

biol **SI** BULLETIN

Volume 26 Number 2

Oct 2003

M.I.T.A (P) No. 209/04/2003

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Dr Darren Yeo



14th International Biology Olympiad (2003)

The Singapore team with their two mentors, Dr Shirley Lim and Dr Beverly Goh

WE WELCOME THE FOLLOWING NEW MEMBERS

Life Member:

Dr Chew Fook Tim

Ordinary Members:

Mrs Susan Kwan
Dr Low Boon Chuan
Dr Mok Yu Keung Henry
A/P Shoba Raganathan
Dr Seow Teck Keong
Mr Joshi Shashikant

ERRATUM

Due to an oversight, Ms Tan Lay Pheng's name was inadvertently left out from 29th SIBiol Council list in the previous issue of the SIBiol Bulletin (Vol. 26 No. 1). The error is regretted.

EDITOR'S NOTE

This issue contains write-ups on some of the major activities of the SIBiol over the past year, including the Biodiversity of Singapore Symposium 2003; the 4th Annual National Biological Convention; the Workshop on Life Science for primary science teachers; and participation in the 14th International Biology Olympiad. Also included is the First Announcement of the *Biology in Asia* International Conference that we are organising to mark the 30th Anniversary of the SIBiol.

I would like to express my sincere thanks to all who have contributed articles, announcements and photographs, and helped in various other ways towards the publication of this year's SIBiol Bulletin (Volume 26, nos. 1 and 2). Special thanks to Yong Ann Nee for her excellent work on the present issue.

Darren Yeo

The Fourth Annual National Biological Convention (ANBC) of the Singapore Institute of Biology (SIBiol)

Oct 18 (Saturday), Guild House, National University of Singapore Society

Benito C. Tan

Chairman, 4th ANBC, SIBiol

This year's ANBC organized by the SIBiol again features a line-up of interesting talks, and, as before, will fall on the same afternoon as the AGM (Oct 18, Saturday). Over the past few years, the ANBC programme has become popular among members, who have participated both as speakers and audience. The gathering has turned out to be an educational experience for everyone in addition to the once a year renewal of friendship and camaraderie.

Considering the current trends and publicity generated in life science education and research programmes, we have lined up several good speakers to talk about topics related to life sciences, in addition to other topics on plant and animal biodiversity and ecology. We urge all members to find the time to attend this year's AGM as well as the ANBC programme afterward, which will be from 3-5 pm. The programme and abstracts are as follows -

- | | |
|---------------|---|
| 11:30-12:00pm | Registration of members/participants |
| 12:00-1:15pm | Buffet lunch |
| 1:15-2:30pm | AGM business meeting and reports |
| 2:30-2:50pm | Special presentation by the 2003 IBO student participants |
| 2:50-3:00pm | Coffee break |
| 3:00-5:00pm | ANBC Seminar presentation |
| 3:00-3:25pm | Beyond Bio-informatics and Computational Biology
Tan Tin Wee (<i>Dept. of Biochemistry, NUS</i>) |

Abstract. - Biology has become Big Science these days. Sophisticated bioinstrumentation from automated sequencers to microarray systems 24by7 churns out ever increasingly large scales of output, throughput and data generation. The data generated may come in the form of linear DNA sequences through to complex movie clips of living cells labelled with quantum dots captured in confocal microscopy: from 1 dimensional sequence data, 2D image of pixels, and 3D X-ray structures, familiar to most, to 4D NMR spectroscopy and 6D space-time-spectral records of every voxel in a tomographic slice. These data necessarily have to be manipulated by computer software and integrated with data management tools that serve as the new fundamental building blocks for biomedical research in the dawning of a new bio-informational millennium. All bio-scientists must address the complex issues of open data sharing within the scientific community and to eliminate the barriers to interoperability in a complex web of biomedical computing systems. The entire community has to gel together and go beyond the engineering issues of bio-informatics and computational biology. The potential application, the infrastructure needed to support the system, and the problem encountered during this transformation will be discussed.

