta.com.au/radar\\_week](http://www.nicta.com.au/radar_week)

# Registration Form and Tax Invoice\* ABN 62 102 206 173

\*Upon completion of this form, including the relevant payment, this form will become a Tax Invoice.

Please register me for **Fundamentals of RF System Design and Simulation on 10-11 September 2008.**

PLEASE PRINT

Date: \_\_\_\_\_

Title: \_\_\_\_\_ First Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Position: \_\_\_\_\_ Organisation/Division: \_\_\_\_\_

Postal Address: \_\_\_\_\_

Telephone No: \_\_\_\_\_ Facsimile No: \_\_\_\_\_ Email: \_\_\_\_\_

Dietary preference: \_\_\_\_\_

Course Fees:  Early bird fee: AU\$1122 (incl. GST)  
(Register before **May 1<sup>st</sup>, 2008.**)  Full fee: AU\$1320 (incl. GST)  
(Register before **Aug 25<sup>th</sup>, 2008.**)

Please also register me for:

One of the following Radar Week courses on 8-9 September 2008:

- Surveillance Radar Systems
- Signal Analysis Techniques: Time, Frequency, and Spatial Algorithms

Total fees for 2 courses:  AU\$1795 (incl. GST)  
(with 20% discount) (Before **May 1<sup>st</sup>, 2008.**)  AU\$2112 (incl. GST)  
(Before **Aug 25<sup>th</sup>, 2008.**)

- Radar Week Dinner (7:30pm, 9 September 2008).** Cost: AU\$ 120 (incl. GST)
- Field trip to the HFSW Radar site (12 September 2008).** Cost AU\$ 220 (incl. GST)

**Total Amount: AU\$** \_\_\_\_\_

Method of Payment (please tick below):

- Cheque (payable to National ICT Australia Ltd)  
Forward the cheque and a copy of THIS registration form to:  
Anne-Marie Eliseo, Industry Education Manager, NICTA, SPRI Bld, Mawson Lakes Boulevard, Mawson Lakes SA 5095, Australia.

Credit Card: Credit Card No.: \_\_\_\_\_ Expiry Date: \_\_\_\_\_

Visa  Master Card Name on card: \_\_\_\_\_

Amount: AU\$ \_\_\_\_\_ Signature: \_\_\_\_\_  Tick if receipt required

Email address of card holder: \_\_\_\_\_

Electronic Funds Transfer  
**Please advise by email to Annette Van Bramer**  
[annette.vanbramer@nicta.com.au](mailto:annette.vanbramer@nicta.com.au)  
**when payment is made**

BANK	Commonwealth Bank of Australia
ACCOUNT NAME	National ICT Australia Limited
BSB	062 900
ACCOUNT NUMBER	1032 4576
REFERENCE NUMBER	RW0908

**FAX the form to +61 – 8 – 8302 3115 or EMAIL it to [industryeducation@nicta.com.au](mailto:industryeducation@nicta.com.au)**

**Enquiries:** Anne-Marie Eliseo, Industry Education Manager, ph: +61 8 8302 3928, email: [industryeducation@nicta.com.au](mailto:industryeducation@nicta.com.au).

**Privacy Clause:** The above information is being collected by NICTA and will be added to our contact database and will be used primarily to provide you with further information about NICTA events and services. All information is collected, used or disclosed subject to NICTA's Privacy Policy which can be accessed at [http://nicta.com.au/about/nicta\\_website/privacy](http://nicta.com.au/about/nicta_website/privacy). Please tick the box below if you do NOT wish to receive any further mailings from NICTA.

I do not wish to receive any further mailings from NICTA

You can use the following options to access or remove your personal information from NICTA's databases, make a complaint about a breach of privacy or if you have a query relating to NICTA's privacy practices and policies: send an email to [comments@nicta.com.au](mailto:comments@nicta.com.au) or phone NICTA's Industry Education Manager on +61 8 8302 3928.