

Contents

- 1. Auckland Chemistry Teachers Support Group Annual report for 2010**
- 2. Report SciCon 2010 Colin North**
- 3. Auckland Chemistry Teachers Support Group Annual report for year 2009**
- 4. Report from Sian Frith, Birkenhead College: ChemEd 09**
- 5. Physics Report 2009**

1. Auckland Chemistry Teachers Support Group Annual report for 2010

The following events were organized in 2010.

1. POGIL Workshop 4-6 pm Monday 29 March - St Cuthbert's College.

Over 30 teachers attended this POGIL workshop presented by Rick Moog from Franklin and Marshall College in the USA who is the principal investigator and project director of the POGIL project. POGIL is one approach that aims to help students build an understanding of scientific concepts while simultaneously building skills such as oral and written communication, problem solving, critical thinking and team work. An in-class activity is developed to help students learn concepts and skills. These involve exploring a model or with a model or task with questions that become progressively more challenging.

The POGIL essentially merges the philosophies of guided inquiry through group learning with individual constructivism and is designed to promote greater student involvement and engagement in their own learning. It uses a 3 phase cycle

- (i) exploration – where students explore a model or task by responding to some critical thinking questions based on resource material
- (ii) concept formation – where in response to questions concepts are identified and understanding is developed
- (iii) application of knowledge - where extended problems require synthesis and the transfer of these concepts to new situations.

Further information can be obtained from the web-site www.pogil.org and the POGIL Instructors guide can be downloaded from <http://www.pogil.org/resources/implementation/instructors-guide>.

At the conclusion of the formal part of the presentation, teachers moved to the staffroom for informal chats over a wine and also had the opportunity to look at recent developments on BestChoice with Sheila Woodgate.

2. Pete Hollamby DIY ICT Workshops

Monday 19 April St Cuthberts College and Thursday 22 April Takapuna Grammar

Pete Hollamby from Wales undertook a tour of the country running workshops on the DIY ICT DVDS that proved so popular at ChemEd 09. Unfortunately the Icelandic volcanic eruption delayed his arrival for almost 2 weeks which meant Ian had to run both workshops (with help from Carol from Taka Grammar) so it was a lot more DIY hands on than originally intended but teachers still got a lot out of the day and certainly appreciated the 4 DVDs of teacher resources they received.

3. NCEA Exam Discussion meeting 7pm Tues 30th November University of Auckland Epsom Campus (the old ACE)

For the first time in over a decade, the 2010 Auckland meeting was a combined effort by ASTA for all science teachers that allowed an initial discussion of the Level 1 Science papers before teachers split into the individual senior science areas to discuss their specialty subject at levels 2, 3 and Scholarship. Unfortunately because of a clash of dates the numbers present were dominated by the large contingent of Chemistry teachers so timing will need to be confirmed earlier this year.

Other activities that were promoted and supported in the Auckland region included:

1. A half day workshop for Science technicians held on Fri 12 Nov at St Cuthbert's College focused on chemistry requirements including extended investigations. This proved so popular a second session was run a week later.
2. A one day practical day on Saturday 25th September for Yr 13 Chem/Schol students run by the University of Auckland Chemistry Department

Teachers can also e-mail me requesting that you be added to the database to receive regular national e-mail newsletters with this sort of information, plus responses to questions about NCEA and curriculum issues and other resources available for chemistry teachers. This is particularly important for any new chemistry teachers in your departments but also highly valued by experienced teachers. ian.torrie@stcuthberts.school.nz

Ian Torrie, Auckland Chemistry Teachers Support group.

2. Report Colin North Scicon 2010

Thanks to ASTA for the support to enable attendance at Scicon 2010. Particular high point from the conference was the lecture by Dr Brian Boyle on the SKA project. His enthusiasm for Science was an ideal way to wind up the conference.

3. Auckland Chemistry Teachers Support Group Annual report for year 2009

The following two events were organized in 2009.

1. Thurs 25th June, St Cuthbert's College.
Presentation by Mary Kirchoff, Director of Chemical Education for the American Chemical Society. Mary talked to about 35 chemistry teachers on aspects of "Green Chemistry" as well as some of the resources available from the ACS.
2. Wed 25 Nov, St Cuthbert's College.
NCEA Exams discussion evening. About 50 teachers contributed to some lively debate on the "quality" of the Level 1 -3 Chemistry NCEA papers for 2009. This was extremely successful and will certainly be run again this year

Other activities that were promoted and supported in the Auckland region were:

Two student days run by the University of Auckland Chemistry department.

