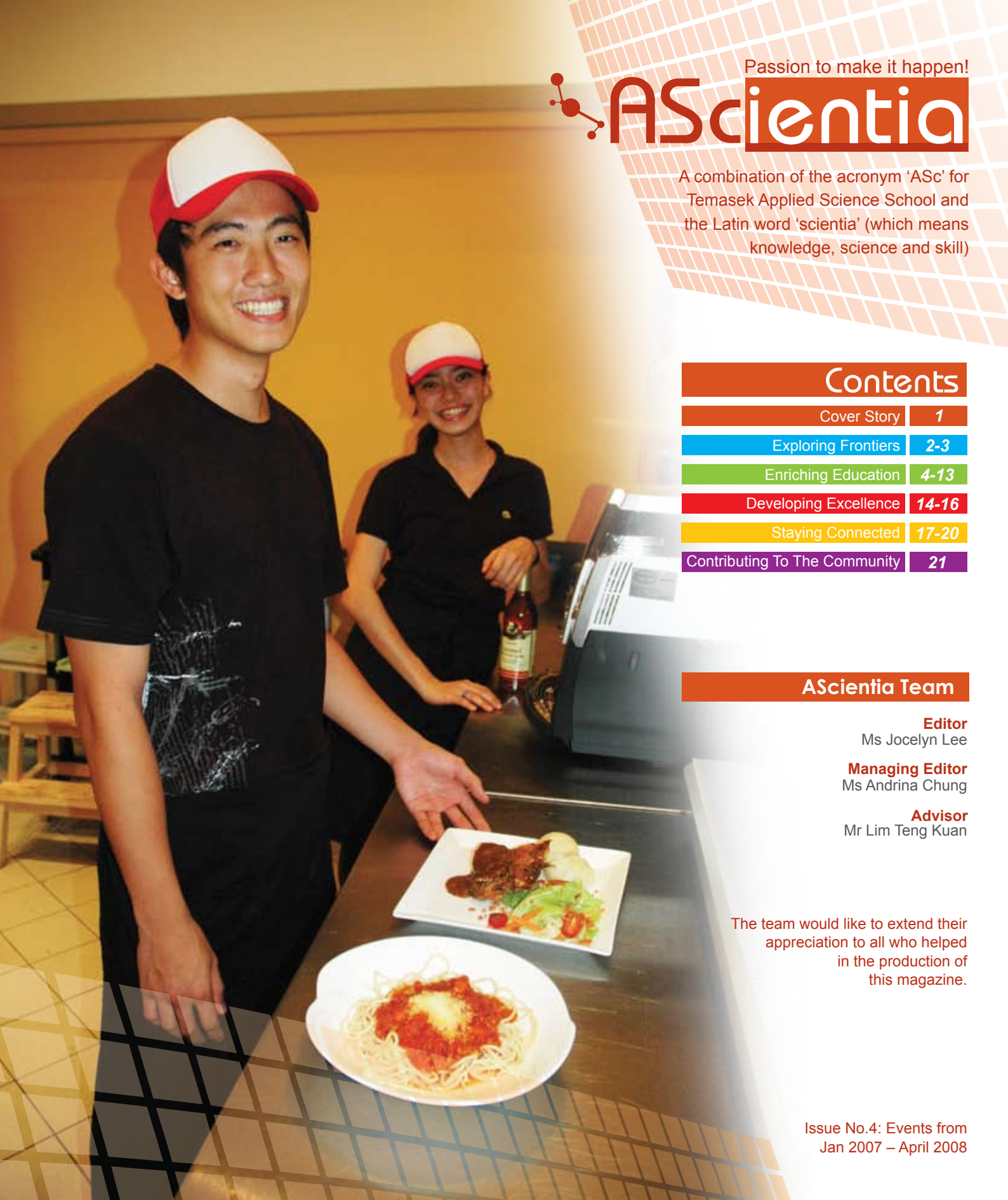


Passion to make it happen!

 AScientia

Temasek  
Applied  
Science  
School





Passion to make it happen!

# A Scientia

A combination of the acronym 'ASc' for Temasek Applied Science School and the Latin word 'scientia' (which means knowledge, science and skill)

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## A Scientia Team

**Editor**

Ms Jocelyn Lee

**Managing Editor**

Ms Andrina Chung

**Advisor**

Mr Lim Teng Kuan

The team would like to extend their appreciation to all who helped in the production of this magazine.



## Learning Enterprises : Making Learning Relevant & Rewarding

### Bistro Walk



The latest **Learning Enterprise** rolled out by ASc is a trendy café offering a real plum to students pursuing the **Diploma in Baking & Culinary Science** and the **Diploma in Applied Food Science & Nutrition**.

In this real-life commercial F&B retail setting, students apply scientific knowledge and techniques that they have learnt in subjects such as Food Ingredients, Food Chemistry, Food Service Management, Catering Technology, Baking Practicum and Food Safety, to prepare high quality fare that is palatable, safe and consistent in quality. They do everything from designing the daily set menus, developing new recipes, cooking

on a large scale, managing their own stations, handling rostering of 'staff', organising stocktaking as well as interacting with customers and generally running the enterprise under the watchful eyes of their instructors.

Suthasenee Mohan, currently completing her internship programme at the café, enthused over this holistic approach of acquiring hands-on experience where the learning goes beyond the confines of a traditional classroom. She also finds it "absolutely rewarding when the food and service draw returning patrons!"

Gary Lim, café instructor, is heartened to see the students face their steep learning curve with confidence, cheerful enthusiasm and professionalism. He observes that their intensive involvement in the daily operation of the café business develops their entrepreneurial spirit and soft skills such as responsibility, teamwork, leadership and communication skills. Cheered by the success of this learning enterprise, he has big plans for growing it: "We would like to turn Bistro Walk into a franchise chain or even branch out to more central areas so that our students can experience the challenge of serving a wider clientele."

These exciting aspirations would not be impossible to achieve, given everyone's passion at ASc to make things happen!

