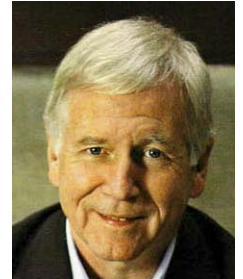


3RD IPOS SYMPOSIUM ENERGY & THE ENVIRONMENT: PHOTONICS SOLUTIONS FOR THE 21ST CENTURY

INVITED SPEAKERS

DR. DAVID MILLS

Dr. DAVID MILLS has worked in non-imaging optics, solar thermal energy, and solar concentrating systems since 1976. Born in Canada, he attended UNSW in Australia during his doctoral program, in which he developed fundamental concentration limits for asymmetrical non-imaging concentrators. Mills later ran the research project at the University of Sydney that in 1991, with colleague Dr. Q-C. Zhang, developed the sputtered double cermet selective absorber coating, now used widely on evacuated tubes throughout China for the production of solar hot water; the company Himin licensed by the University. In 2008 Himin sold 2 million sq. m. of solar water heaters annually, claiming this to be half of world production; this is about 500,000 systems sold at excess of \$200 each, about \$1 billion. Production has since increased substantially.



Mills developed the CLFR solar thermal electricity concept in the early 1990's and in 2002 co-founded SHP in Australia, and in 2006 co-founded Ausra Inc. in Palo Alto California, which received \$130 million in international VC finance. Ausra was voted one of the 20 most innovative companies by Fast Company Magazine in 2008, and won an award for R&D excellence from Frost and Sullivan in the same year. In February of 2010, the startup Ausra was successfully onsold to the huge French Areva conglomerate as its new solar division, called in Silicon Valley the 'first successful cleantech exit after the GFC'. In 2011, Areva Solar became supplier to tenders in Australia totalling 294 MW, including the \$1.2 Billion 250 MW Solar Flagship project 'Solar Dawn', all using the CLFR technology.

Mills is a former president of the International Solar Energy Society (ISES, 1997-99) and served as inaugural Chair of the International Solar Cities Initiative (ISCI). At this time he also co-chaired the International Performance Measurement and Verification Protocol for Renewable Energy in partnership with the U.S. Department of Energy. A solar sterilizer design he originated won a World Health Organization award in 2002, and he was a finalist in the 2002 World Technology Awards for Energy. In 2009 Mills became the first VESKI Entrepreneur in Residence for the State of Victoria in Australia, and gave the Deakin Lecture in September that year. He assisted Al Gore in a report for the Australian Cabinet on solar policy in 2009. He retired from his current position as Areva Solar CSO in June 2010, and returned to Sydney. He is married to Karina Kelly, a well-known former TV science reporter, and they have two sons aged 18 and 14.

Day 1: "Concentrating Solar Power Developments"

DR. MURIEL WATT

Dr. MURIEL WATT is Chair of the Australian Photovoltaics Association. She also holds the position of Australian representative on the Executive Committee of the International Energy Agency Photovoltaics Power Systems Programme, member of the Australian Solar Institute Research Advisory Committee, Head of Energy Policy & Photovoltaics for renewable energy consulting company IT Power Australia and part-time Senior Lecturer in the School of Photovoltaics and Renewable Energy Engineering, University of NSW.



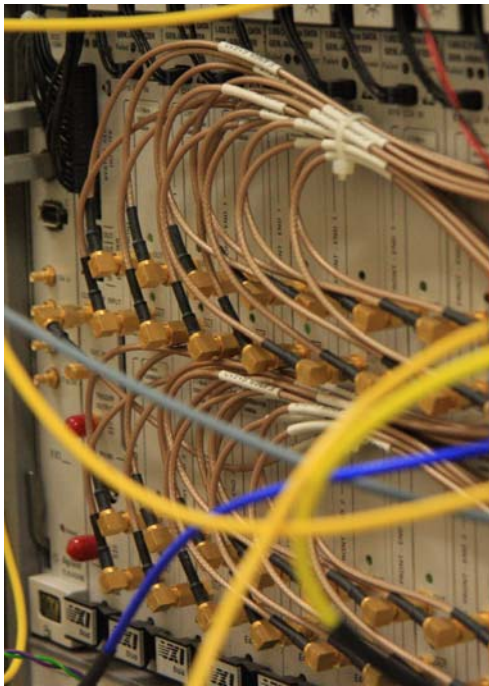
Dr. Watt has worked in government energy agencies, private companies and universities on energy related matters since 1980, with a strong focus on renewable energy research, development, technologies, deployment and policies.

