THE SINGAPORE INSTITUTE OF BIOLOGY

SIBiol BULLETIN

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Feature

Singapore bags Top Gold at IBO 2009

"What an experience!"

Public Forum 'lively and engaging'

Participants praise Teachers' Workshop

SIBiol to conduct workshop at ISEC 2009

SIBiol Celebrates 35 Years!

Two Professors to be honoured at 35th Anniversary Dinner

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20th INTERNATIONAL BIOLOGY OLYMPIAD

12 – 17 July 2009
Tsukuba, Japan

The Singapore team at this year's International Biology Olympiad (IBO) has achieved the best ever result since Singapore began participating in the IBO in 2001. Not only did the team return with a haul of three Gold and one Silver medals and an overall ranking of third out of 56 participating countries, the team members clinched the 1st, 3rd and 14th Gold medals! Ms Dong Yangzi from Hwa Chong Institution (HCI) won the Top Gold medal, followed by Mr Tan Wei Han (HCI) with 3rd, Mr Yuan Chengxiang from Raffles Institution (College Section) in 14th place, and Ms Ang Qiyan winning the Silver medal.

The team this year included a larger than usual number of official Observers and this will continue for the next two years in preparation for the 2012 IBO which Singapore will be hosting. Granted access to the 'backroom' operations of the IBO, the observers had the opportunity to observe firsthand, the meticulous planning and execution the Japanese are famous for.

Congratulations to the team, and to the dedicated trainers who have devoted their time to intensively coach the students prior to the competition.

The four students members of the team reflect on their experiences at the IBO in a write-up on Page 7

(Front row L-R): Yuan Chengxiang, Tan Wei Han, Dong Yangzi, Ang Qiyan
(Standing L-R): Mr Timothy Tan, Dr Shawn Lum, A/P Shirley Lim (Team Leader), A/P He Jie, A/P Tham Foong Yee, A/P Diong Cheong Hoong, Mr Tan Hong Kim

THE SINGAPORE INSTITUTE OF BIOLOGY PUBLIC FORUM 2009

Associate Professor Lim Tit Meng

To commemorate the 150th anniversary of the publication of Charles Darwin's scientific work, "On the Origin of Species", the Singapore Institute of Biology (SIBiol) organized a Public Forum on 27 June 2009 at the Science Centre. We were honoured to have two distinguished speakers give talks on topics pertinent to the occasion. Professor Brent Mishler from the University of California, Berkeley, spoke on "The Evolution of Species Concept: Back to Darwin", while National University of Singapore Professor Peter Ng's talk was amusingly entitled, "The Naming of Beasts, Counting of Dead Bodies, and What Taxonomists REALLY do!".

There were about 80 participants at the forum, the majority whom were members of the public. The presentations were clear and informative, with good humour thrown in besides. The Q&A session was very lively with many interesting exchanges.

One of the walk-in participants was an Australian tourist who happened to be visiting the Science Centre, but he stayed and sat engrossed throughout the entire forum. Other audience members were similarly very engaged and some gave feedback that they had learned a lot from the speakers. One of them was formerly a professor in Botany and a long time member of SIBiol, but this had been the first Public Forum he had attended. He said the experience made him realize what he had been missing all this time and he would henceforth make it a point to attend in the future!

WINNER OF THE 3M YOUNG SCIENTISTS AWARD 2009 AT THE 15TH YOUTH SCIENCE CONFERENCE 19 SEPTEMBER 2009

Associate Professor Lim Tit Meng

A Science Mentorship Project entitled 'Evaluating Different Methods of Synthesizing Biodiesel' by a group of secondary school students from Hwa Chong Institution has won the top honour at the recent 15th Youth Science Conference. The 15 year-old students Lee Men Quan, Toh Yong Seng Derrick and Khoo Chun Yuet, impressed the judges during the project poster presentation session, topping its category. The team was subsequently evaluated by a larger panel of judges and became one of the top three projects that clinched the coveted 3M Young Scientists Award. They were guided by their teacher advisor Mdm Sow-Peh Yoke Keow, and the project was mentored by our SIBiol member, Associate Professor Lim Tit Meng of NUS.