### KoolWerkz

**KoolWerkz Training Factory** is the innovative brainchild conceived by **ASc**, the **Temasek Business School** and the **TP Entrepreneurship Centre** as the first Learning Enterprise, providing students across various disciplines with broad-based entrepreneurship and food manufacturing training. This off-campus factory was where healthier and delicious frozen desserts were first pioneered.



## Bread With Low GI Ingredients



AFSN Lecturers Kalpana Bhaskaran, Lau Kum Yee and Evelyn Lim moulding the bread loaves

The first of its kind to be formulated in Singapore, this innovative bread formula developed by staff from our **Applied Food Science & Nutrition (AFSN) Department** with the financial backing of **Densen Bakery**, took almost a year to produce.

But this white bread with low GI (glycemic index) ingredients was worth waiting for. According to Mr Amir Poh, managing director of **Blossoms Cake House** which sells the bread, the loaves have been flying off the shelves since making their appearance in the bakery's outlets.

Diabetics and health-conscious bread lovers have been making a beeline for this special bread which was awarded the '**Healthier Choice**' symbol by the **Health Promotion Board** as the bread not only helps keep blood glucose levels stable, it is also high-fibre and trans-fat free.

This diabetic-friendly bread would be in high demand as the world faces a growing diabetes pandemic. As for Singapore, the World Health Organisation (WHO) estimates that the number of diabetics in Singapore will double to 695,000 by 2030.

As far as TP is aware, we are currently the only tertiary institution in Singapore to actively develop and test low GI products using the internationally accredited WHO/FAO testing protocol. As the team builds up the current limited GI database on local foods, the food industry as well as discerning consumers will soon be able to know the GI values of local foods such as bakery products and even roti prata.

Like the tiny measure of yeast whose powerful little bubbles cause dough to rise, so our talented and competent AFSN staff are the yeast in TP, bubbling with their zeal in creating healthy food products!



Here's to your good health!



## Egg Powder Power

After the successful joint development in March 2007 of new egg formulations for use in chiffon and sponge cakes, the **Agri-Food & Veterinary Authority of Singapore (AVA)** asked TP to develop recipes for Asian dishes using egg powder. And again, TP rose to the challenge.

Lecturers from the **Diploma in Applied Food Science & Nutrition** and the **Diploma in Baking & Culinary Science** Lau Kum Yee, Michael Lau, Petrina Lim and Choo Yang Sim and student Liang Xue Fei, pooled together their creative energies for this task.

Their creativity and hard work culminated in the refinement of recipes that were eventually used by AVA to train hawkers. The team also whipped up dishes using this egg substitute for a food-tasting session on 8 October 2007 for the committee members of the **Restaurant Association of Singapore (RAS)** who gave the Oriental favourites which included *Egg Drop Soup*, *Egg Fu Yong*, *Yangzhou Fried Rice*, *Steamed Egg* and *Fried Egg with Shrimp* the thumbs up.

With bird flu being endemic in this region and the possibility of a recurrence of a similar egg supply crisis, industry users and consumers can turn to the egg powder as a viable alternative to shell eggs.



Preparing *Chawamushi* using dried egg powder for RAS committee members

## Home-Grown Temperate Vegetables



ASc joined forces with TP's Engineering School in developing a **Miniature Chilled Hydroponic System** for growing temperate plants such as lettuces and culinary herbs.

The system applies a concept used in the cooling of computer systems to chill hydroponic nutrient solutions to a temperature suitable for the growth of temperate plants. As the system is smaller in size compared to that of a conventional chilling system, it has the potential to be adapted as a hobby kit for growing temperate plants at home for both food and ornamental purposes.



## Pedagogical Practice : Block Teaching

Staff in ASc have been constantly exploring new teaching strategies to make learning come alive for students.

In 2007, Block Teaching was implemented for a batch of Biomedical Science students taking the Pharmaceutical Science and Technology option. **Pharmaceutical Manufacturing Technology**, taught in Block One, showed students how various dosage forms are

manufactured and **Pharmaceutical Analysis**, taught in Block Two, had students analysing the products they had prepared in Block One. **Current Good Manufacturing Practices** ran parallel with Blocks One and Two to complement these two subjects and ensure a firm foundation in the principles and guidelines of good manufacturing practices. This emulates pharmaceutical industry practice where products have to be

manufactured and analysed under stringent regulatory guidelines.

Staff involved recommend this teaching strategy which allows better integration of the subjects and students have responded positively to this new way of learning as they can better appreciate the manufacturing workflow in the pharmaceutical industry.

## ASc's Research Bug

**Students at ASc are getting bitten by a new strain of bug – the Research Bug. Less deadly than its counterparts, the symptoms of its bite are no less infectious and if the number of students who have been bitten by it are anything to go by, the School is set for a happy epidemic!**

The dynamo of all research activities is the new **Temasek Applied Science Research Centre** which is helmed by research staff with years of professional research and industry experience. **Research and industry projects** range from in-house staff-led projects in niche areas identified by the respective diploma courses to cross-disciplinary projects led by multi-disciplinary teams from various schools in TP, to consultancy projects that the School has taken on with industry partners.

The transformation of students into skilled industry-ready workforce is ASc's core business and thus the School continues to commit large investments to spearhead research activities to:

### • Promote Student Learning

Students and staff jointly critically examine traditional knowledge and create new information. By doing so, students hone their skills in a conducive environment and model good judgement and academic wisdom. Platforms for research include the School's unique **Differential Research Programme**. This offers students the opportunity for short stints in the labs which

provide exposure and help students realise their aptitude in carrying out scientific processes. The opportunities to work on real industry projects as their **Major Projects, Student Internship Projects, Competition Projects** also broaden students' perspectives and enable them to understand the needs of the industry.

### • Promote Staff Learning

Often initiated and led by staff, these research projects enable staff to fuel their passion in their respective areas of interest and keep themselves updated on new technologies to stay industry-relevant. Certainly, the new knowledge and skills acquired are often used to further enhance the teaching curriculum.

