MACQUARIE UNIVERSITY | MQ PHOTONICS RESEARCH CENTRE

# NEWSLETTER

Issue 35 – 14 July 2010

***MQ Photonics Newsletter*** is an informal internal publication of the ***MQ Photonics Research Centre*** <http://web.science.mq.edu.au/groups/mqphotonics/>.
We aim to distribute it by e-mail every 3 weeks. Please send copy to <lizb@physics.mq.edu.au> by 9 a.m. on the due date. **Next due date: Wed 4 August 2010**

## Focal Points

This Newsletter overlaps with a changing of the guard as I step up as the new Director for the MQ Photonics Research Centre. My first duty is to acknowledge and thank Prof. Brian Orr for his vision and considerable energy guiding us through the CORE era and producing a cohesive Centre that continues to go from strength to strength. I trust I can do credit to the foundations he has built. Which brings me to a segue linking to this issue of our newsletter. I note the comments of Nem Jovanovic below referring to praise received at the recent SPIE Astronomical Instrumentation conference for the quality of the Centre presentations, testimony to our culture of practising these talks and a pet interest of Brian's. Members of the Centre have recently received awards for their work, namely Russell Connally's win in the ABC's New Inventors and CUDOS students (and staff) in the OSA's Visualising Optics competition. See below for more detail regarding these. Finally, I look forward to interacting with all of you in my new capacity as Director.

Michael Withford

### Moyal Medal Lecture by Nobel Laureate Bill Phillips – and other events on Wed 4 August …


Macquarie University's Moyal Medal is awarded annually for research contributions to mathematics, physics or statistics, the areas of research of the late Professor José Enrique Moyal (Professor of Mathematics, 1973–77). The 2019 Moyal Medal Lecturer is Professor Bill Phillips (National Inst. of Standards & Technology, Gaithersburg and U of Maryland, College Park, USA), who won the 1997 Nobel Prize in Physics for his work on laser cooling.

◄ **www.maths.mq.edu.au/medal/overview.html**

**http://en.wikipedia.org/wiki/William_Daniel_Phillips** ►

***The Moyal Medal presentation to Prof. Phillips, followed by his lecture, will commence at 11 am on Wednesday 4 August in the Caltex Theatre, Macquarie Graduate School of Management (MGSM).***

**Lecture title:** **Quantum Information: a scientific and technological revolution for the 21st century**

**Abstract:** Two of the great scientific and technical revolutions of the 20th century were the discovery of the quantum nature of the sub-microscopic world, and the advent of information science and engineering. Both of these have had a profound effect on both our daily lives and on our worldview. Now, at the beginning of the 21st century, we see a marriage of quantum mechanics and information science in a new revolution: quantum information. Quantum computation and quantum communication are two aspects of this revolution. The first is highly speculative: a new paradigm as different from today's digital computers as they are from the abacus. The second is already a reality, providing information transmission whose security is guaranteed by the laws of physics. NIST's Laser Cooling and Trapping Group is studying the use of single, ultracold atoms as quantum bits, or qubits, for quantum information processing.

***There will be a catered reception in the E11A Function Room following the Moyal Medal Lecture.***

***We in MQ Photonics are in for a real treat on Wednesday 4 August.*** Not only do we have a Nobel Laureate (who is, moreover, a great communicator) delivering the Moyal Medal Lecture on a topic that is central to our interests, but also our own **Prof. Jim Piper will deliver a LaserFest Sydney Lecture the same evening**. Jim's lecture will be followed by a reception in the Macquarie University Art Gallery (E11A), where a major exhibition of holographic works by internationally acclaimed artist, Paula Dawson, is being staged from 9 July – 1 September: **"Virtual Encounters: Paula Dawson – Holograms"** as a part of LaserFest Sydney. (This exhibition, rarely seen on public display, offers us a unique opportunity to engage with the symbiotic relationship between art and science through Paula Dawson's striking and haunting holograms. More than just a showcase of science meeting art, "Virtual Encounters" is a beautiful interactive experience for all audiences.)

Brian Orr

## LaserFest Sydney

**Virtual Encounters: Paula Dawson Holograms**

**An event of the Macquarie University Art Gallery**

| | |
|---|---|
| When | 16th July to 1st September |
| Place | Macquarie University Art Gallery |
| | **"Virtual Encounters: Paula Dawson Holograms"** is a major survey exhibition highlighting the significant contribution made by the artist Paula Dawson to contemporary new media visual arts practice. Paula Dawson's utilisation of the holographic medium underpins and expands upon — in a visual dimension — the concept of virtual reality. Since Paula Dawson's holograms are rarely seen on public display due to holography's reliance on laser technology to play back the image, the exhibition will attract wide audience appeal whilst also providing a unique experience for viewers.<br>As new media art Paula Dawson's holographic production over the last three decades has earned her an international reputation. The exhibition will embrace holography as a significant force in visual art practice to engender the way we experience time, memory and the everyday presence of living through holographic devices. "Virtual Encounters" will explore the way technology and advanced systems in communication have altered our understanding of 'presence' in real time and space.<br>Additionally, the work To Absent Friends 1988 will be on public display for the first time — a bar restaurant that represents a complex theatre of memory of what happens over time at a New Year's Eve Party. It is the largest hologram showing the greatest depth of field on an international scale. |