Wed 15 April was a hands on opportunity to develop practical skills required by AS 3.1 and 3.2.

Sat 26 Sep was a 1 day seminar for scholarship students although some teachers also took the opportunity to attend.

Two repeat PD sessions entitled "How to make Chemistry easier" were run by Jan and Ian at St Cuthberts on 22 May and 7 Sep and both were fully subscribed.

Finally the major event of the year was the very successful biennial ChemEd conference held in Chch from 5-8 July. Resources from the conference can be freely downloaded from <http://www.chemteach.ac.nz/chemedresources.shtml>

In 2010 so far in conjunction with the NZIC education sub ctte, we are offering:

4 pm 29 Mar at St Cuthberts College: A 2 hour presentation on the POGIL teaching approach.

All day **Mon 19 April** at St Cuthberts College: A 1 day course by a Welsh expert, Pete Hollamby on a DIY-ICT course for Chemistry teachers

Late Term 4 at St Cuthberts College: NCEA Exams discussion evening.

Further details can be obtained by contacting Ian, ian.torrie@stcuthberts.school.nz

Teachers can also e-mail me requesting that you be added to the database to receive regular national e-mail newsletters with this sort of information, plus responses to questions about NCEA and curriculum issues and other resources available for chemistry teachers. This is particularly important for any new chemistry teachers in your departments but also highly valued by experienced teachers.

Ian Torrie & Jan Giffney, Auckland Chemistry Teachers Support group.

4. ChemEd 09: Chemistry on the edge Christchurch July 2009

Report from Sian Frith, Birkenhead College: The abridged version!

As with previous years, I found this conference informative, entertaining and enjoyable. I also came home with a variety of materials that I have used in my classroom teaching and some valuable contacts – which counts as a very successful conference in my view. I would like to thank the Auckland Science Teachers Association for helping to fund my trip to Christchurch.

The conference started with a demonstration of how to use liquid nitrogen by Rudi Jansen of Middleton Grange School. Put one hundred Chemistry teachers in a lecture theatre and show them things that change colour and blow up, and you surely have a recipe for a successful launch!

Keynote Speakers

The conference organisers had brought in four keynote speakers from around the world with an extraordinary breadth of experience. Don Pettit, NASA astronaut, presented a talk which focussed on the frontiers of discovery. Second keynote was Mary Kirchhoff, Director of the Education Division of the American Chemical Society. Mary's talk was titled "Chemistry Education: A journey, not a destination" and she discussed the trends and reforms that are currently evident in Chemistry education in the United States. The third speaker was Peter Hollamby of the University of Cardiff, Wales who described a variety of schemes he is involved in to improve students learning experiences. He is also returning to New Zealand later this year to run a further series of workshops. Peter Atkins from the University of Oxford was given the unenviable task of delivering his talk on the morning after the conference dinner. Many of the audience recognised his name with either fear or fondness depending on their results, as he is the author of the standard undergraduate text "Physical Chemistry".

Workshops

A wide range of workshops was available to choose from, with subjects as diverse as 'Molecular viewing and modelling' and 'What's in a name – possibly DEATH and TAXES!'. Many of the sessions available presented practical demonstrations or practical activities that could be introduced into your classes, from Effective Yr 13 Enthalpy practicals to a well orchestrated demonstration of practicals suitable for Yr 9 and 10 done by three chemistry teachers from the Christchurch region. It was impossible to attend everything of interest due to overlaps in timetables, but many of the presenters have posted their materials on-line at <http://www.chemteach.ac.nz/chemedresources.shtml>

Conference Dinner

As usual, a highlight for many, with the lowlight being the following morning! Thanks to the organisers for putting on a great evening's entertainment, which included a number of quizzes of varying content. The results of the "Chemists Chat-Up Line" competition were eagerly awaited; "Hi, I'm Ian Torrie" came close, but the biochemists won out with the classic "Hi, I'm DNA helicase – can I unzip your genes?"!

Thanks to ASTA for helping fund my trip to a great conference!

ChemEd 09: Chemistry on the edge Christchurch July 2009

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I flew down to Christchurch immediately after the front page of one of the Sunday newspapers included a story of police being called to Auckland Airport to calm tensions arising from JetStar delays – I was hopeful that they were not going to be needed when I got there! The flight was singularly uneventful; the staff were polite, confident and competent, and we touched down a mere five minutes later than expected.

