From the Director’s Chair

The impact of QMNC continued to grow in 2012. An important recognition by the University occurred with the announcement that QMNC, together with the Centre for Quantum Dynamics, would form a new Area of Strategic Investment, called Physical Sciences.

This year, 18 new students have commenced their PhD degrees. Welcome to all new PhD students and I hope that you will greatly benefit from the research environment, including the supervision by QMNC members and access to QMNC labs and equipment. We also have a new postdoctoral fellow: Dr Jessica Chai joined us recently to work on a project funded by the State Government and SPTS Technologies. Jessica has been featured under New Starters later in the newsletter.

QMNC has made a significant contribution to this year's success of Griffith University in the very competitive ARC funding schemes. QMNC members have also been successful in internal University funding schemes. The list of successful grant applicants is in the New Grants section of the newsletter. Congratulations and thanks to all grant winners - it is this funding that underpins the vital research activities in the Centre.

Writing these lines as the Acting Director, I would like to acknowledge the role of our inaugural Director, Prof Debra Bernhardt, and to thank her for the work and time she devoted to make the work and life of all Centre members more productive and more enjoyable. I would like to extend a warm welcome on behalf of all QMNC members to the newly appointed Director, Prof Nam-Trung Nguyen who is due to commence in the position on 18 February 2013. The QMNC Board commented that the transition period between Directors had been seamless, and I certainly owe great thanks to Ms Lacey Shaw without whose knowledge and dedication this continuity would not have been possible. Finally, special thanks to all Board members who continue to provide advice and much-needed support to QMNC.

I wish you all great holiday season and a very prosperous New Year!

Sima
Acting Director, QMNC
New Starters

STAFF

*Dr Jessica Chai*

Jessica joined the QMNC in November as a Research Fellow within the Queensland Microtechnology Facility. Jessica’s qualifications include B Engineering (Hons), PhD in Electrical and Computer Engineering and her research interests are as follows:

- Molecular beam epitaxy of thin film compound semiconductors
- Thin film deposition of oxides, nitrides, tellurides, selenides, and antimonides
- Electrical and structural characterisations of thin film semiconductors

Jessica was a postdoctoral research associate in the material science, engineering, and commercialisation program at Texas State University-San Marcos. Whilst there, she worked predominantly on the molecular beam epitaxy deposition and characterisation of tellurides for detector and thermoelectric applications. In her new role, she will be working on the deposition of aluminium nitrides and gallium nitride by MOCVD on silicon carbide. Jessica is located in room 1.05 N74, xtn 58009

STUDENTS

Several new PhD students have commenced this semester and they include:

- Amirhossein Aminbeidokhti (Sima Dimitrijev)
- Hamidul Islam (Peter Johnston)
- Atieh Ranjbar Kermany (Francesca Iacopi)
- Tingting Liu (Xiangdong Yao)
- Neeraj Mishra (Francesca Iacopi)
- Kun Zhang (Greg Hope)
- Shahrzad Seyed Mohammad Shahi (Dzung Dao)

This brings the total number of new students this year to 18 (34 in total).

*We welcome all new staff and students to the QMNC*
Research

Here we highlight some of the recent research activities and achievements in our Centre.

Installation of state-of-the-art equipment

The first Panalytical Empyrean X-ray Diffractometer with a silver-anode tube (22 keV/0.56 Å x-rays) in Australia has arrived at Griffith. This state-of-the-art instrument was funded from a LIEF grant led by Evan Gray. It is equipped with a 1200°C furnace with capillary spinner and will be customised for studying hydrogen storage materials under hydrogen pressures up to 700 bar (70 MPa). The process of getting from the Science 2 loading dock to level 2 of Science 1 was "interesting", involving building a temporary crane inside Science 1 to hoist the 1200-kg diffractometer up one level (see photo below). Installation will be completed within the next few weeks.

Publications

Two papers from the group of UWA colleague Prof Colin Raston, and co-authored by Prof John Dobson, have been used for the front cover illustration of the journal.

