

Young Tassie Scientists 2004



www.youngtassiescientists.com

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August 14 - 22

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science in
Salamanca
Celebrating art and science

Scientists 2004

introduction

Not all scientists fit the stereotype of a middle-aged male with glasses and a lab coat!

The Young Tassie Scientist program is aimed at raising awareness of the role undertaken by young scientists in different areas of scientific research in Tasmania.

It involves developing profiles of selected scientists and publicising these during National Science Week. Scientists also participate in key National Science Week events and present talks to school groups at both primary and secondary levels.

In 2004, the Young Tassie Scientist program will also involve science/art collaborations with students from the University of Tasmania's School of Fine Arts, who will create artworks inspired by the scientists' research, resulting in an exhibition "eMerging" at Salamanca Arts Centre during National Science Week and the following Tasmanian Living Artists Week. School students are also invited to create artworks based on the science themes; these will form a concurrent exhibition, "eLemental," on display at venues in Hobart, Launceston, Devonport and Burnie.

The Young Tassie Scientist program aims to raise awareness of the value and relevance of science, engineering, technology and innovation; it assists in making connections between studying science and resulting jobs and careers; it helps to build a scientifically literate society - and it celebrates the excitement of science and innovation!

Read about the innovative work of these twelve young Tassie scientists who are not only making progress in their chosen field, but also have fascinating stories to tell.

Go to the Young Tassie Scientist website for more information on the scientists and their research.

Invite a Young Tassie Scientist to come and speak at your school before or during National Science Week (14 - 22 August).

For bookings, contact Fiona Taylor at the University of Tasmania's Faculty of Science, Engineering & Technology
ph: 6226 2845 email:
Fiona.Taylor@utas.edu.au

Involve your class in eLemental, the science art exhibition for school students, and create your own science-inspired artwork (painting, drawing, collage or digital image).

For more information, contact Kim Menadue
ph: 0419 983202 email:
jexsouth@netspace.net.au

Visit the eMerging and eLemental art exhibitions inspired by the work of the Young Tassie Scientists and held during National Science Week (see www.scienceweek.info.au for details of dates and venues).

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Tomas Remenyi BSc-BCom

www.youngtassiescientists.com/tomas

Armed with a double degree in Science and Commerce from Deakin University, Victoria, and with majors in analytical chemistry, economics and management, Tom moved to Tasmania in 2004 to pursue his interest in Antarctica. He is enrolled in Honours at the Institute of Antarctic and Southern Ocean Studies in Hobart. "I am investigating the morphology of foraminifera. These microscopic, single-celled organisms form a shell, similar to snails, and live throughout the world's oceans. When they die, they form fossils in deep-sea sediments and can be

used in palaeoceanography, the study of ancient ocean systems, to identify how widespread sea-ice was in the past or past sea surface temperature." Tom loves both the ocean and the challenge of figuring out how things work; a combination that ties in perfectly with his research project. "I love getting my hands dirty as well as having to think analytically and solve problems." After he completes his Honours degree at the end of this year, Tom hopes to become an oceanographer and travel the world with his research.



Mike Grose BSc, BAntStud(Hons)

www.youngtassiescientists.com/mike

Mike was born in Hobart and has completed a bachelor degree in biological science, an honours degree in Antarctic & Southern Ocean studies, and a Masters degree on Antarctic sea ice at the University of Tasmania. Mike's research has taken him on several marine science voyages to Antarctica. "The trips were really exciting," says Mike, "and a great way to meet other scientists." His Masters work was used to make an improved estimate of the biomass of microscopic plants (algae) contained in the sea ice of the Australian Antarctic Territory. After that project, Mike travelled overseas for a couple of years and has now returned to Hobart to start a PhD investigating the biological production of natural greenhouse gases and ozone deplet-

ing gases in the ocean, and their release into the atmospheric system. Mike has been interested in science from an early age, and got involved through learning from enthusiastic teachers, reading science books and, "...taking an interest in the fascinating world of science history and research."

"All the previous work I have been involved with has happened through meeting science researchers, taking an interest in areas of science research and putting my hand up to become involved," Mike says. "Through meeting people and cooperating with the exciting science community, opportunities to do interesting things become available."