## Fresh vistas

MACQUARIE UNIVERSITY
SYDNEY ~ AUSTRALIA

**Macquarie University Research Awards**

**Categories**

Interested parties may apply for the following eight categories:

- Excellence in Research - Science & Engineering
- Excellence in Research - Social Sciences, Business & Humanities
- Excellence in Higher Degree Research - Science & Engineering
- Excellence in Higher Degree Research - Social Sciences, Business & Humanities
- Excellence in External Research Partnership
- Excellence in Research in Sustainability
- Excellence in Commerciaisation of Research IP (post 5 years)

Winners of the Early Career Researcher of the Year will be nominated by the Associate Deans of Research

- Early Career Researcher of the Year

Applications opens: Thursday 1st July 2010 and will close on Friday 30th July 2010

For more details, see: http://www.mq.edu.au/researchawards/

# Publications

## Recently published articles

**David W. Inglis**,

"A method for reducing pressure-induced deformation in silicone microfluidics"

*Biomicrofluidics* **4**, 026504 (2010) (published online 17 June 2010; DOI: 10.1063/1.3431715)

**Abstract:** Poly(dimethylsiloxane) or PDMS is an excellent material for replica molding, widely used in microfluidics research. Its low elastic modulus, or high deformability, assists its release from challenging molds, such as those with high feature density, high aspect ratios, and even negative sidewalls. However, owing to the same properties, PDMS-based microfluidic devices stretch and change shape when fluid is pushed or pulled through them. This paper shows how severe this change can be and gives a simple method for limiting this change that sacrifices few of the desirable characteristics of PDMS. A thin layer of PDMS between two rigid glass substrates is shown to drastically reduce pressure-induced shape changes while preserving deformability during mold separation and gas permeability.

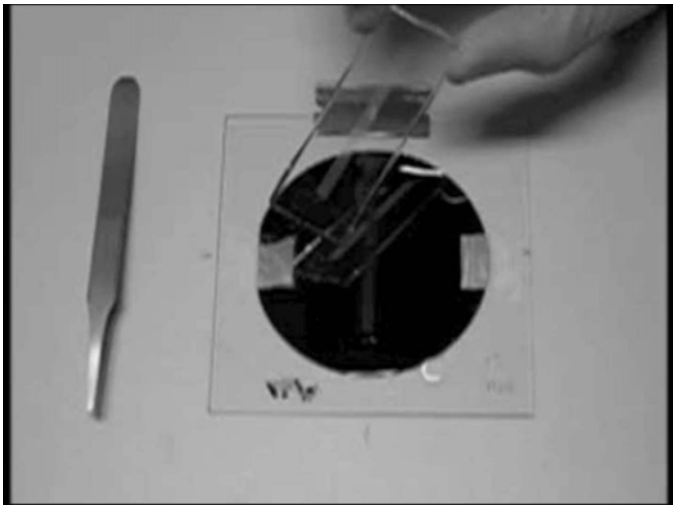


FIG. 3. Still image from video showing fabrication of a glass-PDMS-glass device from a 3 in. silicon wafer master. Visit http://dx.doi.org/10.1063/1.3431715.1 to access the video.

