On 31 March 2010 undergraduate physics students, staff and alumni witnessed a live feed from CERN and learned the latest news about ATLAS and the Large Hadron Collider (LHC). Two of the School’s high energy physicists, Dr Bruce Yabsley and Dr Aldo Saavedra, enlightened the excited gathering as the first ATLAS collision clocked in at 12:58am Geneva time (corresponding to 9:58pm Sydney time) showing the expected large number of charged particles produced in the collision.

The beams were accelerated to the world record energy of 3.5 TeV and once that was achieved (it takes around 40 minutes for the ramping to occur) the beams were stabilised. The next step was to steer the beams so the two overlapped allowing collisions to take place at the interaction points. Dr Saavedra says a new threshold has been surpassed and the next two years should result in a large amount of data. In the ‘new regime’ people will need to find their bearings by measuring well-known physics processes before any hints of new physics can be confidently claimed.

Back in Slade the Sydney PhD students couldn’t hide their excitement and said they can’t wait to get to CERN to contribute to the effort locally.

ISS2009 alumna Paige Miller (seen at left with Dr Karl Kruszelnicki) scored an impressive ATAR of 98.2 earning her a Merit Scholarship to the University of Sydney as well as a residential scholarship to The Women’s College. Now living on campus Paige is enrolled in Bachelor of Science/Advance Maths. Matthew Georgiades, the ISS2009 winner of the Len Basser Prize for Science is also doing well as one of our Physics undergrads. If any other ISS2009 alumni are now at the University of Sydney we’d love to hear from you.

All ISS and Physics alumni updates (no pun intended) are welcome at any time from all over the world. Send Alison Muir your story e: alison.muir@sydney.edu.au

Elaine Sadler (left), an ARC Australian Professorial Fellow and Professor of Astrophysics in the School of Physics at the University of Sydney, has recently been elected a Fellow of the Australian Academy of Science. Distinguished for her work in high energy astrophysics and galaxy evolution Professor Sadler said she was delighted to be a Fellow, “The Academy is a prestigious institution, and to be elected as a Fellow is a great honour for any scientist”.

Professor Sadler’s main research area is galaxy evolution, which is studying how galaxies form and change over cosmic time. Currently she says she is busy trying to learn more about the feedback mechanisms which link the energy output of a galaxy’s central black hole to global properties such as the star-formation rate as well as planning an ambitious new study of distant galaxies which will use the Australian SKA Pathfinder (ASKAP) radio telescope currently under construction in Western Australia.
As a postdoc at Tufts University, Boston, Dr Peter Domachuk and his colleagues had the revelation of using protein to make an optical chip in strip form to monitor health. Two years on and the idea has become closer to the reality of producing a networked interface to the human body that can potentially provide an unparalleled standard of patient care by ensuring correct, efficient diagnosis and treatment without drawing blood or using lab tests. The idea was developed when a colleague’s four-year-old daughter swallowed unknown quantities of different medicines from her grandparents’ medicine chest. Against all odds the little girl survived as she had refused to allow any doctor with a needle near her to obtain a blood sample. “Even if a doctor had been successful in getting a blood sample it still would have taken hours for the results to come through,” says Dr Domachuk who is today based within The University of Sydney’s School of Physics. “By using an optical chip in a strip form on her wrist an accurate toxicology report would’ve been generated almost instantly and in a minimally invasive fashion saving much stress, pain and trauma on the child, her parents and the attending medical staff.” The strips are flexible optical chips combining biochemistry, light, electronics and medicine that plug into, or under, the skin, instantaneously analysing and communicating the torrent of medical information that humans produce. For a while though an appropriate material that had a low-immune response, was robust and able to be used as a platform for biochemistry and optics eluded Dr Domachuk. “My colleagues were researching the refinement of silk protein from the cocoon of the Bombyx mori silkworm (seen below right) for use in artificial ligaments. With a small modification to the refinement process I was able to create strong, clear films of silk protein with favourable optical properties that meet the criteria for making optical chips for health and biological sensing.” Dr Domachuk’s research pioneered manipulation of light on the protein chip and demonstrated silk’s versatility in an optic, patterned to manipulate light based in silk film that contained blood - the optic being used to measure the reactivity of the blood. Not only could the film support human biochemistry on an optic, he and his colleagues then discovered that the films have no immune response when implanted in the body. “That was pretty exciting especially as these protein films can be stamped with structures 1/1000th of a width of a human hair. The combination of human biochemistry and optical devices on a chip made from natural protein is unprecedented,” Dr Domachuk says. By using this protein to make optical chips Dr Domachuk says diagnostic medicine will be transformed, ensuring quicker, more effective and accurate measurements and monitoring, particularly in triage treatment, remote area medicine and military hospitals based in war zones. “This optical chip is not only going to help save lives but will underpin new research into further revolutionary medical technology. This is just the beginning.”

**LORD MAY HONOURS MESSEL**

You can probably tell you’ve had a successful career when a) the organisation you worked for decides to hold a special tribute to honour your achievements and b) when the list of guest speakers post nominals covers most of the alphabet! Professor Harry Messel can certainly be assured that he’s done a pretty good job promoting physics by the calibre of the special guests who will be speaking at Honouring Excellence: A Tribute to Emeritus Professor Harry Messel AC CBE on Thursday 20 May from 6-8pm in The Great Hall, The University of Sydney. With Robyn Williams AM, Presenter, ABC’s The Science Show as MC; HE Professor Marie Bashir AC CVO, Governor of New South Wales, Professor Mitchell Guss, A/Dean of Science The University of Sydney, Dr Barry Jones AO, Professor Lord May of Oxford OM AC FRS (left), Professor Mary O’Kane, NSW Chief Scientist and Scientific Engineer and The Hon Neville Wran AC CNZM QC we hope you’ll join us on this once-in-a-lifetime occasion. RSVP Alison Muir e: alison.muir@sydney.edu.au

**IN BRIEF**

The Science Foundation for Physics within the University of Sydney has launched its winter fundraising appeal. We hope as our alumni and friends you’ll be able to support our important work in science education, trialing and communication. You can make a tax deductible donation to the Foundation online by visiting: http://www.usyd.edu.au/supports_sydney/areas/foundations.shtml