Day 1: "International and Australian Photovoltaics Markets"

INSTITUTE OF
PHOTONICS &
OPTICAL SCIENCE
(IPOS)



THE UNIVERSITY OF
SYDNEY



INVITED SPEAKERS

DR. DAN KILPER

Dr. DANIEL KILPER is Chair of the Technical Committee of the Green Touch Consortium and is a member of technical staff at Bell Labs, Alcatel-Lucent. He received BS degrees in electrical engineering and physics from Virginia Tech and the MS and PhD degrees in physics from the University of Michigan, Ann Arbor. He is a senior member of IEEE and an associate editor for the OSA/IEEE Journal of Optical Communications and Networking. He currently serves as Bell Labs Liaison Executive for the Center for Energy Efficient Telecommunications. While at Bell Labs he has conducted research on optical performance monitoring, network energy trends, and on transmission and control systems for transparent optical networks. He holds six patents and authored three book chapters and 91 peer-reviewed journal articles and published proceedings.



Day 1: "Energy Trends and Challenges in Optical Networks"

DR. MICHAEL LEBBY

In April 2010, Lebby joined Translucent Inc. based in Palo Alto, California to head up the company's R&D efforts to commercialise rare earth oxides for epitaxial based materials that have been developed over the past decade. Crystalline based semiconductor rare-earth oxides exhibit a number of attractive properties for advanced substrate and device solutions that include GaN-on-Si for solid state lighting and power electronics, Ge-on-Si for CPV solar and GaAs based photonics and electronics.



Lebby led the drive for green photonics while heading OIDA in the mid 2000s. The adoption and acceleration of this new discipline has become a significant focus for the photonics industry.

Lebby's career has spanned all aspects of the optoelectronics business ranging from research and development, operations, manufacturing, and finance, to sales, marketing, and investing. Lebby has worked at RSRE for the British Government in the UK, AT&T Bell Labs, Motorola, Tyco Electronics, Intel, Ignis Optics (VC backed start-up that was sold to Bookham - now Oclaro), OIDA, and presently, Translucent.

With more than 180 USPTO utility patents issued in the field of optoelectronics, Lebby has been cited by the USPTO to be in the most prolific 75 inventors in the country from 1988 - 1997. Lebby is a Fellow member of IEEE and OSA, and has testified on behalf of the optoelectronics industry while working for OIDA on Capitol Hill. Lebby has given numerous talks, speeches, panel discussions, and interviews, on the subject of optoelectronics internationally over the past two decades. Lebby has 2 doctorates and a MBA from the University of Bradford in the UK.

Day 1: "Green Photonics Growing Trends over the next Decade"

DR. AL SCOTT

Dr. SCOTT received his PhD in Physics from University of Waterloo. His thesis was "Laboratory Formation and Analysis of Interstellar Dust Analogues".

He is an adjunct professor at York University Centre for Research in Earth and Space Sciences, and president of the Royal Astronomical Society of Canada, Ottawa Chapter.