The project was motivated by the fact that while majority of the world energy needs are supplied through petrochemical sources, coal and natural gases, these sources are finite and the oil reserves in the world are predicted to be used up in 35–84 years at the rate it is being exploited. Augmented by the fact that fuel from crude oil produces numerous pollutants, such as sulfur dioxide and oxides of nitrogen, there is a pressing need to find alternative sources of energy, of which one possible source is biodiesel. Biodiesel comprises fatty acid methyl esters derived from vegetable oil or animal fat. It is a good alternative to diesel because it is renewable, biodegradable, produces fewer pollutants such as carbon monoxide, sulfur dioxide and unburnt hydrocarbon, and does not contribute to a net rise in the amount of CO2.

The project involved procedures and methodology that students could do in their school lab except for some advanced analyses that required support from NUS. The students were very organized, conducting a systematic study and gathering multidimensional data to derive a meaningful conclusion on the efficacy of extracting biodiesel from used cooking oil.

Project Outline

Three types of transesterification processes (acid-catalysed, base-catalysed, acid-base catalysed) were compared and evaluated in terms of yield, total and bound glycerol content, density, viscosity, heat of combustion and combustion rate. The base-catalysed transesterification was carried out with methanol and sodium hydroxide as a catalyst while the acid-catalysed transesterification was carried out with methanol using and 98% w/w concentrated sulfuric acid as a catalyst. The acid-base catalysed transesterification was carried out by acid pretreatment followed by base catalysed transesterification. For all processes, reflux was carried out at 65°C for a total of one and a half hours.

Results showed that the conversion of waste vegetable oil is highest in acid-base catalysed transesterification, followed by base-catalysed transesterification and acid-catalysed transesterification. Qualities of biodiesel synthesised from acid-base catalysed transesterification are generally the best.

Lee Men Quan, Toh Yong Seng Derrick and Khoo Chun Yuet with A/P Lim Tit Meng

The students did a very professional oral presentation during the 15th Young Science Conference which was graced by Guest of Honour, Mr S Iswaran, Senior Minister of State, Ministry of Trade and Industry and Ministry of Education. The feedback from the VIPs, invited guests and students was that the project demonstrated a good example of multidisciplinary approach to solving a problem as the students used chemistry, physics and some engineering methodology to conduct the experiments and investigation. The students are very encouraged to continue with the project and will take part in next year's Singapore Science and Engineering Fair.

SIBIOL TEACHERS' WORKSHOP

The International Biology Olympiad: A Workshop on How to Prepare Your Students

(15, 22, and 29 August 2009)

Associate Professor Lim Tit Meng

SIBiol regularly conducts much anticipated Teachers' Workshops on topics useful to teachers at all levels. This year, SIBiol organized a "Train-the-Trainers" workshop conducted over three Saturdays in August 2009 for teachers interested in preparing their students to take and do well at the Singapore Biology Olympiad (SBO) and hence have the opportunity to represent Singapore at the International Biology Olympiad (IBO).

Conducted by many of the same Professors and academics that train the IBO team annually, the intensive and varied programme included lectures, hands-on experiments and a field trip to the Labrador Nature Reserve. The topics covered included biochemistry, molecular biology, plant and animal dissections, systematic and taxonomy, biostatistics and ecology.

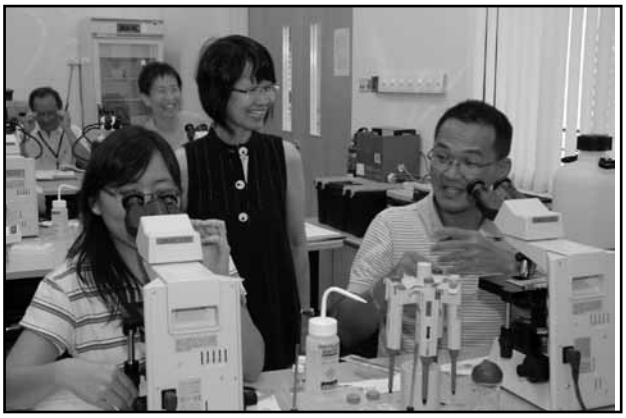
The 16 teachers who attended the workshop had an excellent discussion on the last day of the series on how each school could help prepare their students for future SBOs, with each taking back many ideas learned from the workshop. In particular, the participants found the fieldwork-related sessions very helpful. Many have asked about where to buy sampling quadrats so that they could conduct field samplings with the students.