### • Promote Industry Engagement

Collaborative projects enable the School to work closely with industry partners to solve industry problems. This mutual sharing of expertise and resources allows ASc to support industry partners by ensuring a quality workforce for the respective industries and offers expertise to support the technical developments of the industry.

## Focus Areas Of Research Projects :

These projects are carried out in the Temasek Applied Science Research Centre as well as other laboratories in ASC such as the Nanotechnology Laboratory and Temasek Animal Facility.

- **Traditional Chinese Medicine (TCM)**
  - Anti-cancer effects of herbal extracts
  - Chemical profiling of herbs
  - Elucidation of the molecular mechanisms of TCM action
- **Proteomics**
  - Identification of clinically-important proteins in bacterial pathogens



**Traditional Chinese Medicine :** Student viewing cancer cells treated with herbal extract



**Proteomics :** Using an automated robotic system to increase the throughput of protein analysis

- **Plant Biotechnology**
  - Micropropagation of ornamental plants
  - Genotyping of TCM herbs
- **Animal Studies**
  - Efficacy and toxicity studies of traditional herbs and health products
- **Nutrition**
  - Development of functional foods
  - Development of healthier food recipes
- **Nanotechnology**
  - Bimetallic nano-alloys



**Nanotechnology :** Students running the temperature programmed reduction for a nanocatalysis project



**Plant Biotechnology :** Smiling at the successful outcome of their propagation experiment

## Transferable Skills Valued By Our Research Students :

- Analytical Thinking
- Critical Reasoning
- Problem-Solving & Troubleshooting
- Discipline, Diligence & Perseverance
- Logistics Planning
- Manual Dexterity
- Report Writing
- Presentation
- Teamwork

The research activities at ASC have indeed grown tremendously over the last few years. These developments are the result of the staff's unwavering pursuit to understand industry needs followed by targeted attempts to engage the industry to help meet these needs. Such an approach, coupled with an active outreach for industry projects, ensures that staff remain relevant to the industry and students are ready for a rewarding career in the respective industries.



## Nurturing Of Young Research Scientists

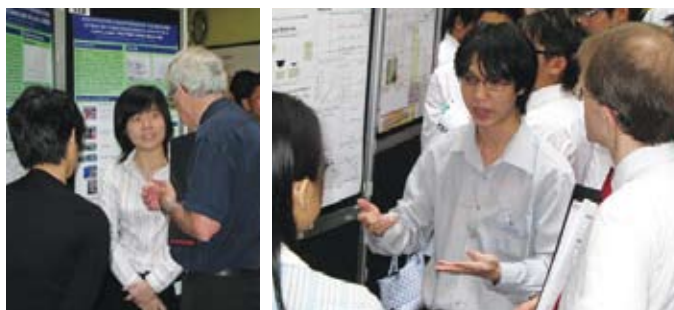


Bitten by the *Research Bug*, students from the Diplomas in Chemical Engineering and Biomedical Science jumped at the chance to build up their research skills by signing up for the **Singapore Chemical Science Fair** organised by the National University of Singapore (NUS).

The excitement was palpable as the students set about their projects. While some, excited by the great potential of hydrogen to be used as a safe and clean alternative energy source in fuel cells, worked on the synthesis of a platinum-based catalyst, a newly discovered catalyst for hydrogen generation, others were fascinated by the rapidly emerging field of proteomics. Three projects, in the area of Catalytic Chemistry & Chemical Biology, were finally submitted for this competition held in March 2008.

At the Science Fair, students from schools and polytechnics drew inspiration from each other's projects. When the panel of international judges came round, our students put to good use their communication skills presenting their work with passionate earnestness.

Although awards eluded our students, their real rewards were in having gained tremendous knowledge through their stimulating scientific research investigation and exposure to multi-disciplinary learning. Unfazed by the thought of not bringing home any trophies, like true research scientists driven by their sense of wonder and joy of discovery, these young ones knew in their heart of hearts that they were real winners. And like true scientists who *Never Say Die*, our young researchers will press on in their quest for knowledge and excellence.



*"Research work is like a roller coaster ride. One moment you are up and the next moment you are down. You do not know what is round the corner. This makes research very exciting and full of surprises."*

» Benjamin Ma, ASc Research Student

*"I enjoyed conducting experiments. The exhilaration of getting results and finding out the unknown while proving my hypothesis is what I look forward to. I like the independence given to me as it gives me a sense of fulfillment to be given so much trust from my supervisor."*

» Johan Sim, ASc Research Student

*"Research has been rather intriguing for me thus far. Despite the short period of time, this enlightening ride has granted me the thrills of research progress and the suspense of yielding results. With this in mind, and with ample research opportunities to come, I foresee that my flaming passion for research will not die off prematurely."*

» Albert Chan, ASc Research Student

*"Students often start their projects with a "please tell me what to do next" mindset. However, once they understand their work and are enthralled by what they do, their passion and perseverance takes over. The transformation is quite remarkable, and very rewarding."*

