

## ICS MQRES Mimix Electronics PhD Scholarships

Closing date: 15 April 2007



### Postgraduate Scholarships in Microwave and Wireless Applications

Two full-time Macquarie University Research Excellence Scholarships (MQRES) are currently available to undertake projects supported by Mimix Broadband. The location is Sydney, Australia.

#### **Project 1: Simulation and Design of Low-noise Heterojunction Bipolar Transistor Oscillators**

Postgraduate Scholarships in Microwave and Wireless Applications Radios require stable oscillators and normally use multipliers to obtain the desired frequency. The amount of multiplication introduces a trade off between efficiency and stability, and the introduction of noise causes frequency and phase shifts. Efficient oscillators are often implemented with hetero-junction bipolar transistors. However, it is problematic to simulate the low frequency (1/f) noise in the transistor and hence correctly predict the phase noise that it introduces to the signal. This project aims to develop a model, simulation technique, and extraction procedure for oscillator design.

#### **Project 2: Linearisation of Passive Mixers for Point-to-Point Radio Applications**

Mixers translate communications signals to microwave frequencies for radio transmission. Since a mixer distorts strong signals and corrupts them, signal levels are reduced to preserve their integrity and amplifiers are added to restore levels. The challenge is to produce a linear mixer that will not significantly distort strong signals. This improves cost and efficiency of integrated radio circuits by eliminating the need for extra amplifiers. There are several techniques to be explored, including combinations of transistors, exploitation of symmetric topologies, and application of specific loading impedances.

MQRES scholarships are available to domestic and international students. Applicants should have completed equivalent research qualifications to an Australian undergraduate degree with first class honours in a relevant discipline, such as a Masters degree with substantial thesis component. We are seeking high calibre, suitably qualified Telecommunications, Engineering or equivalent graduates. Early career professionals interested in returning to higher degree studies are particularly encouraged to apply. The MQRES stipend is currently \$A19,616 p.a. tax exempt (2007) and successful applicants may receive a merit based top-up from Mimix Broadband to a maximum \$A30,000 p.a. Tenure is 3.5 years full-time, subject to satisfactory progress with tuition fees will be funded for the scholarship tenure. Additional support for project costs and conference travel will also be available.

Further information regarding the projects, may be obtained by contacting Prof. Anthony Parker, +61 2 9850 9131, [tonyp@ics.mq.edu.au](mailto:tonyp@ics.mq.edu.au), ([www.elec.mq.edu.au/cnerf](http://www.elec.mq.edu.au/cnerf)) or Dr Simon Mahon, +61 2 9956 3355, [smahon@mimixbroadband.com](mailto:smahon@mimixbroadband.com) ([www.mimixbroadband.com](http://www.mimixbroadband.com)).

Application forms are available from the Macquarie University Higher Degree Research Office: telephone +61 2 9850 7987, email: [hdrschol@vc.mq.edu.au](mailto:hdrschol@vc.mq.edu.au), or from the Macquarie University website: [www.research.mq.edu.au/students/scholarships/pages/ics\\_mimix](http://www.research.mq.edu.au/students/scholarships/pages/ics_mimix)

Applications should be forwarded to:

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Higher Degree Research Office  
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