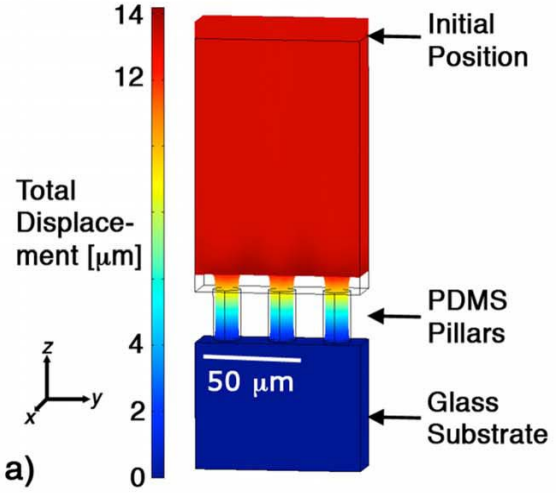
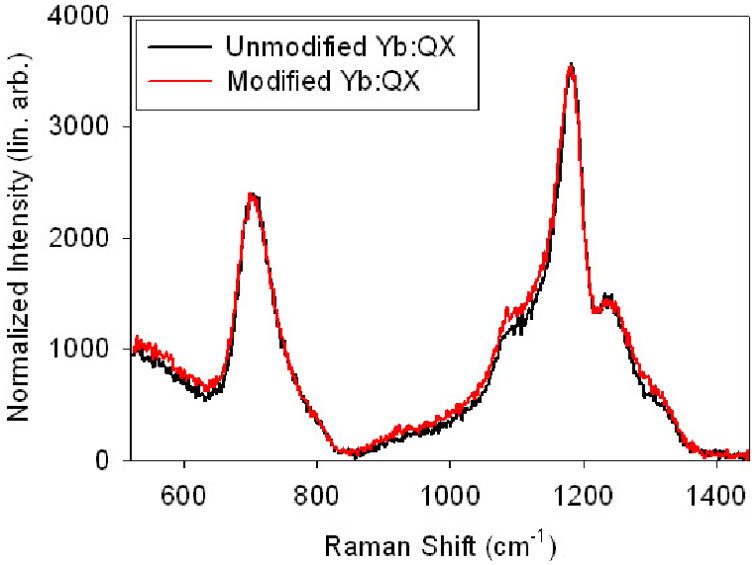



FIG. 4. Results of structural simulations of fluid pressure-induced deformation. (a) The reduced model for the PDMS on glass construction.

**D J Little, M Ams, P Dekker, G D Marshall, M J Withford,**

"Mechanism of Fs-laser Induced Refractive Index Change in Phosphate Glass under a Low Repetition-Rate Regime" *Journal of Applied Physics* (accepted 7 July 2010)

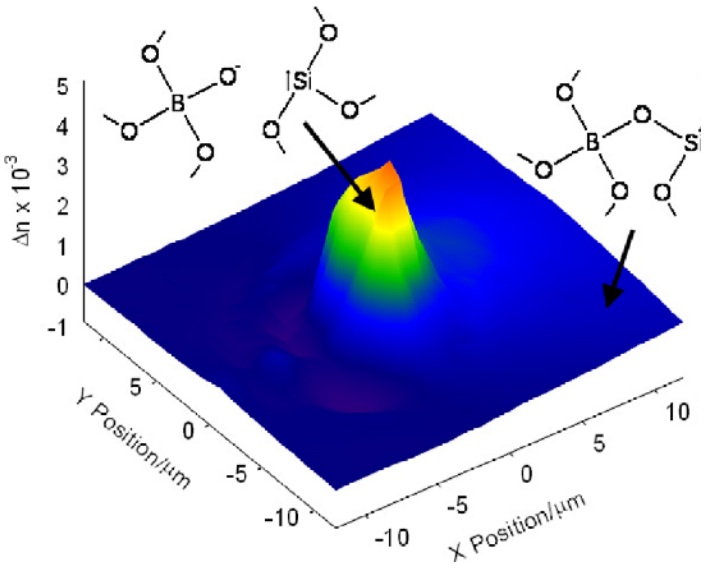
**Abstract:** Raman microscopy and refractive near-field profilometry was used to analyze waveguides written in Yb-doped Kigre QX glass under the low repetition-rate (non cumulative-heating) regime. It was found that fs-laser induced refractive index change was due to an increase in the proportion of Q1 P-tetrahedra and the associated increase in the polarizability of the glass. The role of color center formation and removal in this process is clearly defined, phosphorous-oxygen hole centers (POHCs) and PO3- ions form as a result of P-O bonds being broken during the modification process, and the subsequent removal of POHCs give rise to the increased proportion of Q1 P-tetrahedra. This result, when compared to other studies undertaken in the cumulative heating regime, show conclusively that the mechanism of refractive index change in a particular type of glass can be very different, depending on the irradiation conditions.




Raman spectra of unmodified Yb:QX phosphate glass (black) and Yb:QX modified using fs-laser pulses (red).

**D J Little, M Ams, S Gross, P Dekker, C T Miese, A Fuerbach, M J Withford,**
"Structural changes in BK7 glass upon exposure to femtosecond laser pulses"
*Journal of Raman Spectroscopy* (accepted 5 July 2010)

**Abstract:** A general picture of refractive index change mechanisms in glass modified by a femtosecond laser has proven elusive. In this paper, Raman microscopy was used in conjunction with refractive near-field profilometry to analyze the structure of borosilicate glass (Schott BK7) modified by a femtosecond laser and determine the mechanism of the observed refractive index change. For a pulse repetition rate of 1 kHz, it was determined that the refractive index change was due to an elevated population of non-bridging oxygen atoms, resulting in more ionic bonds forming within the glass network and increasing the molar refractivity of the glass. For a pulse repetition rate of 5.1 MHz, the dominant mechanism of refractive index change was densification and rarefaction of the glass network. Different refractive index change mechanisms were attributed to different thermal conditions imparted to the glass under different pulse repetition rates. Implications for device fabrication are also discussed. These findings constitute an important step toward a complete overview of fs-laser induced refractive index change in glass.