3:25-3:50pm **Molecular phylogenetics of the betel nut palms and their relatives (Arecaceae; Areceae; Arecinae) based on two low copy nuclear genes**

Adrian Loo¹, Dransfield, J.³, Lewis C.E.², Chase M.W.³ and Baker W.J.³

¹Dept. of Biological Sciences, NUS

²Fairchild Tropical Garden, Miami, USA

³Royal Botanic Gardens, Kew, UK

Abstract. - Subtribe Arecinae comprises eight palm genera distributed from India to Australia and Fiji. We gathered data from two low copy nuclear genes, phosphoribulokinase (PRK) and RNA-polymerase-II, subunit B (RPB2), to evaluate the monophyly of the subtribe and genera, and to explore the radiation of the group across its range and the evolution of dichogamy. Surprisingly, the subtribe was found to be non-monophyletic and divided into three major clades. The first clade, consisting of the Sri Lankan monotypic *Loxococcus*, is more closely related to a clade of Pacific arecoid genera than to any other member of the Arecinae. The second clade comprises *Pinanga*, *Nenga* and *Areca*, and is most diverse to the west of Wallace's Line. The third clade is restricted to the east of Wallace's line with species diversity centred on New Guinea; it includes four poorly defined genera, *Gronophyllum*, *Gulubia*, *Siphokentia* and *Hydriastele*, two of which are not monophyletic. The topology indicates that convergent floral morphologies, which correlate tightly with shifts between protandry and protogyny, have arisen several times.

3:50-4:15pm **Language for cell communications**
Low Boon Chuan (*Dept. of Biological Sciences, NUS*)

Abstract. - Cells in our body define our well-beings. Any irregularities in their behaviour often result in unwanted fates in disease manifestation. How exactly our cells sense the cues for their right actions at the right place underlies the basis for tight control in their communications. This talk will illustrate some of the mechanisms that cells adopt to achieve just that.

4:15-4:40pm **Structure determination of proteins related to human diseases using NMR (Nuclear Magnetic Resonance)**
Henry Mok (*Dept. of Biological Sciences, NUS*)

Abstract. - An understanding of the role played by a protein molecule in human disease requires a detailed picture of its three-dimensional structure and identification of crucial amino acid residues involved in interaction with its targets. Structural information will shed light on the molecular pathology of human disease and aid us to design drugs that could potentially cure the disease. Over the past several years multi-dimensional (3-D or 4-D), multi-nuclear (¹H, ¹⁵N and ¹³C) solution NMR spectroscopy has become a powerful technology for obtaining both structural and dynamical information on protein and protein-ligand systems with molecular weight up to 30-40 kDa. A brief description on how NMR can be used for protein structure determination will be introduced. *Salmonella typhi* is the bacterial pathogen involved in typhoid fever. The bacteria employ their pili as a tool to adhere onto human intestinal cell before they can invade the human body. The structure of PilS protein (the pilin monomer that made up the pilus) was determined by NMR. Its structure allowed us to build a model of the pilus and to understand how pilus can adhere onto human intestinal cell through its interaction with the Cystic Fibrosis Trans-membrane Conductance Regulator (Cl⁻ channels on cell surface).

4:40-5:05pm **Where is Nemo? - The Clownfishes in your backyard**
Zeehan Bte Jaafar (*Dept. of Biological Sciences, NUS*)

Abstract. - The lifestyle of "Nemo" and other species of clownfishes made popular by the movie, "Finding Nemo", will be discussed, including their courtship behaviour, parental care, larval phase, social hierarchy and even sex change! Its threatened habitat and conservation measures in Singapore water will be highlighted.

5:05pm Closing of 4th ANBC



Guest of honour, Dr Vivian Balakrishnan, Minister of State for National Development, delivering the Opening Address.



The chance to interact and exchange views was an important feature of the symposium.



Some of the topics covered left the audience on the edge of their seats

The Biodiversity of Singapore Symposium 2003

Darren Yeo

Co-organiser, The Biodiversity of Singapore Symposium 2003

The Singapore Institute of Biology (SIBiol) jointly organised the “Biodiversity of Singapore Symposium 2003” together with Nature’s Niche Pte. Ltd and Raffles Museum of Biodiversity Research of the Dept. of Biological Sciences, NUS (RMBR), on 11 – 12 July 2003. The event, which was officially opened by Dr Vivian Balakrishnan, Minister of State for National Development, also saw the launch of the new Chek Jawa guidebook as well as an award presentation to Lady Yuen-Peng McNeice in recognition of her contributions to nature and conservation in Singapore.