The conference started with a demonstration of how to use liquid nitrogen by Rudi Jansen of Middleton Grange School. Put one hundred Chemistry teachers in a lecture theatre and show them things that change colour and blow up, and you surely have a recipe for a successful launch! Rudi has shown his demonstrations to a wide age-range of students, and I expect that their responses were similar to ours, even allowing for the fact that a number of those among us had seen much of it before. Flowers solidified to a level where they crack into pieces on being touched, a motorcycle inner tube converted to a material with properties akin to a thick clay, a tennis ball that loses all of its bounce, and a piece of bungy cord that becomes so solid it can be hammered into a piece of wood – these demonstrations were an extremely powerful illustration of the way properties of solids could be made to change by changing the temperature of the material. The loudest demonstration involved using a small volume of liquid nitrogen to rapidly inflate a balloon as the liquid turned to gas – and then burst the balloon quite spectacularly! The demonstration that would need the most explaining to students would have to be pouring the liquid nitrogen over an inflated balloon which appears to deflate as the gas inside it compresses; when you gently blow warm air over the surface of the balloon the demonstrator appears to be blowing the balloon up 'from the outside'. These practicals provided a vivid introduction to some scientific concepts that students find very difficult to visualise in their normal experience.

Keynote speaker #1: Don Pettit, NASA astronaut.

Don Pettit presented a talk which focussed on the frontiers of discovery. He has worked on two separate space missions and, at the other end of the spectrum, in searching for meteorites in Antarctica. He described these places as "environments where your intuition does not apply", and certainly his video clips showed examples of what he meant by this. The frame of reference that makes sense in our normal life does not allow these things to immediately make sense – a spinning football on the ice in Antarctica or the bubble



formation when you place an Alka Seltzer tablet in a small volume of water in zero gravity. The wow-factor of Don's talk was the amazing photographs, video footage and time lapse images that he showed us. A photograph that can show the whole of the South Island of New Zealand in a single shot; the changing light as experienced by an astronaut as the sun rises (or sets) in 7.5 seconds; a view of the 90 minute day and night cycle that the astronauts experience in orbit – these were all things of wonder to the earth-bound audience.

The ingenuity of the astronauts was remarkable. They were sick of drinking beverages from 'sucky tubes' (their description, not mine!) – obviously normal drinking vessels are of no use in a zero gravity atmosphere. So they designed a type of coffee cup – made out of some old Perspex – based on the same principles of fluid mechanics used to ensure fuel delivery in the engines of the space craft in a zero gravity atmosphere. Accurate photographic observations of the lights of cities across the world proved problematic due to the speed of the motion of the ISS. They managed to make device using the Imax frame that was on board for recording other material, an extremely powerful Hasselblad lens, an ordinary digital camera body - and a hand drill to control the movement. They also played with their CD players, making CD gyroscopes – each crew member given a CD player while on board. When the CD player is off, they move around the cabin like everything else, very easily pushed off course. However, when CD is playing, there is an increased level of gyroscopic stability, and the CD player stays remarkably still. Having discovered this, they tried taping two players and then three together set at right angles to each other, and ended up with a device that was extremely difficult to move from its stable position! I hope future space travellers are able to be equally inventive with iPods.



Key Note Speaker #2: Mary Kirchhoff, Director of the Education Division of the American Chemical Society.

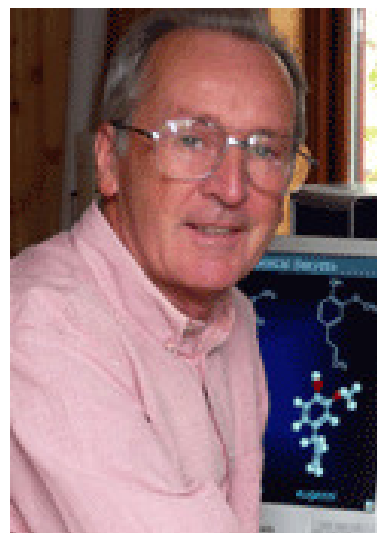
Mary's talk was titled "Chemistry Education: A journey, not a destination" and she discussed the trends and reforms that are currently evident in Chemistry education in the United States. The number of acronyms that she had to work with was fascinating from STEM education (Science, Technology, Engineering and Mathematics education) to UTeach (programme of initial teacher education at the University of Texas) and an offshoot of that same programme UKanTeach (initial teacher education at the University of Kansas!). I found the number of reports being produced quite daunting – there was even a Report on the Reports by Project Kaleidoscope! Mary was able to highlight some issues that face American teachers that we don't have to deal with and some that seemed remarkably familiar. The burden of over-assessment is prevalent