Top: Refractive index profile of a waveguide written using a fs-laser with a 1 kHz pulse-repetition rate (left) and the concentration of B-O- groups in the glass as a function of position along the waveguide cross-section (right). Bottom: Refractive index profile of a waveguide written using a fs-laser with a 5.1 MHz pulse-repetition rate (left) and the local density of the glass as a function of position along the waveguide cross-section (right).

## Conference Presentations

### Recent conferences

Thirteen papers were presented by members of *MQ Photonics* at the BGPP, Sensors and NP sections of the OSA Advanced Photonics Congress in Karlsruhe, Germany:


OSA Topical Meetings

**Five OSA Topical Meetings (ANIC, BGPP, Sensors, NP, SPPCom) collocated with the 2010 Renewable Energy Optics & Photonics Congress**

***More information:***
**www.osa.org/meetings/topicalmeetings/BGPP/default.aspx**

BGPP and NP were co-hosted under the umbrella of the "Advanced Photonics Congress" which was held in Karlsruhe, Germany in late June. There was a strong showing at this congress by MQ Photonics with 9 attendees and many more co-authored papers presented. Stand out talks from Macquarie personnel included Graham Marshall's invited talk which inspired a lot of interest and excitement within the audience, as well as Graham Town's invited talk in the sensing conference. Jens Thomas's talk describing the extensive collaboration on the cladding modes of point by point gratings with MQ Photonics stirred significant interest with a current world leader in that field Jacques Albert. Prof Jacques Albert himself presented an extremely interesting talk on the use of cladding modes of tilted fibre Bragg gratings for sensing applications including temperature/strain discrimination, directional bend sensing, refractive index sensing as well as vibration frequency determination. This was the pick of the talks for me and well worth looking into. Other stand out talks included Dr Martin Wegner's talk on metamaterials, as well as Kumar Patel's talk about detection of

chemical warfare agents with $CO_2$ and quantum cascade lasers.

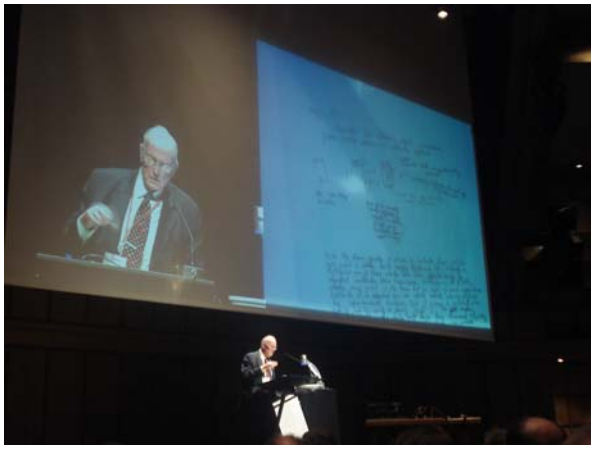
Besides the talks there were many networking opportunities with our colleagues from Jena, Toronto and Potsdam over some traditional Hefeweizen Bier and food as we sat in the beer gardens watching the world cup of football in the evening twilight. The optics-visualized contest was also held at this congress with our entry entitled "Phrame by Phrame Photonics" winning first place in a hotly contested final. Amongst the attendees of the finals presentation were the Nobel Laureates Prof Ted Hänsch and Prof Charles Townes. They subsequently presented two of the most inspirational talks I've ever heard, about how they achieved their successes during their careers. I think its safe to say that most people that were at the talk would agree with me as the clapping lasted several minutes after the talks. All in all the conference was interesting, productive and successful.

Nem Jovanovic

MQ Photonics and collaborators watching the world cup in the evenings.

Nobel Laureates Prof Ted Hänsch giving us a sneak peak at the newly redefined Rydberg constant.


Optics Visualised Contest



Nobel Laureates Prof Charles Townes showing an overhead of the page from his note book where he first proposed a cavity for a laser back in 1954-5.

Nem collecting the prize for the optics Visualized contest.