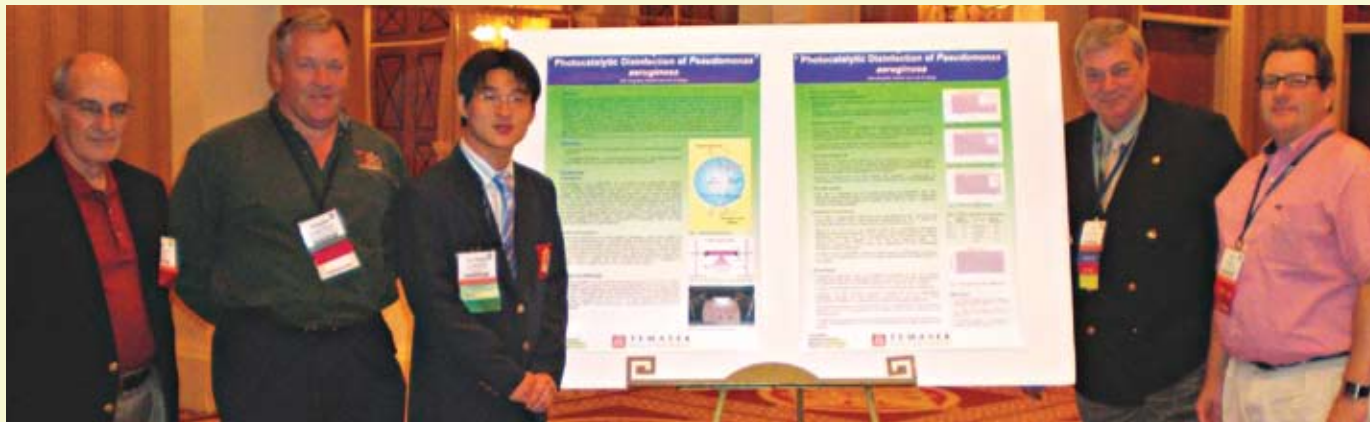
» Quek Hung Hiang, ASc Lecturer



## Awards & Accomplishments

More than the jubilation of hauling in coveted awards is the deep sense of accomplishment of having stretched ourselves to our limits to pursue our passion. As articulated by Chemical Engineering student Grace Soh Ziwei: "It is extremely gratifying to do something that we believe in and be recognised for it!"

### Bug Study Brings Sweet Success



Versatile Chemical Engineering students, Kelven Lam, Koh Yong Xian and Lim Yu Xiang, took up the challenge of stepping outside their discipline to research on microorganisms and tasted sweet success when their poster presentation *Photocatalytic Disinfection of Pseudomonas aeruginosa* entered for the **ISPE (Singapore)**

**Student Poster Competition** in June 2007 was awarded the top prize.

Along with the prize was an invitation by the ISPE (International Society for Pharmaceutical Engineers) for Yu Xiang to represent his team at the prestigious **2007 ISPE Annual Meeting** (4 - 7 November 2007) in Las Vegas,

Nevada, USA. There, Yu Xiang met other students and industry professionals, learnt about industry trends, took part in mock interviews and made valuable connections. He said, "The whole experience was very enriching. I wish more students can benefit from such events."

### Scooping Prizes At SSBMB



Students from the Diplomas in Biotechnology and Biomedical Science shared their final-year project experiences at the inaugural **Mini Symposium** organised by the **Singapore Society for Biochemistry &**

**Molecular Biology (SSBMB)** for polytechnic students in April 2007.

Deborah Khoo Li Kim and Kok Jiaying won two of three 'Best Poster' awards while Samantha Li Hui Juan picked up the 3rd prize in the oral presentation category.

For the **SSBMB's Pre-University Essay Competition 2007**, Cheng Han Yin (Diploma in Biotechnology) earned himself a **Certificate of Distinction** for outstanding achievement. He was the only polytechnic student given that honour. His essay *Can Science Provide the Answer to a Shortage of Organ Donors?* was one of only two best essays awarded a Distinction.



## Green Wins

ASc's school colour is green, the colour environmentalists love. It is also the colour of hope. Our students fill us with hope for environmental stewardship as they, in their passion for the environment and their enthusiasm to promote the green message, keep coming up with creative and innovative ideas and bringing home prizes as well.

### Generating & Optimising Of Electricity



The idea of using waste materials to generate electricity came to Ang Shiong Hui Jonathan, when he heard his parents complain about rising PUB bills. He and his fellow Chemical Engineering team mates,



Grace Soh Ziwei and Kuan Kai Wen Kavan, then salvaged industrial and household waste materials (zinc metal casings of used batteries, paper bowls, sulphuric acid and copper sulphate) and created a battery which generated electricity capable of powering simple appliances. Tampines GRC which organised an environment-themed competition in April 2007

recognised a winner and awarded them the top prize!

The team then worked on an improved version and submitted it for the prestigious annual **Green Wave Environmental Care Project** organised by Sembawang Shipyard. Their entry *Generating & Optimising of Electricity Using Industrial/Household Waste* was shortlisted with 9 others, beating more than 50 entries submitted for the tertiary level. At their final presentation in November 2007, the team members were grilled by experts from the recycling industry, a professor from the National University of Singapore and officials from Sembawang Shipyard. The panel of judges was duly impressed by their performance and the team walked away with a Commendation Award.



### Harnessing Heat Energy From The Kitchen Stove



Grace then paired up with Diploma mate Joanna Ang to win a Silver Award in TP's **Innovation Contest 2007** for their idea of harnessing heat from a kitchen stove and using the escaping heat energy to heat water for daily use. Kenneth Tan Ke Yao from TP's Engineering School joined them to build their invention which was then presented for the prestigious **Tan Kah Kee's Young Inventor Competition 2007**.

The trio earned a Commendation Award after being subjected to a rigorous round of questioning by a panel of expert judges. Our young green crusaders had through this competition become even more aware of current issues related to escalating inflation and environmental conservation.