It was very encouraging to note that even the teachers from secondary schools were already keen to prepare their students for the future. All the teachers shared candidly their passion and enthusiasm in promoting biology through exposing students to the Biology Olympiad and other contests, stretching students to read beyond classroom teaching and to embark on more hands-on and inquiry-based learning.

We learned that most junior colleges have an internal selection process using theory aptitude tests or class tests before sending students for SBO since participation from each school is capped at 8 to 10% of each cohort. Training on practical skills is only carried out if they are shortlisted after the theory round. After the Train-the-trainers workshops, the teachers felt they are better equipped to prepare their students, and could potentially use what they have learnt to develop enrichment programmes all their students regardless of whether they were participating in the SBO.

Participants also valued the free sharing among teachers. Those with little or no experience with SBO found it eye-opening to learn from the more established colleges. Many teachers however, lamented the constraints they face in terms of competing demands, such as from CCA, limited budgets, and manpower limitations. One teacher admitted that he had to pay out of his own pocket to attend the workshop!

Overall, teachers found the sessions very comprehensive and helpful. The trainers were also very impressed by the dedication and commitment of those teachers who sacrificed three consecutive full Saturdays for the sake of biology education



Editor's Comment

WHAT'S A FLOWER FOR?

"We tend to assume that flowers were placed on this Earth to gladden our hearts…"
Sir David Attenborough

Try this. Ask the people around you, what's a flower for? What's its purpose, what does it do? It is (tragically) funny how an alarmingly large proportion of them will be stumped!

To those who manage to include "reproduction" anywhere in their answer, the purpose of a fruit, or the relationship between flower and fruit, is often another source of perplexity.

This, despite having learned it all in school, moreover fruits and flowers being part of our everyday lives!

Yes, it has been said that 'an Education is what is left, after what has been learnt has been forgotten', thus giving credence to the general acceptance that we will inevitably forget the 'fact and figures'… But, I would argue that 'facts' such as the role of a flower would never be forgotten, if a student learnt it, not by rote, but through understanding and 'seeing it' in our everyday lives.

That is why it is so fitting that we should, on the occasion of our 35th Anniversary as a society that pledges to 'promote biology', honour the two outstanding biologists mentioned in this issue.

They have led their field in research, but are also universally remembered by students for their evocative teaching. They have taught, nurtured and mentored whole generations.

Not having the privilege of ever being taught by either of them, I have but listened to and read the glowing citations prepared for this occasion. The common thread has been their ability to reach out to students with their inspired teaching. No mere recitation of facts here, but a desire to seek and impart a deeper understanding of the remarkable workings of nature.

No wonder then, the impact they have had over the years. Our heartiest congratulations, Professors!

WHAT AN EXPERIENCE!

Dong Yangzi, Ang Qi Yan, Tan Wei Han and Yuan Chengxiang

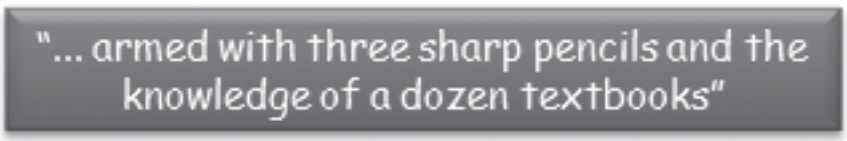
Ms Dong Yangzi, Ms Ang Qi Yan, Mr Tan Wei Han and Mr Yuan Chengxiang represented Singapore at the 20th International Biology Olympiad in Tsukuba, Japan, and returned with the best medal haul ever, including the Top Gold Medal for Ms Dong. They share with us their experience:

It is with these anecdotes that we stepped with anxiety and apprehension out of the plane and into Japan, the Land of the Rising Sun. Known for Mount Fuji, cherry blossoms and raw seafood, arriving in Japan was like a dream come true, especially so after the torturous and lengthy night-flight. Little did we know that the week to come would fly by!