A second major conference that was attended by *MQ Photonics* members active in astrophotonics of was:

## Observational Frontiers of Astronomy for the New Decade

**27 June – 2 July 2010 San Diego, California, USA**

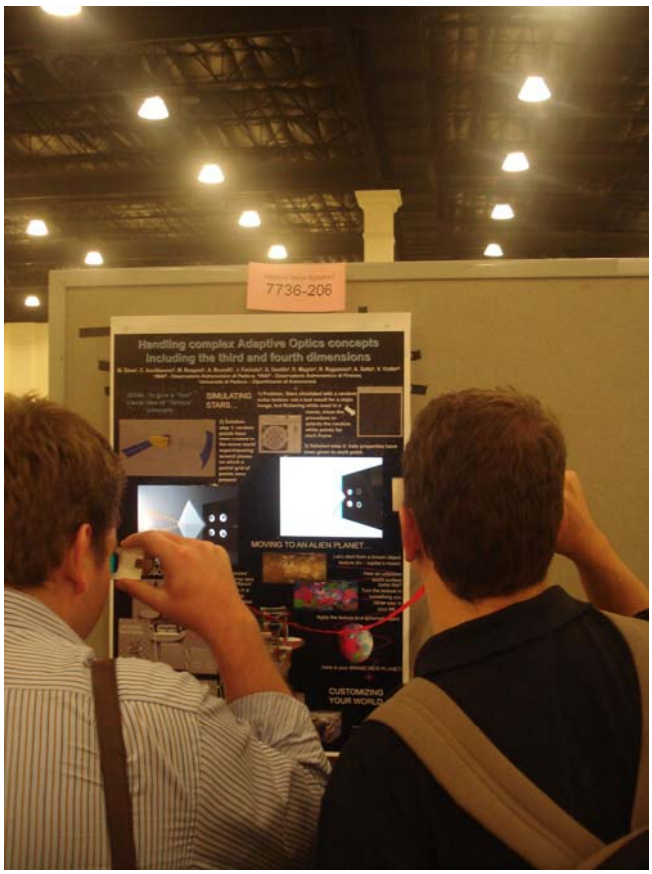
**Twelve collocated SPIE Technical Conferences nos 7731 – 77342**

***More information:*** **http://spie.org/x13662.xml**

This conference was held in San Diego, California in the first week of July. There were 4 attendees from MQ Photonics but 15 co-authored papers presented. This was a typical full on American conference. It started on Sunday morning at 8 am and finished at 5 pm on Friday afternoon with Poster sessions almost every evening till 8 pm. There were many interesting talks about upcoming space telescopes such as James Webb, and large ground based telescopes such as the Giant Magellan Telescope (GMT) and the Extremely Large Telescope (ELT). The talks by MQ Photonics attendees were well attended and several researchers from other institutes approached me personally to point out that the quality of the talks by MQ representatives was not lost on the audience and they even said that they were the highlight talks of the conference! So I guess that practice talks definitely paid off. Much networking was carried out with collaborators from the AAO, Potsdam (including Roger and Dionne), Durham and Grenoble who were extremely excited about the recent progress at MQ Photonics and were interested in further collaborations. A social highlight of the conference was the Jon Lawrence led mission across the border to Tijuana for dinner and drinks were we enjoyed some authentic tequila and the hottest salsa I have ever tried. Finally, I must mention that we saw the coolest poster at the conference. The poster had two cut outs which were windows for two small LCD screens to be placed behind which ran 3D animations of the concepts discussed in the poster. The author gave red/blue glasses to visitors for the full experience. I think this is the future.

Overall, much was learnt from the short course on spectrograph design and the talks, but I think the key feature of the conference was getting to know the key players and collaborators in the field of astrophotonics and the extensive networking with them.

Nem Jovanovic




Coolest poster ever! The poster had two cut outs which were windows for two small LCD screens to be placed behind which ran 3D animations of the concepts discussed in the poster. The author gave red/blue glasses to visitors for the full experience.

Dinner in Tijuana.

## 2010 IPOS SYMPOSIUM – *Biophotonics*

**University of Sydney; 9:30am – 6pm, 1–2 July, 2010**

***More information:*** **http://www.usyd.edu.au/ipos/news_events/events/symposium.shtml**

Several of us from *MQ Photonics* attended the 2010 Symposium of the U of Sydney's Institute of Photonics & Optical Science (IPOS), the first day of which was held in the MacLaurin Hall – a cavernous Gothic building that is not the warmest place in Sydney on a cold winter's day! However, the gathering was warm and cordial, with enthusiastic introductory remarks from the Head of U of Sydney's School of Physics (Prof. Clive Baldock) and NSW Chief Scientist & Engineer (Prof. Mary O'Kane). Profs Ben Eggleton and Simon Fleming then gave an overview of IPOS as it enters its second year of operation. Subsequent plenary speakers were: Profs Demetri Psaltis (Lausanne, Switzerland), Fiorenzo Omenetto (Tufts U, MA, USA), Holger Schmidt (UC Santa Cruz, USA) & Min Gu (Swinburne U of Technology, Hawthorn, Vic) and Drs John Arkwright, CSIRO Div. of Materials Science & Engineering, Lindfield) and Rod Vance (Optiscan P/L, Notting Hill, Vic); their talks focused on selected aspects of biophotonics (notably optofluidics, nano-materials, cell manipulation, and bio-medical imaging, sensing & micro-endoscopy).

