Sarah Chapman
Prime Minister's Prize for Excellence in Science Teaching in Secondary Schools

Using a motor race to fuel interest in science

Each year in early July, when its 700 students are on holiday, Townsville State High School becomes the headquarters for one of the races in Australia’s V8 Supercar series. But before and after the race the Year 11 science students are hard at work, slopping their way through the nearby mangroves, and wading into the estuary that borders the school.

They are taking measurements to assess the impact of the race on the surrounding environment. Afterwards, the students report their results and pass them on to the local council and the Great Barrier Reef Marine Park Authority. The data is also assisting a program in which the biology students are collaborating with James Cook University as part of the National Estuary Restorative Study.

“The students are really taken by the idea that they are finding out things nobody else knows,” says biology and chemistry teacher, Sarah Chapman, who is Townsville High’s Head of Science. “The project has already inspired one formerly unengaged student to study marine biology at university.” It also helps students for whom English is a second language to develop vocabulary and communication skills.

Observing the impact of the V8 Supercars is typical of Sarah’s hands-on approach to teaching science. “I like it when science is real. The student of today wants to be able to see and touch, to be engaged with science.”

And her enthusiasm is infectious, spreading not only to her students, but also to the 10 other teachers of her department, local primary school teachers, and out into the community. Her success is there for all to see—an improvement in the pass rates in her biology class from 40 per cent at the beginning for Year 11 to 86 per cent at the end of Year 12, according to her principal, Mr Scott Stewart.

For her contributions to teaching science and inspiring students to continue their studies, Ms Sarah Chapman has been awarded the 2013 Prime Minister’s Prize for Excellence in Science Teaching in Secondary Schools.

Sarah’s love of teaching was not always apparent—even to her. Her father was principal of the state school in Airville, in the Burdekin River Valley near Ayr about 100 km south of Townsville. So Sarah spent the first 21 years of her life living at different schools. She was not particularly attracted by the idea of continuing to do so and, anyway, she was fascinated by science.

Encouraged by her teachers, in particular Mr Kerry Flynn at Ayr State High School, she did a science degree at James Cook University in Townsville, majoring in biochemistry, physiology and pharmacology. She loved it. And, having become interested in the human brain, Sarah continued studying, spending her honours year investigating brain injury. She graduated with first class honours. At her thesis defence, she was complimented on her ability to present information to an audience.

For the next few years, she worked at organising scientific conferences. Part of the job involved reading often complex background material and then outlining what it was about in simple terms both for the conferences and the media. People kept telling her how good she was at explaining science. The idea of doing this every day combined with her background, eventually got the better of her. She decided to give teaching a go.

Sarah does not regret it. “I love seeing kids become inspired by science. For National Science Week this year we ran an astronomy night with CSIRO Education Officer, Rob Hollow. After looking through one of the telescopes, a student I don’t even teach turned to me and said, ‘This is what I want to do for the rest of my life.’”

Sarah’s own inspiration came from her father, Mr Viv Chapman. He taught her for three years in primary school. “He was a real story teller. He had the ability to capture a student’s imagination. I saw a side of him at school that I never saw at home.” And he also passed on to Sarah his hands-on approach to teaching.

For instance, Sarah took a practical investigation designed by a colleague and aligned it with the Australian Curriculum to allow the extension Year 10 students to explore the chemistry of copper extraction and processing. It’s no coincidence that Xstrata Copper operates a large copper ore refinery in Townsville. Although Sarah has not yet sought the involvement of the company, one gets the feeling that it is only a matter of time.

Sarah’s teaching is almost always based on science related to daily life, and very much geared to her audience. The Middle School students, for example, do a series of experiments based around lollies. Among other things, they test the elasticity of jelly snakes and investigate the thermochemistry of chewing gum. And if things don’t turn out as hypothesised, you can always dream about eating your results.