The first two days we spent in Japan confirmed all our expectations — Japan was modern, clean and beautiful, yet still in touch with Nature. What other reason could explain the tall and beautiful tree growing right in the middle of Tsukuba Convention Centre lobby?

We did not, however, have the chance to enjoy the scenery and shopping of Tsukuba, as we were plunged straight into the programme. We received our experiment kits with trepidation while our excitement grew. The familiarisation tour of the laboratories raised more questions than it answered — What are they going to test? Would there be any dissections? Will they provide us with stereoscopes?

The practical tasks were to be first: Four tasks the next morning, each one-and-a-half hours of hands-on work, covering topics from Animal and Plant Physiology to Biochemistry. That night was spent fitfully.



Morning arrived, and so did we at the Tsukuba University, armed with three sharp pencils and the knowledge of a dozen textbooks. We said our final good-lucks and good-byes, and marched into the examination grounds with our fellow competitors.

Ang Qi Yan during practical

The next eight hours were likely the most harrowing experience of our lives. Silkworms, Chlamydomonas, crushed Drosophila heads… the tasks were so varied and dazzling that we were utterly exhausted at the end of each session.

That is not to say the entire day was a bad one. All of us, separated from our comfortable quartet, made new friends. It was awkward at first, when we tried to understand each other's accents, but by the end we were patting each others' back, congratulating one another for having completed half of the competition. That night, we would enjoy 'Origami Night' with the same friends, laughing at the host's antics and gimmicks.

The theoretical examinations was the second and last of our trials. Even as we compared answers in between bites of spaghetti and rolls during lunch, we were thinking of the liberation that we would experience at the end of the day. As the last seconds ticked by, the examination hall was filled with energy, ready to burst.

However, as we streamed out of the lecture theatre, we felt a sense of loss. Was that all? The end? Finale? As the sun dripped melancholically over the rolling grass, we returned to the university grounds after a trip to the

"...as we streamed out ... we felt a sense of loss. Was that all?"

convenience store, to be greeted by the sound of drums and the smell of food cooking. It was no time to feel glum, Tsukuba Night was starting!

As we enjoyed the festive atmosphere at this matsuri, we thought about the previous six months. Ever since we were selected, we had been training hard, losing hair and sleep over the unusual method of genetic analyses of ascomycetes, the curious exhibition of torsion in gastropods, and the remarkable diversity of life in pond scum. Now that we have accomplished what we aimed for, what was there left?

Plenty, in fact. Over the next two days we played as hard as we could, staying up after midnight watching Japanese sumo wrestling, buying out the souvenir shops in Nikko, Tochigi Prefecture, eating the best sashimi and wasabi of our lives.

Chengxiang, Wei Han, Yangzi and Qi Yan after the Awards Ceremony

These were the best parts of the journey —results did not matter (though they would indeed be the cherry to top off everything!), what mattered was that we went, we saw, and we encountered. Friends from all over the world, that is!

And lastly, the awards ceremony. We were nervous even as we sat down for the special lecture session; even more so as the medallists were called and filed one by one up on stage. The four of us sat in a row and held hands tightly, our knuckles white with the effort.

Each medallists' country was announced first, then their name — hence we tensed up every time the master of ceremonies pronounced the syllable 's'. We gave a small cheer of relief as all the bronze medallists were announced. Then the top fifty. Forty. Thirty…

"The four of us... held hands tightly, our knuckles white with the effort."