Brian Orr

### Upcoming conferences

## SPECIAL NMI SYMPOSIUM – *Barry Inglis Medal*

**10:30am – 12noon, Wed 21 July, 2010 • Lehany Theatre, NMI (National Measurement Institute), Bradfield Road, W. Lindfield**

The Barry Inglis Medal is an annual award presented by Australia's National Measurement Institute (NMI) to commemorate World Metrology Day; it acknowledges and celebrates outstanding achievement in measurement research and/or excellence in practical measurements by an individual (or group) in the fields of academia, research or industry in Australia.

The award is named in honour of Dr Barry Inglis PSM, inaugural Chief Executive and Chief Metrologist of the National Measurement Institute, which was established in 2004.

***The 2010 recipient of the Barry Inglis Medal is Prof. Ken Baldwin of the Australian National University.***

Ken is well known to many of us. He is currently Deputy Director of the ANU Research School of Physics and Engineering, as well as the Deputy Director of the ARC Centre of Excellence for Quantum-Atom Optics (ACQAO). He leads a team engaged in world-class research into the use of precise laser frequencies to characterise and control the motion of atoms, and explore the opportunities represented by this new field of atom optics. He is a fellow of the American Physical Society, the UK Institute of Physics, the Optical Society of America and the Australian Institute of Physics. He has been the recipient of numerous awards including the 2004 Eureka Prize for Promoting Understanding of Science. As President of the Federation of Australian Scientific & Technological Societies (FASTS) in 2008/09, he was a member of the Prime Minister's Science, Engineering & Innovation Council. As above, Ken will receive his medal and give a lecture on 21 July.

***Free entry, but RSVP to jacqui.debattista@measurement.gov.au or 8467 3789 by Friday 16 July 2010. Please contact Brian Orr or Elizabeth Bignucolo for additional information concerning the Symposium.***

Brian Orr

### 2010 Barry Inglis Medal Lecture

### "Precision measurement: How a better understanding of atoms keeps us on time"

### Professor Ken Baldwin (ANU)

Throughout history, improving our ability to measure physical quantities has enabled us to understand the world around us better, in turn leading to inventions that exploit this understanding and improve our quality of life.

One example is the development of the atomic clock, which improved our ability to measure time by orders of magnitude when it was introduced in the 1950's. In those days it was possible to measure time with an accuracy

of 1 part in 1010, now it is possible to do so almost 100 million times more accurately. The development of the atomic clock led to GPS technology which is now a daily part of modern life, and it was via a better understanding of how atoms work that these advances were made possible.

The key theory underpinning our knowledge of atomic structure is Quantum Electro Dynamics – or QED – one of the best-tested theories of modern physics. Because it is so reliable, QED is used to predict the structure of all atoms. We therefore need to probe QED constantly with even more precise measurements, in order to push the limits of accuracy of our atomic clocks and other applications even further.

Helium has a simple atomic structure, and its two-electron configuration makes it an excellent test-bed for probing QED theory with a view to applying the theory in more complex multielectron atoms. This presentation describes the precision measurement of both singlet and triplet states of helium to challenge QED, thus providing a benchmark for future understanding of atomic structure.


***"… the biggest and most diverse scientific meeting of the Australian physics calendar"***

***Key dates:*** ***Time marches on!***

| | | |
|---|---|---|
| ***Call for papers:*** | **Abstract submissions extended to:** | Friday 16 July 2010 |
| ***Registration:*** | **Open:** | Monday 5 July 2010 |
| | **Early bird closes:** | Friday 24 September 2010 |
| ***Accommodation:*** | | Information not available yet |
| ***Congress dates:*** | | Sunday 5 – Thursday 9 December 2010 |
| ***Information:*** | | http://www.aip2010.org.au/ |

## *MQ Photonics* seminars

http://web.science.mq.edu.au/groups/mqphotonics/events/index.htm

Time: 12 – 1:30 pm, Thursday 15 July
Place: E7B 100

***Two seminars (A & B) presented in a single session by German visitors to Prof. Graham Town …***

***Seminar (A):***

SPEAKER: Dipl.-Ing.Tobias Schuster
(Communications Laboratory, Dresden University of Technology, Germany)

TOPIC: **A fiber-optic Surface Plasmon Resonance biosensor**

ABSTRACT: Evaluation of surface plasmon resonances (SPR) is widely used for highly sensitive and selective bio-detection. However, biosensors for modern medical or environmental point-of-care devices are also required to be small, cost effective and easy to deploy. Optical fibers meet these demands due to their compact size, electromagnetic insusceptibility and biochemical compatibility. This talk will outline the operating principle and fabrication of a novel fiber-optic sensor which enables the selective detection of molecular binding processes in minimal volumes. The sensor concept achieves high sensitivity by exciting surface plasmon waves with a single cladding mode employing a long-period fiber Bragg grating.