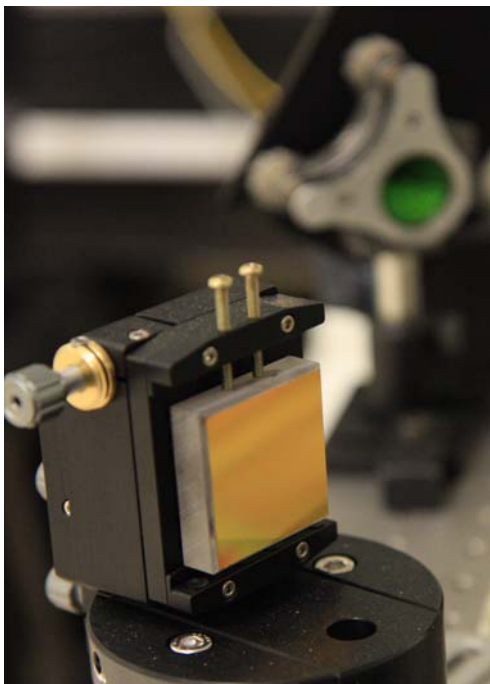
Dr. Scott is currently R&D coordinator for COM DEV Canada, and is leading the development of a new type of integrated optics interferometer for remote sensing of the atmosphere from space.

Day 1: "Space Photonics and the Environment"

INSTITUTE OF
PHOTONICS &
OPTICAL SCIENCE
(IPOS)



THE UNIVERSITY OF
SYDNEY



INVITED SPEAKERS

PROF. MIN GU

Prof. Min Gu holds the Chair of Optoelectronics, is the Director of the Centre for Micro-Photonics (research budget A\$3 m/pa) and a Pro Vice-Chancellor at Swinburne University of Technology. He won the 2002 Swinburne Research Excellence Award and was awarded the University Distinguished Professor in 2003. From 2003, he has also been a Node Director of the Australian Research Council Centre of Excellence for Ultrahigh-bandwidth Devices for Optical Systems. Since 2005, he has been a node leader of the Australian Cooperative Research Centre for Polymers. He was Dean of Science, a Deputy Dean of the Faculty and a member of the University Council.



Day 2: "Nanoplasmonic Solar Cells"

DR. KYLIE CATCHPOLE

Dr. Kylie Catchpole is an Australian Research Council Research Fellow at the Centre for Sustainable Energy Systems at the Australian National University. She has a PhD from the ANU and was a post-doctoral fellow at the University of New South Wales and the Institute for Atomic and Molecular Physics, Amsterdam.



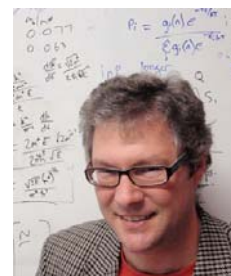
Dr. Catchpole's research focuses on using nanotechnology to increase the light absorption in solar cells in order to make them cheaper and more efficient. In these 'plasmonic' solar cells tiny particles of silver on top of the solar cells act like a TV antenna, directing light into the solar cell where it can be usefully absorbed.

Dr. Catchpole's work on plasmonic solar cells was named as one of the top 10 emerging technologies in 2010 by MIT Technology Review, and she has also been named as one of the '50 Smartest People in Tech' by Fortune magazine as well as being a recent episode winner on the ABC program 'New Inventors'. She has published over 60 papers and her work has also been featured in the news sections of Science magazine and The Economist.

Day 2: "Improving the Efficiency of Solar Cells Using Nanophotonics"

A/PROF. TIM SCHMIDT

Tim Schmidt gained his BSc (Hons) from the University of Sydney in 1998, winning the University Medal in theoretical chemistry. He then studied at Churchill College, Cambridge, gaining a PhD in chemistry from the University of Cambridge in 2001 for work on the femtosecond dynamics of molecules in intense laser field under the supervision of Dr. Gareth Roberts. Postdoctoral work was performed in the group of Professor John Paul Maier in Basel on the electronic spectroscopy of highly unsaturated hydrocarbons of astrophysical relevance.