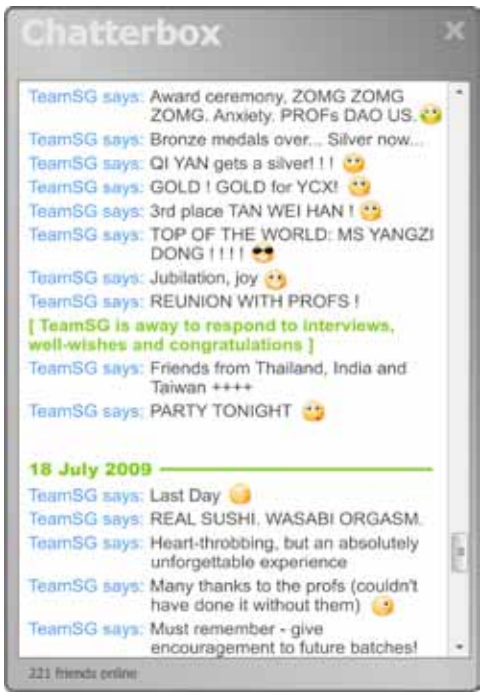
with Thai Team

with Chinese Taipei Team

Tsukuba Night

After what seemed a lifetime, the ceremony was over. Elation was evident in the auditorium; there were people chatting, celebrating and taking pictures. We hugged each other, congratulated each other, and looked at each others' medals and certificates. Everyone enjoyed themselves immensely at the buffet and dance party later in the evening — We were glad to bring an end to this significant event of our lives.

Eight days passed like a dream. Before we knew it, we were seated and buckled for the gruelling seven hour flight. But this time, the journey seemed shorter and easier, as we joked and laughed all the way back to Singapore.



UPCOMING EVENTS

Welcome to New Members
A warm welcome to the following new members:

Ordinary Member
Dr. Kim Mijung
Dr. Mohini Ahirwar

Life Member
Mr. Goh Yan Yih
Mr. Hong Enping
Mr. Peng Nan
Mr. Teo Shiyi
Ms. Karenne Tun

35TH ANNUAL GENERAL MEETING

SIBiol's 35th AGM will be held on Saturday 17 October 2009 at 4pm in the Tudor Ballroom, Goodwood Park Hotel. All members would have received a Notice of Annual General Meeting from the Honorary Secretary with details of the Agenda and other documents via postal mail.

Aside from the Annual Report, Council Election, and regular business matters of the society, one additional item on the Agenda this year is the discussion for possible changes to the society's Constitution, in particular, the current stipulation that restricts the number of Fellows of the Institute to six at any instant. We urge members to attend and contribute to a productive discussion.

10th SINGAPORE BIOLOGY OLYMPIAD

November - December 2009
National Institute of Education, Nanyang Technological University

The 10th Singapore Biology Olympiad (SBO), which is organised by SIBiol, with support from the National Institute of Education, Nanyang Technological University (NIE/NTU), Department of Biological Sciences, National University of Singapore (DBS, NUS), and the Ministry of Education, will take begin in November 2009. This annual competition sees the cream of our country's pre-university biology students competing against one another for honours and for the chance to represent Singapore at the next International Biology Olympiad. All participants first sit for a Theory Test (to be held on 10 Nov 2009). The top students emerging from the Theory Test round will move on to the next round of evaluation in a Practical Test (to be held in Dec 2009). Both rounds will be conducted at NIE/NTU. More information on the SBO and IBO are available on the SIBiol website at http://www.sibiol.org.sg/ibo/

UPCOMING EVENTS

SIBIOL TEACHERS' WORKSHOP AT ISEC 2009

Effective Learning and Talent Development through Science Research Projects for Students

This workshop will be conducted as part of the exciting programme at the International Science Education Conference 2009 (ISEC 2009), to be held 24th to 26th November 2009, at the National Institute of Education, Nanyang Technological University. The workshop is open to all registered conference participants. ISEC 2009 will see over 700 international participants, including teachers from every school in Singapore.

Workshop Synopsis:
The easy access of scientific knowledge through the World Wide Web is transforming the way science is learned and taught in school. A modern teacher should not be teaching science mainly via a process of knowledge transfer but to also capitalize on the IT-savvy students' ability to get science information online and facilitate their learning through knowledge discovery. This is of strategic significance because science is best learned through inquiry with experimentation. Mentoring students to work through a science project can be a structured way of teaching science with students taking the driver seat. In conjunction, science research projects are also effective means to develop science talents among students. However, many teachers are apprehensive about student project mentorship. This 1.5 hr workshop aims to equip teachers with some basic understanding of the scientific process and methodology so that they would be able to guide students on research matters ranging from hypothesis development, experimental design, scientific writing to project presentation at a science fair. Tips on how student projects can be of high standard for winning awards at science fairs will be shared.

This workshop is suitable for secondary and pre-university science teachers.