***Seminar (B):***

SPEAKER: Dipl.-Ing. Rene Landgraf
(Fraunhofer Institute for Photonic Microsystems, Dresden, Germany)

TOPIC: **Low-cost biochemical sensing based on polymer micro-ring resonators**

ABSTRACT: Microring resonators (MRR) are planar optical structures that are today used as filters and multiplexers in optical communication systems. Because of their high sensitivity to surrounding media, which may be

a challenge in communication systems on the one hand, MRR have a high potential as future biochemical sensors for medical diagnostics, monitoring in biotechnology and drug screening devices. Because of their polymer material, simple structure and small size MRR are ideal for low-cost point of care diagnostics. This talk will show results of waveguide manufacturing by direct electron beam lithography and its surface functionalization by low-pressure oxygen plasma. The analysis of surface functional groups with X-ray photoelectron spectroscopy (XPS), chemical derivatization XPS and fluorescence markers is presented. With the development of a microfluidic system further aspects of the sensor system will be discussed.

Time: 12 noon, Thursday, 22 July
Presented by: Prof. Ernst Wintner
Place: C5C 498
(Photonics Institute, Vienna University of Technology, Austria)

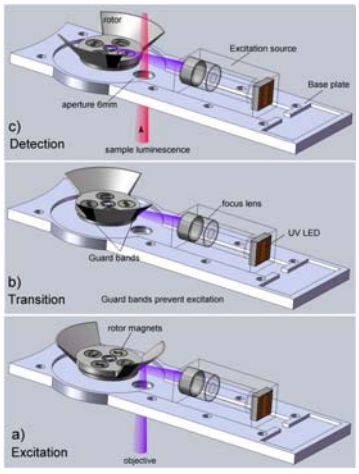
TOPIC: **Laser ignition of internal combustion engines**

ABSTRACT: For many combustion applications, lasers represent attractive potential alternative ignition sources, especially for internal combustion engines. The main advantages are arbitrary positioning of the ignition plasma, the absence of quenching effects by electrodes as well as the possibility of precise ignition timing, and, last but not least, the feasibility of very lean mixture ignition being important for the reduction of $NO_x$ in the exhaust as well as for an increase of efficiency of the engine. In case of an advanced version of operation of internal combustion engines, namely HCCI (homogeneous charge compressed ignition) which represents an interesting alternative to the before mentioned approach of $NO_x$ reduction, the laser allows to stabilize the temporal jitter of the self-ignition which is a central problem of this development. Furthermore, direct injection gasoline engines face an ignition problem due to the malpositioning of spark and fuel spray cone at different loads.

As an ignition beam source, lasers like Nd:YAG with a wavelength around 1µm are most promising. They are generally well developed, reliable and cheap. Laser ignition at such a wavelength is based on the formation of plasma via non-resonant breakdown. To achieve breakdown in e.g. gases under normal pressure, light intensities in the order of $10^{11}$ W/cm$^2$ are necessary. Such intensities become feasible with tightly focused laser pulses having energies higher than 1mJ and pulse durations under a few ns. However, for a safe start of the combustion and for igniting lean fuel/ /air mixtures, pulse energies over 10 mJ are required. The development of an adequate laser spark plug is presented. Furthermore, issues of fiber transportation of the ignition pulses and aspects of the window cleanness are discussed.

## People and Progress

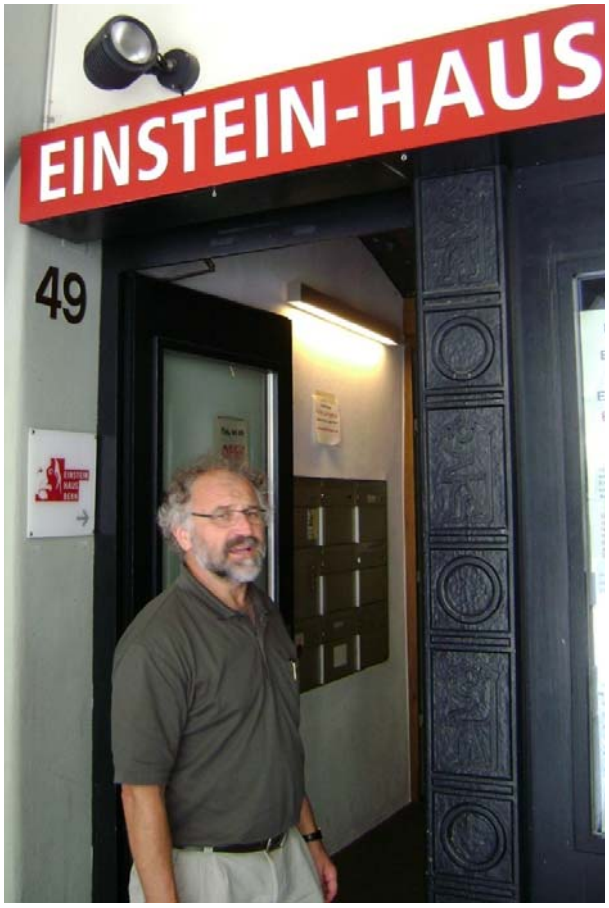
### Russell Connally wins the ABC TV's *New Inventors* contest on 30 June …