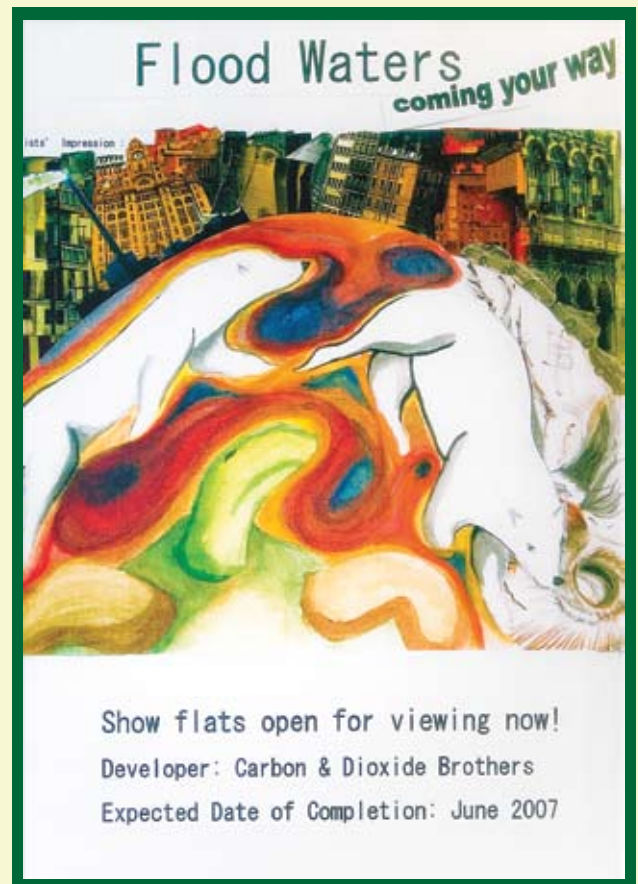
### Global Warming



Dickson Goh Yaoming, Sundra Gaytri Meriange and Chloe Tan Yi Ting (Diploma in Biotechnology), gamely dived into the marine conservation project organised by the Underwater World Singapore and upon surfacing, discovered that they were top in the tertiary institution category of the prestigious **Young Marine Biologist Award Competition**.

Their team, having acquired a deeper understanding of global warming and its effects on marine life forms, had made the award-winning mural encompassing the different effects of global warming on the coral reef ecosystem and ocean acidification; marine turtles; marine animals at the poles; melting polar ice caps; and global sea-level rise and ocean currents.

While these young marine biologists are thrilled with their prize, what they really hope their mural would do is to raise public awareness on the impact of global warming.



The award-winning mural



## Plaudits For Budding Food Scientists

Student teams from the Diploma in Applied Food Science & Nutrition won plaudits for their high quality projects at these two competitions.

### SFMA Food Product Concept Competition 2007



Siti Nafisah Bte Mohd Nor, Haryah Bte Ali and Ramesh Kumar were the team that clinched the **Best Packaging Award** for their *Tea-flavoured Rolled Cookies* while the other team comprising Mah Yi Ting, Tan Yi Le and Liu Huai Wen received the most votes for the **Most Popular Product Award** for their *Trans-Fat Free Pastry*.

Small & Medium-sized Enterprises (SMEs), encouraged by the **Singapore Food Manufacturers' Association (SFMA)** to improve their products or create new ones, offered 22 products as product development projects to the student teams from the various polytechnics. The students' mission

was to develop the products from scratch, conduct sensory, quality and marketing tests on the products and present their products to the judges within specified deadlines.

Siti's team took **Gryphon Tea Company's** premium scented jasmine green tea, modified a popular traditional Ashkenazic (Polish) cookie recipe by substituting healthier ingredients such as sunflower seeds and inulin, did intensive research on the science of packaging and food preservation techniques, roped in a fellow student from TP's Design School to help on the aesthetic aspects and finally presented to the judges their novel product exotically named "*Pearl of the Orient Rugelach*".

This award-winning product was exhibited at the **Asia-Pacific Food Expo 2007** and attracted media attention for its creative innovation. While Siti is encouraged by the success of this premium gift product, she says, "I would really like to develop something healthy and affordable for the masses." Spoken like a true food scientist.



### SIFST Biennial Student Symposium 2007

The symposium, organised by the **Singapore Institute of Food Science & Technology**, saw winners in Goh Siew Koon, Chan Bao Fang Mitchelle and Hazel Ratcliffe who worked together as a cohesive team to develop *Ice Popsicles with Fruit/Vegetable Juices/Extracts*, a healthy dessert for children.

The team was awarded the top prize in the diploma category, carrying with it a fully sponsored trip for a team representative to the **10th ASEAN Food Conference** in Malaysia.

## Overseas Student Internship Programme (OSIP)

Every year, students hungry to add an international dimension to their TP education, cross boundaries to carry out their internships. They return, with an international outlook and global mindset, very grateful for having gained practical experience and life skills in a real work environment.



1. Bangkok, Thailand
2. Wuxi, China
3. Bangkok, Thailand
4. Nanchang, China



5. Adelaide, Australia
6. Perth, Australia
7. Cebu, Philippines
8. Perth, Australia



In 2007, the list of generous companies and organisations helping to train the future workforce included:

- Ranbaxy (M) Sdn Bhd in Kedah, Malaysia
- National Center for Genetic Engineering & Biotechnology in Bangkok, Thailand
- US Wheat in Bangkok, Thailand
- Maritans Recycler in Cebu and Manila, Philippines
- Sinomem Technology Limited in Xiamen, China
- Singapore Food Industries in Shanghai, China
- Nanchang University in Nanchang, China
- Jiangnan University in Wuxi, China
- University of Western Australia in Perth, Australia
- University of Adelaide in Adelaide, Australia
- Saturn Biotech Limited of Murdoch University in Perth, Australia
- La Trobe University in Melbourne, Australia

Young interns living and working in a new environment away from their comfort zone, inevitably find their lives turned upside down, rather like this statue turned on its head. Nothing can really fully prepare them for the eye-opening, life-transforming experiences of learning in the real world. But ever resilient, our ASc students adapt quickly, maximizing their learning opportunities. Here are some students' reflections on their enriching OSIP experiences.



Sandy Chan beside the statue of Charles >>>  
La Trobe in La Trobe University, Melbourne

### >>> Kedah

- > Neo Yong Sheng Rennie
- > Fatin 'Ammarah Bte Seno
- Diploma in Biomedical Science



At Ranbaxy, our classroom knowledge came alive! We also got to know about the workflow of a pharmaceutical company, how to work with people in a big company, cope with work stress and manage our time. Thanks to the exposure, we've developed a greater interest in pharmaceutical science and technology as well as research and development.

[Rennie] Although Kedah is just "next door", it was a challenge for me to leave the emotional security of my family and the comforts of home. I had to keep telling myself: "Let me win. If I cannot win, let me be strong in the struggle." At the end of the 20-week stint, I did feel I had grown so much and I'm much stronger in character!

[Fatin] We need to have an open mind before going on an OSIP trip and we must adapt fast. Not everything turns out the way we expect it to.