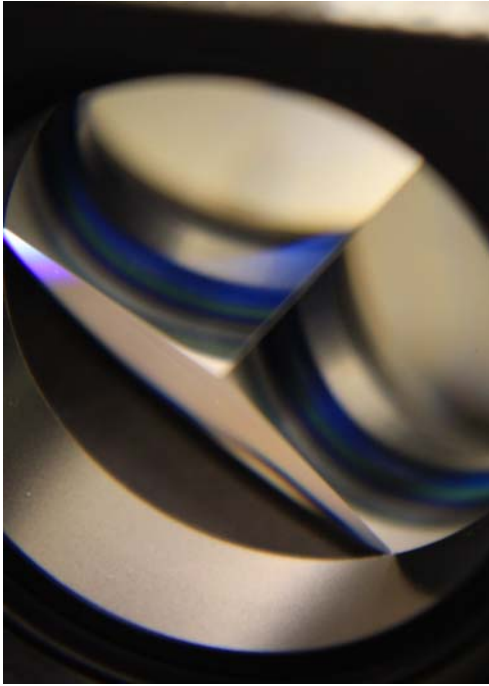


Tim returned to Australia in 2003 to work at the CSIRO (CTIP, Lindfield) on modelling of the rubisco enzyme. He commenced as a lecturer in the School of Chemistry, The University of Sydney in April 2004, and was appointed as a Senior Lecturer in 2008. He was the recipient of the Coblenz Award in 2010 and was promoted to Associated Professor in 2011.

Day 2: "Spectral Management for Photovoltaic Energy Conversion"

INSTITUTE OF
PHOTONICS &
OPTICAL SCIENCE
(IPOS)





INVITED SPEAKERS

PROF. DAVID MCKENZIE

Professor McKenzie is a condensed matter physicist by training and currently holds a Personal Chair in Material Physics in the School of Physics, University of Sydney.

His contributions to optics and energy conversion include the design and development of high performance selective surfaces for solar energy conversion, the development of evacuated tubular solar collectors and contributions to the optics of thin films.

He has also carried out research into medical applications of optics including the development of plastic scintillator dosimeters for radiotherapy that use air-cored light guides.

Day 2: "Optics and the Management of Solar Energy"



PROF. JOHN CANNING

John Canning runs the Interdisciplinary Photonics Laboratories (iPL) within the School of Chemistry. He is a member of the regional experts committee on Latin America for the University of Sydney as well as representing the University abroad in other regions. He has published more than 500 peer reviewed journal and conference papers and more than 30 patents spanning materials, devices, and applications. He established Australia's capability in advanced grating technologies and structured optical fibres, including more recently where he is involved with a newly founded National Fibre Facility at the University of NSW. He was a founding member of the Optical Fibre Technology Centre and the Australian Photonics Cooperative Research Centre and was involved with establishing four spin-offs, including Redfern Optical Components (ROC) and Redfern Integrated Optics (RIO), and has supported a number of others. He was consultant to RIO prior to its departure to the United States (where it is now one of the most successful narrow linewidth laser diode producers for optical sensing and metrology) and to Australian Photonics Pty Ltd where he recommended the hibernation of ROC during the telecom crash in order to preserve world leading technology. Although highly criticised at the time, it was later vindicated by the ongoing success of ROC - as he likes to point out "you know you can't be doing anything worthwhile if there is no controversy!".

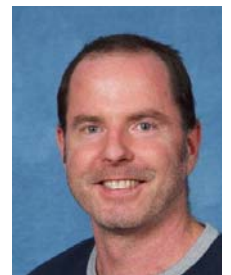
Day 2: "Photonics and the Energy Sector"



DR. STUART JACKSON

Stuart Jackson received the BSc and the BSc(Hons) degrees in 1989 and 1990 respectively from the University of Newcastle (Australia). In 1990, he joined the Centre for Lasers and Applications at Macquarie University to undertake research toward the PhD degree, which he received in 1996. In 1995 he joined the Laser Photonics Group at the University of Manchester and initiated the research there into high power fibre lasers. In 1999 he joined the Optical Fibre Technology Centre at the University of Sydney where he became a Senior Research Fellow and Technical Manager of silica fibre fabrication. In 2009 he joined the School of Physics at the University of Sydney as a Queen Elizabeth II Fellow. Stuart Jackson was appointed Project Leader, Mid-infrared Photonics in CUDOS in 2011. His interests include diode-pumped solid-state lasers, spectroscopy, nonlinear optics and integrated optics.