- “Shear induced formation of carbon and boron nitride nano-scrolls”, Xianjue Chen, Ramiz A. Boulos, John F. Dobson and Colin L. Raston,, Nanoscale, in press.
Conferences and Meetings

Reports from some of the conferences and meetings attended by QMNC Members:

9th European Conference on Silicon carbide and Related Materials (ECSCRM 2012), Saint Petersburg, 2-6 September 2012

More than 600 attendees from 26 countries participated in this year's conference on Silicon Carbide and Related Materials in St Petersburg, Russia. QMNC, Griffith University, and Australia were represented by three participants: Prof Sima Dimitrijev, Dr Jisheng Han, and Dr Li(Lily) Wang and two papers: “The impact of the surface treatments on the properties of GaN/3C-SiC/Si based Schottky Barrier Diodes” and "Colour chart for thin SiC films grown on Si substrates". In addition to the technical presentations and various meetings, the conference and the exhibition booth by SICC, a new SiC growth company from China provided the opportunity for the QMNC delegation to strengthen the relationship with this emerging but very important company that is likely to play an important role in future developments in the field of SiC electronics.

Towards First-Principles Description of van der Waals Interactions in Complex Materials Workshop, Lausanne, Switzerland, 15 – 19 October 2012

Prof John Dobson and Dr Tim Gould attended this international workshop which was organised by the European organization CECAM (Centre Europeen de Calcul Atomique et Moleculaire). John gave the keynote address entitled "Introduction to Dispersion Interactions in Complex Systems", and Tim gave a talk entitled "Efficiently Going Beyond the RPA".
Student News

Report from QMNC HDR and Student Committee Rep - Tim Webb

This month we had the first HDR Student Seminar and lunch organised by the QMNC HDR Student Committee, which was a great success with about half the HDR students attending.

We will be holding the next seminar in early February. For the next seminar we will need three volunteers, two to present and one to chair the seminar. This is a great opportunity to get some experience in presenting in a no-pressure environment, which will be a great advantage when you are presenting at conferences or your confirmation seminar.

We also have a bush walk through Toohey Forest planned. Watch your emails for details of HDR events in 2013.

I hope everyone has a merry Christmas and a happy new year!

Well done Tim for taking on the role of QMNC HDR Representative, and organising exciting and interesting events for the QMNC HDR students to attend this year

Summer Scholarship Students 2012/2013

Once again, the QMNC offered Summer Scholarships to students who have completed 2nd year or higher in any science or engineering based courses at Griffith University. The following five students were successful and awarded a scholarship to the value of $750 each at the completion of their project.

- Khadija Alsabawi (Jim Webb)
- Tommy Brennan (Owen Jepps)
- Bryce Davies (Faisal Mohd-Yasin)
- Mark Riley (John Dobson)
- Christopher Scott (Owen Jepps)

Congratulations to all these students. We hope that you find the experience interesting and rewarding.

Visit by School of Engineering Students

In conjunction with Dzung Dao, a visit to the QMF by students enrolled in 3313ENG-Precision Engineering and Prototyping was organised and held on 14 September. The students were given a tour of the facility and activities were demonstrated on a rotational basis between four groups. QMF staff led each of the four groups in these activities and positive feedback was received from Dzung and the students after the visit. Special thanks to Dzung for organising this initiative and the QMF staff who assisted.
Congratulations

2012 Academic Promotion Results

Congratulations to the following QMNC members on their recent promotions:

Dr Yuri Anissimov – promoted to Associate Professor
A/Prof Xiangdong Yao – promoted to Professor

Well done Yuri and Xiangdong!

HDR Graduations

Congratulations to Dr Lester Barnsley who graduated with his PhD on 15 December. His thesis is titled “Exchange Bias in Manganese Alloys with Mixed Magnetic Behaviour”. Lester’s supervisors are Prof Evan Gray and Dr Jim Webb.

Also, Darryl Pyle, who completed a QMNC Summer Scholarship in 2011/2012 and subsequently completed honours with Jim Webb this year, graduated with First Class Honours. Darryl has just been offered an APA to undertake a PhD in 2013.

It’s great to see our students progressing onto further study and achieving their goals.