### >>> Melbourne

- > Chan Cheng Fang Sandy
- > Aloysius Wong
- Diploma in Biotechnology

Our attachment at La Trobe University was for only 8 weeks but we picked up a lot of useful technical and life skills from troubleshooting the experiments of our professors who were always patient and willing to teach.

One professor even invited our OSIP team home for a lovely meal which he had cooked and after that he took us on a 5-hour bus ride to Melbourne's famous Great Ocean Road. Wow! We were simply bowled over by the sheer beauty of the natural stone formations carved by the ocean.

We didn't have the money to do the usual 'touristy' things, so we were very touched by his generous hospitality. This lesson in hospitality is something that will remain imprinted in our hearts and minds.

In so many ways, our Down Under OSIP experience changed the way we see the world and yes, we want to see more of the world!





## »» Shanghai

- > Ng Yuan Ge Benjamin
- > Thoo Wei Qiang
- Diploma in Applied Food Science & Nutrition

Great hospitality, super service – that was our China experience! The Chinese people were very hospitable and they really went the extra mile to provide unsurpassed service which we think Singaporeans are seldom used to and have a lot to learn from.

Our project was on *Conducting Quality Assurance & Quality Control of Products* made in the Shanghai premises of the Singapore Food Industries. In the course of our work, we could clearly see the link between what we had been taught at TP and industry requirements. We also had an understanding of how a company operates and the hygiene standards and other regulations that a food company has to comply with.

[Ben] It seemed to me that the workforce was less stressed than Singaporeans so that they were able to relax and enjoy life and were spontaneous in helping one another.

[Wei Qiang] We were constantly learning new things. Sometimes what you learn may not seem useful at first, but then I'm sure they will turn out to be pretty useful in the future.



## »» Xiamen

- > Tang Chung Hang
- > Lim Wei Siang
- Diploma in Chemical Engineering

We learned different membrane technologies from the company, tasted cuisines from different parts of China and made lots of friends with whom we still stay in contact over MSN. We also joined the locals to tie supports to trees just before a typhoon hit. This, like many other learning experiences during our OSIP stint, was not in the lesson plan when we first set off from Singapore for our attachment provided by Sinomem Technology Ltd to work on the project *Desalination Using Electrodialysis*.

[Chung Hang] The little daily challenges I faced were learning to wash my own clothes without a washing machine, struggling to communicate in 'proper' Chinese and figuring my way in and out of town. But I enjoyed experiencing the lifestyle of the people in Xiamen.

[Wei Siang] Living in the dormitory was a great experience. I also enjoyed interacting with the locals and learned many things from my colleagues about work as well as about their personal lives. I felt very inspired by their thirst for learning the English language.

[Chung Hang] But their education system is more competitive than Singapore's. Students there study from morning to evening every weekday.



## 4<sup>th</sup> International Congress Of Traditional Medicine



More than 1000 participants from TCM organisations and associations all over the world converged at this congress on “**Encouraging Creativity and Development of TCM to Improve the Health of Mankind**” held at the Suntec City 17-19 November 2007.

ASc's Dr Quek Hung Hiang and Ms Lee Yian Hoon in their oral presentations shared with the congress participants some of our research findings in TCM and developmental capabilities.

When Mr Khaw Boon Wan, Minister of Health, who officiated this international congress, visited our exhibition booth, ASc staff took the opportunity to explain to

him our TCM research programmes and the *Tui Na* course offered jointly with the **Singapore College of Traditional Chinese Medicine (SCTCM)** to cater for the expanding demand for the use of *Tui Na* for wellness. Member of Parliament Ms Ellen Lee showed a strong interest in the *Tui Na* course.

It was a fruitful time at the congress as ASc staff interacted with more than 300 local and overseas guests, representatives from various TCM-related organisations, academics and clinical experts, and also shared with the visitors to our booth our experiences in improving the health of humankind.

## Swiss Singapore Workshop In Food Consumer Interactions



This workshop held on 7 April 2008 provided participants with an overview of innovative approaches related to food research, production and consumption from both the eastern and western perspectives. The organisers planned for it to be an effective platform for discussion and networking “as well as a fertile ground for identification of specific Asian innovation trends”.

Given the revival of worldwide interest in Traditional Chinese Medicine (TCM) in the realm of healthy food, ASc's passionate proponent of TCM, Dr Ong Seng Poon, was invited to speak to an intrigued audience on TCM Dietary Therapy, the scope of which included Chinese medical theory, TCM medicine and application principles of TCM therapy.

The occasion was also a golden opportunity for TP to feature ASc's competency in various areas like food product development, Glycemic Index testing and other areas of applied research.

Organised by **Swissnex Singapore**, an information, coordination and networking platform of the **Embassy of Switzerland**, this workshop brought together 109 participants from major food companies, the Health Promotion Board, bioinformatics institute, food distributors, flavour houses, all the local polytechnics, NUS, Singapore Sports Council and nutrition consultants.

## Proteomics : Dual Integrated Workflow Under One Roof



attractive location for research collaborations, training and services e.g. MALDI TOF/TOF mass spectrometry services. TP is the only polytechnic with fully integrated proteomic workflow capabilities.

The development of the Proteomics Research Facility took 3 years, during which the Proteomics Research Group monitored industry trends and consulted major industry players. Staff / student training as well as collaborative industry projects were undertaken. The result is an integrated proteomics facility fully equipped with industry standard instrumentation that is relevant for student training and industry engagement. Collaborative projects with **Singapore General Hospital** and **DSO National Laboratories** are currently in progress.

Leading the Asc proteomics capability development is Dr Quek Hung Hiang, the man behind this development since 2005, having anticipated that it would grow in importance in the post-DNA sequencing era. Dr Quek believes that by staying strategically focused and maintaining our technical relevancy, Asc has much to contribute to the industry in this field of proteomics which is an increasingly important technology platform and holds tremendous promise for biomedical research.