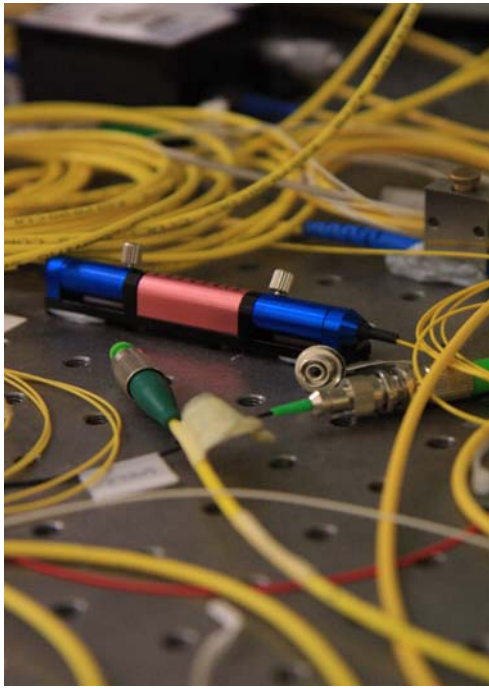
Day 2: "Making Low-Energy Laser Photons Efficiently"



INSTITUTE OF
PHOTONICS &
OPTICAL SCIENCE
(IPOS)



THE UNIVERSITY OF
SYDNEY



INVITED SPEAKERS

PROF. JOSS BLAND-HAWTHORN

Joss Bland-Hawthorn is the recipient of a Federation Fellowship at the University of Sydney where he is a Professor in Physics. He is an Associate Director and a founding member of the Institute of Photonics and Optical Science (IPOS). Joss has over 200 research papers, and is world renowned for his breakthroughs in astrophysics and in instrumentation. In 1986, he obtained his PhD in astrophysics from the Royal Greenwich Observatory prior to taking up faculty appointments in Hawaii and Texas. In 1993, he moved to the Anglo-Australian Observatory where he was Head of a highly successful group that pioneered astronomical concepts with names like WFMOS, FMOS, Nod & Shuffle, Dazle, Starbugs, Honeycomb. Joss has carried out pioneering work on tunable filters, gratings and interplanetary laser communications. In 2002, he proposed the new field of astrophotonics that sits at the interface of astronomy and photonics - in Feb 2009, this field was featured in the Focus Issue of Optics Express. Joss is a recipient of the 2008 Muhlmann Award for experimental astronomy, and a recipient of the inaugural 2008 Group Achievement Award from the Royal Astronomical Society. In 2010, he was the Leverhulme Visiting Professor to Oxford and the Merton College Fellow. In 2011, he was the Brittingham Scholar to the University of Wisconsin, and Visiting Professor (Docente) at the University of Bologna.



Day 2: "Space Photonics: The Next Wave in Space Instrumentation"

PROF. EWA GOLDYS

Professor Ewa M. Goldys holds a Personal Chair in the Department of Physics, Division of Information and Communication Sciences, Macquarie University. Her expertise spans the field of biophotonics, optical characterisation, ultrasensitive detection of analytes, biosensing, bioimaging, materials synthesis and characterisation and cathodoluminescence. Her present projects belong at the interface of materials science, photonics, and biotechnology and she is drawing on her earlier achievements in materials science and ultrasensitive optical characterisation.



With the ARC support she developed advanced methods of synthesis and characterisation of fluorescent nanoparticles for applications in fluorescence labelling. Her advanced expertise in ultrasensitive optical characterisation and nanotechnology leads to the development of novel approaches to biochemical and medical sensing and diagnostics, documented in numerous publications concerning self-organised growth and characterisation of nanostructures. Work in progress focuses on an innovative ultrasensitive surface plasmon resonance sensing system for the application in bioassays capable of sensing ultrasmall volumes. She demonstrated feasibility of the directional two-photon induced surface plasmon-coupled emission and demonstrated that surface plasmon sensing can be done using inexpensive plastic substrates. Her work concerned with metal nanoparticles led to the development of homogeneous silver-coated nanoparticles for their applications in fluorescence enhancement.