In the 2 June issue of the *Newsletter*, we anticipated that *MQ Photonics* VC Innovation Fellow Dr **Russell Connally** would soon be appearing on the ABC "New Inventors" TV programme. Russell has invented a useful cytometry ◄ attachment for a fluorescence microscope: the GALD (Gated Auto-synchronous Luminescence Detector). This invention was featured on Wednesday 30 June and it won both judges' and People's Choice awards. Well done, Russell! If (like me – I was flying back from Canberra) you missed the telecast, you can still see some of the action at **www.abc.net.au/tv/newinventors/txt/s2937438.htm**.

Brian Orr




## Welcome to Prof Martin Frenz

We wish to welcome Prof. Martin Frenz visiting MQ Photonics Research Centre during his sabbatical leave from University of Bern, Switzerland. Prof. Frenz currently holds positions of Head of Division of Biomedical Photonics, and Director of Institute of Applied Physics, University of Bern. Martin will join Optical Biomedical Imaging and Sensing group (head, A. Zvyagin), as a visiting scholar, aiming for broad involvement in the group research activity in the areas of Biophotonics and Nanotechnology. His research interests encompass such diverse fields, as optoacoustic imaging (http://videolectures.net/martin_frenz/), tissue welding, (http://www.iapbp.unibe.ch/), cell manipulation using femtosecond lasers, functional endoscopic imaging, and many others. I am sure Martin will find the Centre environment stimulating and friendly, and, on a broader scale, this visit may serve to bring our international collaborations with Europe on a new level.

This photo was taken in Bern during AZ's visit of University of Bern 2010. Prof Frenz is posing on the doorway to Einstein house in Bern.

Andrei Zvyagin

## Two pictures from the candid camera of Alex Fuerbach in Germany …

**Graham Marshall** ▲, at the BGPP conference in Karlsruhe, engaged in a vigorous discussion with Jens Thomas and Christian Voigtlaender (both of the Friedrich Schiller University, Jena).

In Munich's English Garden, **Chris Miese** ▲ is enjoying his well-deserved "Mass und Schweinshax'n" after a very good and well-received talk at the 12th International Conference on Transparent Optical Networks (ICTON).

## Welcome to Alex Arriola

Alex is a Telecommunications Engineer coming for a cotutelle PhD between Macquarie University and Tecnun - University of Navarra (Spain). He did his engineering thesis project on the "Development of materials and processes for the fabrication of optical waveguides". His PhD project investigates “nanophotonic sensors fabricated with ultrashort pulsed lasers in order to detect neurotransmitters such as GABA and Glutamate” with Alex Fuerbach and Mick Withford.

Mick Withford

## Macquarie OSA Student Chapter

Happily, second place in the LaserFest Laser Graffiti competition was not without its rewards and this week the Student Chapter is celebrating the receipt of a US$400 cheque, to be put to good use in student chapter activities. Also in the last few days the OSA has announced the opening of nominations for its Student Chapter Excellence Award. In recognition of student chapter achievements, the award is given to a single chapter each year that has demonstrated exceptional progress in chapter activities and outreach programmes. With our myriad of projects, activities and schemes, I think we’re in with a strong chance this year.

Laser graffiti and possibly the laser maze will make an appearance in the coming weeks on 28th July for Hornsby Girls’ High School and sometime in August for John Paul College. Each activity will be coupled with the current Paula Dawson holography exhibition in the Macquarie University Art Gallery. More details at physics.mq.edu.au/laserfestsydney.

Finally, registration for the student Konference on Optics, Atoms and Laser Applications (KOALA) ’10 is now open. This is a student conference, organised by OSA student chapters from Australia and New Zealand. This year it is being held at The University of Otago, Dunedin and I would strongly recommend that Macquarie students attend. Beyond it being important to show our support for this event, it’s a conference for students, by students and is an excellent, local forum for sharing information on optics and photonics. The atmosphere is always friendly and there are many opportunities to network with students in both formal and informal settings. I heartily encourage Macquarie students to attend this outstanding optics conference – see poster for registration details. Please note: MQ Photonics is a major sponsor of this event, although the logo has been temporarily omitted from the poster.

Alex Butler