The uniqueness and strength of Asc's **Proteomics Research Facility** is in having both the integrated **2D gel - MALDI TOF/TOF** and the **2D nanoLC- MALDI TOF/TOF** workflow within a single laboratory, placing the facility as an

## Nanotech : X-Ray Diffraction Spectroscopy (XRD)

Three Chemical Engineering lecturers spent an intensive week each between September to December 2007 in Karlsruhe, Germany, being trained in X-Ray Diffraction Spectroscopy (XRD).

Mr Lim Aik Leng and Dr Jiang Li attended the Introduction Course while Mr Wallace Lim completed the Advanced Course which focused on crystal profile analysis.

Equipped with in-depth knowledge of working the XRD spectrophotometer and of its potential in analysing various inorganic samples using a monochromated X-Ray beam, the lecturers returned with high hopes to

Asc's own **Nanotechnology Laboratory** where its latest acquisition, a state-of-the-art XRD spectrophotometer, is housed.

The trio are excited about this XRD spectrophotometer because they can not only identify various composites, but also obtain information such as crystal size and arrangement, inter-atomic distances and the presence of microstrains.

This insight into the crystallisation process and how various crystal properties affect their various performances is crucial to determine and modify various wet synthesis procedures for the nanoparticles of interest.

Currently, the laboratory's area of interest is in bimetallic nano-alloys which have distinct catalytic, magnetic and biomedical functions. Various nanoparticles have been synthesised and tested for use in hydrogen generation, long chain alkylation for fuel, magnetic fluid hyperthermia, and detection test kits.

The possibilities for nanotechnology applications are seemingly limitless. Mr Wallace Lim beamed as he shared his thoughts: "This is all very thrilling for us as researchers. I have a few dreams, but my biggest dream is to be able to contribute in the fight against cancer."



## Life Sciences : Uncover Science, Discover Life



ASc has strived to excel in niche applied research areas by working closely with industry partners to stay competitive in our rapidly changing society. Over the years, the School has excelled in areas such as proteomics, plant biotechnology, nanotechnology, analytical services, environment and water technology, baking science and technology, hydroponics, as well as food development and nutrition assessment. The School has since completed numerous

industrial consultancy projects in collaboration with the respective industries.

**ASc Project Show 2008 - Life Sciences : Uncover Science, Discover Life** - was held from 7 to 12 January 2008 in the **Temasek Applied Science Research Centre**. The aim of the event was to showcase the School's achievements, strengths and research capabilities in the School's identified niche research areas in the life sciences.



Amongst the 73 industry visitors to the Project Show were Ms Ellen Lee (MP for Sembawang GRC) and representatives from **Science Arts Co Pte Ltd**, **Eu Yan Sang International Ltd** and **Chen Fu Ji Group**. All the visitors agreed that the Project Show gave them a comprehensive overview of the projects undertaken by staff and students of ASc. Visitors showed interest in having a collaborative research project with the different diplomas in ASc as well as collaborative work in the areas of plant technology, Traditional Chinese Medicine and proteomics.

## PASS @ TP : A First For Singapore



Mrs Soon-Ong Meng Wan, Director of ASc, with Dr Joerg Lindenblatt, Vice President of Sales Asia, Sartorius Stedim Biotech

TP is the first Polytechnic in Singapore to house a technical application centre with **Sartorius Stedim Biotech (Sartorius)**, a leading provider of equipment and supplies for the biopharmaceutical industry. **PASS (Process Application Service Singapore)** is the new centre which will provide biopharmaceutical consultancy and training services to industries in South East Asia.

**PASS** opened on 15 April 2008, in the midst of a healthy, vibrant biopharmaceutical industry, to play the important role of helping Sartorius' major customers to transfer their processes to Singapore and providing on-site technical support. This centre within the **Temasek Applied Science Research Centre**, is furnished with more than S\$500,000 worth of state-of-the-art equipment in biopharmaceutical processing.

A delighted Mrs Soon-Ong Meng Wan, Director of ASc, said: "This centre is a win-win for both Sartorius Stedim and TP. With this centre, TP can tap on Sartorius' expertise and equipment to enhance our students' education as well as build staff capability in biopharmaceuticals."

Dr. Joerg Lindenblatt, Vice President of Sales Asia, Sartorius, was equally pleased with PASS, which he said "is another

important component of our global support network for our customers. It allows us to ensure consistent quality and technical expertise for our global key accounts. As a result, we can significantly improve the safety and efficiency of relocating production sites from Europe and the USA to Singapore in conjunction with our customers."



Lab photo: Courtesy of Sartorius

## Notable Partnership : Tie-Up With Leading TCM Healthcare Company

TP, acting through ASc, has been developing her Traditional Chinese Medicine capabilities since 2002. An important partnership was forged between TP and **Eu Yan Sang International Ltd**, Asia's leading healthcare manufacturing and retail company with a core focus in TCM, when an **Memorandum of Understanding (MOU)** was signed on 15 October 2007, laying the foundation for collaboration in areas such as:

- efficacy studies of TCM products using animal models
- analysis of TCM product quality
- incorporation of TCM ingredients in food product development
- nutriproteomics
- TCM education

Through these areas of collaboration, Eu Yan Sang will be able to tap on ASc's expertise in lab analysis and food development to support its marketing efforts while ASc students and staff will be able to hone their technical skills to enhance their relevance to the industry. Eu Yan Sang will also be sponsoring book prizes, academic medals and scholarships to TP students.

## New Course For Working Professionals : Specialist Diploma In Environment & Water Technology



Launched on 7 January 2008, this one-year course aims to provide participants with the theoretical and practical knowledge to operate environmental and utility installations for the environment and water industry.

Environment and water technology, identified by the Research Innovation & Enterprise Council (RIEC) as an economic bright spot, is expected to grow steadily from 0.6% in 2003 to 1.5% in 2015. Currently, there are some 250 companies in Singapore, of which 50 are international and local companies providing water-related services.

A quarter of this pioneer cohort is from the water treatment industry while the rest comes from the semiconductor, chemical and industrial waste industries. Tan Chee Siong, a TP graduate in Mechatronics, is one satisfied participant who is pleased with the relevance of this course to his work: "It not only helps me to upgrade my own skills, it has also benefitted my team at work because I am now applying the knowledge learnt. This course is definitely useful for my career because I envisage environment and water to be key growth areas."