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Tim Jordan BAppSc(Hons)

www.youngtassiescientists.com/tim



Tim attended Riverside High School and Launceston College before completing a Bachelor of Applied Science, majoring in Chemistry. As part of his degree he also spent a semester in Sweden, where lectures were conducted in English just for him. Tim is now a fourth year PhD student, investigating air pollution. "At high school chemistry just clicked for me," says Tim. "At uni, I enrolled in applied science and did an undergraduate project on industrial emissions at Bell Bay. From there I got into air pollution, which is a major problem in Launceston, especially from wood heaters." His

research involves regular travel to the Australian Nuclear Science and Technology Organisation in Sydney (yes, that's where the nuclear reactor is) to measure radiocarbon levels in airborne particulate matter to determine fossil versus wood heater contributions. For Tim, one of the best things about his applied science degree is the way he's been able to combine his love of the environment and wilderness with his work, and the opportunities for travel and work overseas.

Nina Hamilton BEnvDes

www.youngtassiescientists.com/nina



Little did Nina's ancestors know, when they arrived in Tasmania six generations ago, that their ambitious great-great-great-grand-daughter would seek a career in the male-dominated world of architecture. Nina is completing her Masters degree in environmental design, a discipline that brings together science, technology and art. She is investigating how architectural design can enhance buildings to fit with the characteristics of Tasmania's wilderness; her case studies include visitor facilities at the Bay of Fires, Mt. Wellington, and Lake St. Clair. During her degree, Nina has also

worked as a volunteer for the United Nations Development Program in India, looking at how to construct disaster-resistant buildings after cyclones wiped out coastal villages in 1999. Nina hasn't always been so certain of her career path though—after completing her bachelor's degree she opted to take two years off and worked in a CD shop in Launceston, before returning to start her postgraduate degree. She now hopes to find employment in architecture teaching or journalism and would also love to return to project work in India.

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Claire Trenham BSc

www.youngtassiescientists.com/claire

Claire grew up in Kettering, south of Hobart, and went to Woodbridge District High and then Hobart College. "Woodbridge was a small school with about 40 students per grade," say Claire. "I actually found starting college a bigger challenge than starting uni." But she excelled in science and maths and her teachers encouraged her to continue her studies doing either engineering or science at tertiary level. "I was always interested in how things worked, colours and prisms, crystals and flames. All sorts of things you look at and think 'I wonder why?' as a kid." At university, Claire enrolled in

a BSc and majored in mathematics and physics. She is now doing her Honours year in mathematics. "My thesis topic is the mathematical modelling of chemical combustion, so there's a bit of chemistry thrown in too," Claire says. "I find the applied maths, such as calculus, chaos (related to my project) and fluid mechanics, the most interesting. In these subjects I see the direct application to 'real life' and learn how to solve the problems that nature throws up at us when we don't understand them intuitively, particularly chaos!".



Cameron Potter BE(hons)

www.youngtassiescientists.com/cameron

Cameron Potter's PhD combines two highly technical topics - artificial intelligence and renewable energy. The University of Tasmania student, who already holds a degree in communications engineering and gained honours in power engineering, is investigating the use of artificial intelligence to ensure optimal performance by hydro and wind power generation systems. "In the world there is a rising demand for power," says Cameron. "As resources run low, the world is looking for new and environmentally friendly solutions to power generation." Cameron is working closely with the university, due to its high level of expertise, and Hydro Tasmania

to develop a system to enable better wind prediction for a more stable power system. He believes that the answer could lie in artificial intelligence. "Artificial intelligence allows you to control and model things that are extremely complex," he says. "No-one has used this method in wind forecasting before; instead they've used mathematics, rules and breeding solutions." One type of artificial intelligence technology system is looking promising for forecasting in power systems is the Adaptive Neural Fuzzy Inference System. "This system's not without its drawbacks, but I believe my research into this technology can greatly benefit Hydro Tasmania."



Scientists 2004

Denis Visentin BSc (Hons)

www.youngtassiescientists.com/denis



Denis is a native Launcestonian who enrolled in Engineering at UTAS. But before long he realised his real interest was physics, so he switched degrees and completed a Bachelor of Science. "I've always been interested in the fundamentals, and found physics a fantastic way to understand the world," says Denis. For his Honours year, Denis became involved in computational modelling, which in turn led to his PhD project: numerical modelling of proposed controlled fusion reactors. Sounds tricky, but to you and me it's developing theoretical models of confined plasmas under magnetic

fields and performing computer simulations. The results from Denis's research will help to determine whether novel reactors are feasible and whether existing reactors in the USA can use the new technique. "Fusion is 'Big Science', it's a multi-billion dollar project worldwide and, if feasible, will revolutionise our world. It's amazing to think that one researcher in Tasmania with a PC can make a valuable contribution. You don't need huge resources to tackle these problems." It's a big world out there with even bigger possibilities.