New Grants

Congratulations to the recipients of the following new grants and scholarships:

- Francesca Iacopi (Future Fellowship) “Hetero-epitaxial silicon carbide: enabling wide-band-gap semiconductors on silicon for greener technologies” - $713,328
- Sima Dimitrijev, Alan Iacopi, Debra Bernhardt (Smart Future Research Partnerships Program) “A Silicon Carbide on Silicon Semiconductor Microfabrication Program at the Queensland Microtechnology Facility” - $1,000,000
- Professor Sima Dimitrijev and Dr Jisheng Han (ARC Grant) “Towards Energy-Efficient Lighting Based on Light-Emitting Diodes: The Role of Silicon Carbide Grown on Si Wafers” - $415,000
- Associate Professor Xiangdong Yao and Dr Dongjiang Yang (ARC Grant) “One-dimensional Nanostructured Catalysts for Heterogeneous Catalytic Conversion of Biomass to Furan Derivatives” - $360,000
- Dr Mirko Lobino (ARC Grant) “Lithium niobate integrated quantum photonics for cluster state quantum information with continuous variables” - $375,000
- Dr Philip Tanner et al, (GURIP) “Semiconductor Characterisation Equipment” - $70,000
- Dr Qin Li et al, (GURIP) “Nano Zetasizer - An essential characterisation toolkit for functional materials” - $65,000
Visitors

We have had several visitors to the QMNC including:

- Dr Florentinus Budi Setiawan, Soegijapranata Catholic University, Semarang and Dr Hendi Pratama, State University of Semarang through the Australia-Indonesia Knowledge Exchange Program (Sept)
- Dr Behraad Bahreyni, Assistant Professor and Director, Integrated Multi-Transducer Systems Laboratory (IMuTS Lab), School of Engineering Science, Simon Fraser University, Canada – collaborating with Yong Zhu (Nov)
- Dr Sebastien Lebegue, University of Lorraine, France – collaborating with John Dobson and Tim Gould on a graphene theory/modelling project (2 weeks in Nov)

Longer term visitors to the Centre include:

- Ms Jie Cui, South China Uni of Technology, Guangdong, China (March 2012 to Feb 2013)
- Dr Wenqi Fang, East China Uni of Technology, China (extended to Jan 2014)
- Ms Guo Han, Jilin University, Guangdong, China (July 2012 to June 2013)
- Dr Zhao Jin, Jilin University, Changchun, China (extended to March 2013)
- Dr Dengwei Jing, Xi'an Jiaotong University, China (Aug 2012 to Sept 2013)
- Dr Xiaojun Zhao, Jilin University, Changchun, China (extended to Feb 2013)
- Dr Yuxin Zhao, China Uni of Petroleum, Shandong, China (Sept 2012 to Aug 2014)

Seminars – 2nd Semester 2012

- Assoc Prof Warwick Bowen, Department of Physics, The University of Queensland – “Breaking the quantum limits of sensing in optomechanical devices” (24 July)
- Prof Dongyuan Zhao, Department of Chemistry Fudan University, China – “Synthesis and Applications of Ordered Mesoporous Materials” (24 August)
- Professor Dmitri Golberg, WPI Centre for Materials Nanoarchitectonics (MANA), National Institute for Materials Science (NIMS), University of Tsukuba, Japan – “Diverse "Nanoinorganics" for Various Energy Applications” (3 October)
- Assoc Prof Nam-Trung Nguyen, School of Mechanical and Aerospace Engineering Nanyang Technological University, Singapore – “Microfluidic Technology: Past Developments and Future Trends” (4 October)
- Dr Behraad Bahreyni Assistant Professor and Director Integrated Multi-Transducer Systems Laboratory (IMuTS Lab) School of Engineering Science, Simon Fraser University, BC, CANADA - "Chemical and Physical Sensing with Microresonators" (8 November)
- Dr Sebastien Lebegue, University of Lorraine, France – “Van der Waals forces in solids: semi-empirical and ab-initio calculations” (29 November)

A big thank you to Dr Tim Gould, for taking on the role of QMNC Seminar Co-ordinator, and organising such interesting seminars this year
QMNC Xmas Party

The QMNC Christmas party was held on Thursday 13 December and attended very well by QMNC staff, students, adjuncts and associates. Some photos from the event below. We would like to take this opportunity to wish everyone a very merry Christmas, and a happy and safe new year. We look forward to seeing you all again in 2013.

Merry Christmas and a Happy New Year

Wishing everyone happy and safe holidays