For years, as an extension program in Year 8, Sarah has been encouraging students to become involved in CSIRO’s CREST Program. CREativity in Science and Technology (CREST) is a
non-competitive awards program that supports students in designing and carrying out their own open-ended science investigation or technology project. It has several different levels—blue, green and orange at the introductory level; bronze, silver and gold at the advanced level. CSIRO provides support for the projects.

Sarah has mentored more than 300 students to complete CREST programs up to silver level. This year, 29 Year 8 students, and some at other levels, are involved. Their projects include investigating how to remove the sticky residue of the strapping tape they use during basketball games, testing the effectiveness of shade cloth, and plenty of studies on plants.

Sarah is conscious of removing barriers to learning science as early as possible, and of the difference this can make to teaching science at the earlier stages of high school. She has become involved in the mentoring and professional development of primary school teachers. While she cannot devote as much time to these activities as she might like, she just cannot help herself and designed a range of units for Years 5 to 7. One set of experiments, for example, introduces fair testing to primary kids based on building jelly towers. These fun, messy and creative experiments encourage students to explore, talk about and become involved, literally, in hands-on science.

At the other end of the school learning experience, she works hard at enticing as many scientists and people whose careers depend on a knowledge of science—especially alumni—to come and talk to the students. For National Science Week in 2011, Sarah put together a mega DNA extraction event. She hoped it would be the world’s largest, and even contacted the Guinness Book of Records. Then, drawing on the fact that ABC science presenter Bernie Hobbs had once been a teacher at Townsville High, Sarah asked her to MC the event. Not only did Bernie “have a ball”, but she and Sarah have been in contact ever since, bouncing ideas off each other relevant to both their careers.

Sarah sees awards such as the Prime Minister’s Prize as an opportunity to further such links. “Scientists are rock stars in my eyes. I have attended the PM’s awards dinner before. I didn’t sleep the night before or after.”

Her main way of keeping abreast of what is happening in the world of science is through Twitter (@chapmansar). “I absolutely love it. Lots of my colleagues provide me with information in short snippets.” These often come accompanied by web addresses, so Sarah can check them out for potential use in the classroom.

**FURTHER READING**

- [https://townsvilleshs.eq.edu.au](https://townsvilleshs.eq.edu.au)
- [https://twitter.com/chapmansar](https://twitter.com/chapmansar)

**QUALIFICATIONS**

- 2003 Graduate Bachelor of Education, James Cook University
- 1998 Bachelor of Science (Honours), James Cook University

**CAREER HIGHLIGHTS**

- 2013 Finalist, BHP Billiton Science & Engineering Teaching Awards
- 2013 Committee Member, Science Teachers Association of Queensland
- 2012 Acting District Biology Panel Chair, Queensland Studies Authority
- 2011 – ongoing Head of Department (Science), Townsville State High School
- 2011 Recipient, BP Grants for Schools
- 2011 – 2012 Member, Reef Guardians Consultative Committee, Great Barrier Reef Marine Park Authority
- 2010 Head of Department (Curriculum), Townsville State High School
- 2010 Outstanding Early Career Award, James Cook University Alumni
- 2009 Project Coordinator, The Commonwealth Bank of Australia State Showcase Award for Excellence in the Middle Phase of Learning
- 2009 National Teaching Excellence Award, Teaching Australia
- 2008 Outstanding Teacher of Science, Peter Doherty Awards for Excellence in Science and Science Education, Government of Queensland
- 2007 Grant recipient, Australian Schools Innovation in Science, Technology & Mathematics (ASISTM)
- 2007 – ongoing Curriculum Leader, Primary Connections
- 2007 – 2009 Coordinator, ASISTM Project
- 2006 – ongoing Panel Member, Biology, Queensland Studies Authority
- 2004 – ongoing Science Teacher, Townsville State High School
- 2004 – 2009 Coordinator, North Queensland Student Research Scheme
- 2004 – ongoing Coordinator, CSIRO’s Creativity in Science and Technology (CREST) Program