Will Bignell BAgrSc (Third Year Student)

www.youngtassiescientists.com/will



A seventh-generation farmer, Will has a solid background in traditional farming, but he also has a passion for developing new crops and enterprises. Will first experimented with wasabi, as part of a Grade 12 assignment. He is now exporting a limited supply of the product to top Australian restaurants while completing his third year of an Agricultural Science degree at UTAS. Will decided to try growing it aquatically because the water on the property was similar to traditional growing sites in Japan. The initial aquatic bed was approximately the size of a large speedboat and worked reasonably well till a water supply issue killed the crop. "I also

carried out nutrient deficiency trials, researched the use of hormones to break seed dormancy and investigated bed designs." Will says. Will but he believes he has "designed a good system to grow wasabi, I just need to graduate and carry out further study travel, which will include some time in Japan." Will sees a lot of career opportunities for himself and other agricultural science students. "Agricultural Science is not about how to gather sheep or plough a paddock quicker. It's more to do with the collection of cutting edge science and then applying it to develop more sustainable production systems."

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Lydia Turner BAgSc(Hons)

www.youngtassiescientists.com/lydia

Lydia spent the first nine years of her life overseas and has lived in Tasmania ever since. Her family is based on the NW coast and she has just moved back there with her husband after completing her degree in Agricultural Science at the university in Hobart. She is now half way through a PhD, investigating pasture crops at the Cradle Coast Campus. Her project is investigating the physiology and management of two different perennial grass species and to assess their suitability for the dairy industry in southern Australia. "In the Tasmanian dairy industry today, pastures primarily consist of one perennial grass species, widely regarded as the "best" for the industry. It is likely that other species will prove to be appropriate

alternatives in terms of agronomic potential, particularly under dryland management, that is, without a lot of irrigation," Lydia says. Her research is field or glasshouse based, with associated laboratory work, and each experiment takes from four months to over a year to complete. "At school it never crossed my mind to consider Agricultural Science as a career, but two weeks of work experience in the Primary Industry Placement Programme with a leading pasture agronomy researcher showed me it was a promising option and I haven't looked back," Lydia says. As a 'researcher in training' I love the fact I can find out new things that will really benefit farmers, not only on locally, but potentially on an international level."



Corinne Jager BSc(Hons)

www.youngtassiescientists.com/corinne

Corinne grew up in Dover, south of Hobart, where she went to the local high school before moving to Hobart for college and then to university. By third year, Corinne was hooked on plant science, which became her major, followed by honours in genetics. "I became interested in research when I took the plant science research project as a third year course and enjoyed the hands on aspect and the freedom of organising my own work," Corinne says. She is now in the last year of her PhD in plant science, investigating how plant hormones interact to affect plant growth and development. To extract the hormones, Corinne grinds and filters plant tissue and then analyses the samples using chromatography

and mass spectrometry. She also uses radioactive labelled hormones to determine how and where the hormones are moved and metabolised throughout the plant. "One of the great things about science is that there are so many areas that you can work in, many of which you are unaware of during school. I love that I am studying something as basic as plant growth, yet so much is still unknown, so all my findings are new and exciting," Corinne says. The only other similar research to Corinne's is carried out overseas, so there are great opportunities for her in networking and travel. Corinne believes that scientists are very important people because they are behind the majority of breakthroughs in our society.



Scientists 2004

Paul Armstrong BAppSc(Hons)

www.youngtassiescientists.com/paul



Paul's youth was spent in Launceston and, in grade five, his dad presented him with his first fish tank. "I kept heaps of fish as a kid," he says. It is therefore not surprising to find that Paul has ended up linking his scientific interests to the aquaculture industry. He is two years into his PhD looking at the links between nutrients and phytoplankton blooms in the Huon estuary – particularly around aquaculture areas. The Huon Estuary is the major area for salmon farming in Tasmania. His PhD is being done through the School of Aquaculture in Launceston, and CSIRO Marine Research in Hobart.