across the world, and one specific example horrified many of the audience. The Bush administration introduced a policy which gained the label "No child left behind". This focuses on literacy and numeracy, and standardised tests in those areas are widely published. Teachers of science classes have had the unfortunate experience of having the principal tell them to stop teaching science and to use this time for Reading or Mathematics, as the kids need to be brought up to speed. It is unsurprising that the policy is known amongst teachers as "No child left untested".

.Key Note Speaker #3: Peter Hollamby, University of Cardiff, Wales

What a small world it is! We seem to say this so often, but my personal coincidence this time was meeting a fellow Welshman who just happened to teach in the same department as my aunt when she started teaching in Wales back in the 1970s. Peter described an innovative programme being run at the University of Cardiff that takes secondary school students into the university research departments for a day and introduces them to some interesting, practical and relevant organic chemistry. For me, the huge advantage that this programme appeared to be that the university had used a Science teacher to direct the programme. As a (retired) teacher, Peter has the connection with high school students that is sometimes lacking with university lecturers and tutors, which allows the students to really benefit from the day they spend at the university rather than watching other people put stuff into machines that do something. The overview of the programme suggested to me that students would walk away with a real sense of achievement in what they had done and also the 'wow' factor that is so crucial if they are to continue to be interested in Science. The success of the programme is evident in the number of students attending; over 600 A Level Chemistry students attended this one-day course in 2008, either in Cardiff or in Bangor (partner site in North Wales). The University are looking at expanding the use of their model into other universities, and it would be great to see if a similar project could operate in New Zealand.

In a hugely generous act, Peter gave all the conference delegates a copy of all of his ICT resources – I still haven't filtered through them, although I am using one of his templates on a regular basis. All he asked of us was to acknowledge the source of the materials. He is also returning to New Zealand in 2010 to run further workshops with Chemistry teachers.



.Key Note Speaker #4: Peter Atkins, University of Oxford

Peter Atkins is a name that many of the remembered with fondness or fear from their university days – his text "Physical Chemistry" is a chemistry undergraduate standard around the world. This is now in its eighth edition and has been translated into many languages. He currently has over 55 books to his name, both specific chemistry texts and science directed at the general public.

Peter was given the unenviable task of delivering his talk on the morning after the conference dinner. He discussed some of the issues involved in teaching chemistry at a wide range of levels, the need for the use of appropriate models and simulations and the value of integrating mathematical ideas as they are needed rather than as abstract concepts that students often find difficult to understand.



Workshops

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5. Auckland Science Teachers Association

Physics Report 2009



109 Physics teachers attended the annual Auckland Physics Professional Development Day at the University of Auckland Physics Department. Held on Friday 27 November 2009 the teachers came from as far south as Hamilton and as far north as Whangarei.

The PD day's programme was varied and commenced with a presentation of new developments in the University's Physics department and the choice of six tours of their research labs.

Shagufta Khan from Epsom Girls' Grammar gave a plenary presentation on "*Sharing Simulations in Physics – Applets, and animations*" which was followed by two 50 minute sessions before and after lunch where teachers could choose from:

"Literacy strategies in Physics" (Terry Devere, Team Solutions) or *"Do we always teach the correct concepts? - Getting the Physics Right"* (Francis Bryden, St Cuthbert's College)

and

"Pedagogy and Testing students' understanding in Physics - strategies for engaging learners and enhancing learning in physics" (Sharra Martin and Kate McKinney, Alfriston College) or *"IYPT – International Youth Physics Tournament to introduce challenges, engagement and excitement about Physics"* (Paul Haines, Kings College).

Finally, the programme was rounded out with a session on "*Sharing good ideas, demonstrations & expts*" and an "*NCEA Physics Update*" by Geoff Gibbs from NZQA.

Overall, participants' evaluations of the day were very positive with some good suggestions made towards making the annual event even better.

Thanks go to Graham Foster who organized the Physics Day, the University of Auckland Physics Department for hosting it, Dave Thrasher (Takapuna Grammar) for burning CDs and Carolyn Haslam and ASTA for providing a scrummy morning tea.

Denis Burchill