## Course For MINDEF F&B Managers : F&B Management Course In Nutrition & Food Safety

Army food and army cooks were the bane of army life and the butt of recruits' cruel jokes. That's history. Today's soldier in the SAF can expect his or her taste buds to be tantalised by the flavourful, nutritious and superior quality of army food.

Since September 2007, **MINDEF** has been sending batches of their F&B managers to be trained by our dedicated staff from the **Applied Food Science & Nutrition Department**. The highly motivated participants were taught Food Safety, HACCP, Basic Nutrition, Healthy Cooking and Food Service. They were especially keen to learn about the nutritional value of the foods they ate, menu planning and customer service. Armed with new knowledge, they returned to their charge of supervising contractors involved in preparing food for the soldiers.

Lecturer Kalpana Bhaskaran says, with a twinkle in her eye, that the soldiers, particularly those training abroad, can now look forward to army food that is 'shiock!' and Singaporeans can sleep in peace knowing that a happy, well-fed soldier is probably a patriotic soldier.



## Global Connections : Exchanging Staff & Students, Sharing Expertise

Three **Memorandums of Understanding (MOUs)** were inked in 2007 as part of TP's internationalisation effort to expose staff and students to global industry practices as well as to share our expertise with these international organisations.

The MOUs with **Nanchang University** and **Jiangnan University**, renowned for their food-related degree programmes and capabilities, signed on 1 July and 12 September 2007 respectively, paved the way for attachment opportunities for ASC students, staff exchanges, joint research programmes and other collaborations.

The MOU with **US Wheat Associates** was signed on 5 December 2007. The non-profit organisation represents wheat farmers in the US and assists them to develop export markets. It also has strong capabilities in training in the areas of bakery products and baking facilities. Areas of collaboration include advice on teaching materials, curriculum and facilities to be developed by ASC, training for full-time ASC students as well as the use of ASC facilities by US Wheat Associates. The MOU would allow ASC to tap on the expertise and experience of US Wheat Associates thereby shortening the learning curve for ASC.

## Animal Welfare Education & Training



Participant learning proper handling and restraint techniques on a poodle in the new companion animals workshop

TP is the only polytechnic that provides animal welfare education and training for the public.

ASc staff have trained several batches of research and technical personnel since 2005 when the **Responsible Care & Use of Laboratory Animals Course** had its first run. Participants, given hands-on training in animal restraint, sexing, techniques for blood collection and administration of injections for small animals, gained confidence in handling laboratory animals as well as a heightened awareness of the scientific, ethical and legal principles set out in the **National Advisory Committee for Laboratory Animal Research (NACLAR) Guiding Principles**.

A new course, **Pet Care & Management for Companion Animals Course**, was launched in October 2007 following an agreement between TP and the **Pets Enterprises & Traders Association, Singapore (PETAS)** to train pet shop personnel over a three-year period from 2007 to

2010. Participants were from the **Pet Lovers Centre Pte Ltd, Pets Enterprises & Traders Association, Singapore (PETAS), Tetra Aquatic Asia Pte Ltd** and **K&K Aquarium and Bird Centre**. They received training in areas such as AVA Regulations & Rules for Pet Shops, Animal Housing, Animal Care & Management, Animal Health & Diseases, Occupational Safety & Health, Client Education and Business Ethics & Management.

Encouraged by the success of this inaugural course, plans are in the pipeline for similar training in the care and management of birds and fish.

Training for TP's own final-year students from the Vet Science Option (Diploma in Biotechnology) was given a boost when an agreement signed with **Mt Pleasant Animal Hospital** in April 2007 opened up opportunities for staff and student attachments as well as the involvement of the hospital's clinical veterinarians in teaching.

The internships at the hospital and its clinics enabled students to be more familiar with the expectations of veterinary technologists working in a clinic setting. Student Alyssa Wee said, "Not only were case studies and theoretical techniques learnt in TP brought to life, we also gained insights on veterinarian-client relationships. It was truly real-life learning at its best".



Temasek Life Sciences Laboratory (TLL) staff who attended the laboratory animals workshop in October 2007

## Service Projects At Home & Abroad



YAH Advocates from the Diploma in Applied Food Science & Nutrition: Lee Ying Long, Mawar Bte Salleh, Tan Bee Geok and Tan Li Min

<p><b>Overseas</b></p>	<p><b>Making An Impact In Cambodia</b></p> <ul style="list-style-type: none"> <li>• Soap Making Workshop Using Recycled Cooking Oil</li> <li>• Nutrition Workshop for Community Health Educators and Women Leaders</li> </ul>
<p><b>In Singapore</b></p>	<p><b>Helping Out At Home</b></p> <ul style="list-style-type: none"> <li>• Needs survey of low income families in Tampines and Simei estates</li> <li>• Haw Par Villa excursion for children from low income families</li> <li>• Home makeovers for needy families</li> <li>• Coastal Cleaning Project in Sungei Buloh Wetland Reserve</li> </ul>
<p><b>In TP campus</b></p>	<p><b>Addressing Health Matters, Environmental Issues</b></p> <ul style="list-style-type: none"> <li>• <b>Youth Advolution for Health (YAH)</b> <ul style="list-style-type: none"> <li>- Peer-led educational health programme to inspire healthy lifestyle among TP students</li> <li>- Survey on health issues in TP (smoking, mental wellness/stress management, physical exercise, cyber wellness, STDs and HIV/AIDS)</li> <li>- Health promotion event – exhibits, interactive games, competitions</li> </ul> </li> <li>• <b>Environmental Awareness</b> for students and public</li> <li>• <b>Blood Donation Drive</b> for students and staff campus-wide</li> </ul>





21 Temasek Avenue 1  
Singapore 529757  
T: +65 6788 2000  
F: +65 6789 8220  
[www.tp.edu.sg](http://www.tp.edu.sg)