Paul finds the environmental aspects of science particularly interesting, and believes his outdoor interests – he is a keen bushwalker, surfer and snorkeller – have led him to working in science. Paul particularly enjoys the field work involved in the science he does. "I like to get out there and see what is going on," he says. Paul finds the challenges of working in science, the variety of things he is able to do, and the problem solving nature of his work enjoyable. He spends time in the laboratory, has recently just finished his field work and is now in the process of writing chapters of his thesis.

Cassandra Saunders BBiomedSc

www.youngtassiescientists.com/cassandra



A fascination with the complexity of the human body has motivated Cassandra Saunders as a student, researcher and tutor in human life science. Cassandra completed a Bachelor of Biomedical Science at the University of Tasmania in 2003 and has recently completed her honours degree (first class honours) in biomedical science while working as a researcher and a tutor in molecular biology and metabolic biochemistry. "Knowing that there is so much to be discovered keeps you motivated and inspired. I would be thrilled to make a groundbreaking discovery at some point in the future," she said. Cassandra's honours research project focuses on tachykinins and chilli receptors in the rat urinary bladder and lumbosacral

spinal cord, which play a pivotal role in the process of micturition, or urination. A large proportion of sensory fibres innervating the urinary bladder have recently been found to be susceptible to the actions of capsaicin, the pungent principle in Mexican red peppers, which may aid in the treatment of a common urological complaint known as detrusor hyperreflexia. "I'd like to go back into the University institution as a lecturer in the future so that I can inspire others and help to train the next generation of scientists," she said. "Australia is at the forefront of medical research so it is a great place to work if you're passionate about this area of science."

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elemental: student artworks exploring science

August 14-29 2004

Invite a Young Tassie Scientist to visit your school. Create a 2D artwork based on their work. Selected artworks will be exhibited at Salamanca Arts Centre, the University of Tasmania, the Imaginarium Science Centre and Burnie Civic Centre during National Science Week and Tasmanian Living Artists Week. elemental will be exhibited simultaneously with eMerging, an exhibition by University of Tasmania Arts School also inspired from the research of the Young Tassie Scientists.

Scientific Themes:

Exploring the Oceans:

- Tomas Remenyi (IASOS, Hons, Hobart) Forams & past sea ice distribution.
- Michael Grose (IASOS, PhD, Hobart) Cape Grim phytoplankton.

Saving the Environment:

- Tim Jordan (Chemistry, PhD, Launceston) Air pollution from wood heaters.
- Nina Hamilton (Architecture, Masters, Launceston) Architecture and wilderness.
- Claire Trenham (Maths&Physics, Hons, Hobart) Modelling chemical combustion.

Generating Energy for the Future:

- Cameron Potter (Engineering, PhD, Hobart) Wind/power forecasting using artificial intelligence.
- Denis Visentin (Computing, PhD, Launceston) Modelling to demonstrate nuclear fusion.

Discovering How Plants Grow:

- Corinne Jager (Plant Science, PhD, Hobart) Hormone interactions in peas.
- Lydia Turner (TIAR, PhD, Burnie) Pasture species in dairy industry.
- Will Bignell (Ag. Science, 3rd year student, Hobart) Growing Wasabi.
- Paul Armstrong (Aquaculture, PhD, Hobart) Plankton blooms

Investigating the Human Body:

- Cassie Saunders (Human Life Sci, Hons, Launceston) Chill receptors.

Artwork Guidelines:

- Size: at least A3
- Paper: mounted on thick cardboard
- Style: 2D image, painting, drawing, collage, digital image
- Subject: must be based on the work of one or more of the Young Tassie Scientists

Deadline for artworks is 11th of August:

- Mail to Faculty of Science, Engineering & Technology, University of Tasmania, Private Bag 50, Hobart 7001
- Artworks must include student's name, class, school and scientific theme

Awards:

- Prizes will be awarded on a regional basis for primary and secondary schools in the categories of:
- Best communication of scientific ideas through art
 - School with the highest percentage participation

For more information and a school resource kit, contact:

Kim Menadue Ph: 0419 983202 email: jexsouth@netspace.net.au
Website: www.youngtassiescientists.com

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www.scienceweek.info.au

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