Workshop Facilitator:
Dr Lim Tit Meng is an associate professor at the National University of Singapore, and is the President of the Singapore Institute of Biology 35th Council. He has held appointments as the Chairman for the Science Mentorship Programme, the Science Research Programme, as well as the Director for the Singapore Science and Engineering Fair. He is a seasoned judge in many science fairs and he regularly conducts workshops on research projects for students.

Workshop Details:
Date: Wednesday, 25 November 2009 (Day 2 of ISEC 2009)
Time: 11.00am to 12.30pm
Venue: Lecture Theatre 3, National Institute of Education
Fee: S$10 per participant

The above workshop schedule and venue are correct as of going to press. However, ISEC 2009 participants interested in attending this workshop should check the latest programme details at the conference website at http://www.nsse.nie.edu.sg/isec2009/

About ISEC 2009

The International Science Education Conference 2009 is jointly organized by the Ministry of Education, Singapore and the National Institute of Education, with support from the Singapore National Commission for UNESCO. With the conference theme of "Science Education: Shared Issues, Common Future", this event will bring together over 700 international science education researchers, science educators, school leaders, curriculum developers, and policy makers at all levels, from elementary/primary school to tertiary institutions. The conference will offer participants opportunities to update themselves with news and views of recent developments and to exchange ideas with leading international experts in the field. Five leading authorities from Canada, Germany, Hong Kong and USA will be giving keynote addresses on key issues in Science Education today.

ISEC 2009 SINGAPORE

35TH ANNIVERSARY DINNER

The 35th AGM on Saturday 17 October 2009 will be followed immediately by a celebration dinner at the same venue, starting at 7pm, to mark the 35 years since The Singapore Institute of Biology was formed in 1974 by an enthusiastic group of biologists who wanted to further the cause of Biology and its applications. SIBiol will be taking the opportunity to honour two prominent and highly regarded biologists, one of whom was among the group of founding members of the society. The highlight of the evening will be the presentation of the following awards:

Honorary Fellow of The Singapore Institute of Biology

To Professor Chou Loke Ming, Fellow SIBiol.

When the Singapore Institute of Biology conferred the Fellowship of SIBiol to Prof Chou in 1999, it was in recognition of his significant contribution to the society, and for a long tradition as a champion of biology in Singapore. Prof Chou is acknowledged as one of the pioneers of research and education in marine biology in Singapore. His scientific contribution to the study of coral reefs is internationally recognised, and his over 100 peer reviewed publications attest to this passion.

Ten years on, Prof Chou has continued his unwavering support of SIBiol and our activities, and he has been a true pioneer and mentor to this day. He has graciously accepted various speaking engagements in events that SIBiol has organised, provided mentorship to research projects on the marine environment, as well as pioneered various marine habitat restoration efforts in Singapore and the region.

SIBiol again prepares to confer Prof Chou with an Honorary Fellowship in October 2009, to honour an individual who has kept faith with the society, and who continues to make a difference in the teaching, learning and discovery in the exciting realm of marine biology. He continues to be an inspiration to students and scientists locally, regionally and in the international arena.

Lifetime Contribution to Biology Award

To Professor D. H. "Paddy" Murphy

With a career more than five decades long as an active and energetic field biologist, Prof Murphy has named more than 20 species and several genera of arthropods, and has had more than a hundred species of insects and arthropods named after him. He has collected and accumulated a vast number of specimens, deposited at the Raffles Museum of Biodiversity Research (RMBR) at the National University of Singapore, a resource that continues to be drawn on for study by a new generation of taxonomists.

However, the lifetime achievement of Prof Murphy lies not only in his success as a field biologist and an eminent animal taxonomist. For this accomplishment, he was given the award of Distinguished Biologist in 1989 by SIBiol. His far greater achievement in life as a biologist is in his educating and developing a generation of zoologists and field biologists in Singapore, some of whom are today themselves biology educators and respected leaders in biodiversity conservation in the country.

With his charismatic personality and vast knowledge, Prof Murphy has excited, attracted, and guided young biologists here to follow in his footsteps to document the island's biodiversity. For his immeasurable and valuable contributions to the knowledge of plant and animal biodiversity of Singapore, and for his inspired mentorship of so many among Singapore's community of biologists, SIBiol is proud to bestow Prof Murphy with the Lifetime Contribution to Biology Award.