Her publication track record includes over 200 refereed publications and a similar number of conference presentations. Her book "Fluorescence Applications in Biotechnology and Life Sciences" was published by Wiley in January 2009. She established the Optical Characterisation Facility and an interdisciplinary Research Centre "MQ BioFocus", both at Macquarie University. Ewa also established and led the ARC/NHMRC Network "Fluorescence Applications in Biotechnology and Life Sciences" (2005-2009) and "Light in Life Sciences Trust". She is a Fellow of OSA.

Day 2: "Core-Shell Plasmonic Resonators with High Purcell Factor: Spontaneous and Stimulated Emission"

INSTITUTE OF
PHOTONICS &
OPTICAL SCIENCE
(IPOS)





INVITED SPEAKERS

DR. CHAD HUSKO

Chad Husko received his M.S. and Ph.D. in Applied Physics from Columbia University (New York, USA) in 2010. While on a Fulbright Fellowship in 2007-2008, he was guest researcher at Thales Research & Technology in Paris, France. In 2009-2010, Chad was a Graduate Teaching Fellow at Columbia University's Center for Technology, Innovation and Community Engagement (CTICE). In 2011 he joined CUDOS at the University of Sydney as a postdoctoral fellow. His research interests are photonic crystals, nanophotonics, nonlinear optics, and chip-scale wave propagation for all-optical signal processing.



Day 2: "Energy Consumption for All-Optical Processing in Slow-Light Optical Devices"

DR. IAN BASSETT

I was awarded a PhD in Chemistry in 1960 by the University of Melbourne, having earlier completed an undergrad degree there. I learned some physics from Wigner's great book on group theory and from Landau and Lifshitz, and hoped to move from Chemistry in the general direction of physics. I was at the University of Bristol Department of Physics (1961 to 1964), at first on a Nuffield Dominion Travelling Fellowship, and at Bristol attended some and gave some post grad lectures and some undergrad tutes and received illumination from Bristol illuminati, including my supervisor Maurice Pryce, and Charles Burch, Charles Frank, and Andrew Keller and the Australian John Malos. I returned to Australia in 1964 to take up a position in the School of Physics at the University of Sydney, initially in the computer department and later in theoretical physics. An interest in light collection for solar energy led to some work in collaboration with Graham Derrick (Sydney University Physics) and Walter Welford (Imperial College Optics Group) on the limits to light concentration by passive means, and following this, election to a fellowship in the Optical Society of America. An impulse to do something useful led me and my friends and colleagues Drs John Haywood, Andrew Michie and Mamdouh Matar to form Smart Digital Optics Pty.Ltd. We were early supporters of Sydney University's Optical Fibre Technology Centre, ably led by Mark Sceats in its most productive years. We have developed what may be the best way to measure electric current, using optical fibre and high speed electronics, with commercial application in high voltage power transmission. We owe much to the support received from Asea Brown Boveri (ABB) in the middle years of our work – we learned from Margareta Bjarme of ABB something of the problems really faced by the power industry. Our work was (perhaps prematurely) recognized by the Australian Institute of Physics by the award in 2002 to John Haywood and me of the Institute's Walsh medal for service to industry. The determining circumstances in SDO's survival and further development may turn out to be Australian Technology Park Innovation (ATPi, our present location), the Chinese market and the Spanish company Artech.



Day 2: "Optical Physics, Interferometry with Intensities Computed in Real Time and a Commercial Venture in High Voltage Power Transmission"

INSTITUTE OF
PHOTONICS &
OPTICAL SCIENCE
(IPOS)



Major Sponsors



Co-sponsors



Technical Co-sponsors