Under the main theme of “Biodiversity of Singapore – What’s Up?” the symposium highlighted the important work of numerous organisations and individuals, whose efforts contribute to the vibrant biodiversity scene in Singapore. There were four themed sections within the symposium, and the plenary speakers for the sessions were A/Prof Peter Ng of RMBR [Research Session]; Dr Leong Chee Chiew, COO, National Parks Board [Management Session]; Prof. Leo Tan, Director, National Institute of Education, NTU (NIE/NTU)[Education Session]; and Prof. Chou Loke Ming (Dept. of Biological Sciences, NUS)[Conservation Session]. Organisations represented included the Agri-food and Veterinary Authority; Asia-Pacific Centre for Environmental Law (Faculty of Law, NUS); Ministry of Education; NIE/NTU; National Parks Board; Nature Society, Singapore; RMBR; Singapore Environment Council; Singapore Zoological Gardens; and the Urban Renewal Authority. Our own SIBiol was also introduced in a talk titled “Promoting Biodiversity Research and Education through the Singapore Institute of Biology” by A/Prof. Lim Tit Meng & A/P Shirley Lim (Present by A/P Lim Tit Meng).

A total of 250 people attended the 2-day symposium that featured 30 talks. The event was a success not only in providing updates and disseminating information on the status of biodiversity-related efforts in Singapore, but also in bringing together biodiversity workers from different backgrounds, contributing in different aspects, to exchange ideas and experiences, and build camaraderie.

More information and photographs available on the SIBiol website at <http://rmbn.nus.edu.sg/biodiversitysymposium/>



A/P Lim Tit Meng introducing SIBiol and its role in education to the local biodiversity community.

Biology in Asia International Conference

Singapore
29th November to 2nd December 2004

National Institute of Education
Nanyang Technological University



Jointly Organised by:
The Singapore Institute of Biology
National Institute of Education, NTU
Department of Biological Sciences, NUS



Supported by:
Ministry of Education, Singapore

Introduction and Invitation

It gives us great pleasure to invite you to participate in *Biology in Asia*, an international conference marking the 30th anniversary of The Singapore Institute of Biology (SIBiol) in 2004. The conference aims to provide a platform for Singaporean and international biologists to interact and exchange the latest ideas and techniques in the business of biology—from the fields of education, to research to applied biology—especially with respect to Asia, often touted as an arena of rapid economic growth and growing global influence. We look forward to welcoming you.

The Organising Committee
Biology in Asia International Conference 2004

Conference Goal

To examine the roles of biologists in the 21st century, especially within the context of Asia.

Conference Themes

Biology in Asia aims to cover a wide range of topics under three sub-themes:

1. Biodiversity, Ecology and Conservation in Asia
2. Biotechnology in Asia
3. Biology Education in Asia

Presentations

Both oral and poster presentations are welcome. The official language of the Conference is English.

Publications

Abstracts will be compiled into a Conference Book of Abstracts. No Proceedings will be published.

Conference Keynote Speaker

Dr Richard Leakey (*Managing Director, Richard Leakey and Associates Ltd.*)

Other invited speakers

Dr Peter Ng (*National University of Singapore*)

Dr David Micklos (*DNA Learning Center, Cold Spring Harbour Laboratory*)

Dr Stuart Davies (*Harvard University*)

Dr. Lanna Cheng (*Scripps Institution of Oceanography, University of California, San Diego*)

Dr L G Eldredge (*Pacific Science Association, Bishop Museum*)

Dr Patrick Grootaert (*Royal Belgian Institute of Natural Sciences*)

Biology in Asia International Conference, 2004

Social Programme and Post-conference events

Details will be given in the second announcement.

Deadlines

31 Jan 2004:

- Release of 2nd Announcement
- Call for Abstracts
- Registration opens

15 Oct 2004:

- Abstracts due
- Early Bird Registration ends

29 Nov 2004:

Final Registration

For enquiries, please contact:

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E-mail: dbsbox5@nus.edu.sg

Conference website:
[http://www.dbs.nus.edu.sg/
sibiolconference/](http://www.dbs.nus.edu.sg/sibiolconference/)

Organizing Committee

Dr Shirley Lim (Co-Chairperson)
Dr Lim Tit Meng (Co-Chairperson)
Dr Beverly Goh (Treasurer)
Dr Darren Yeo (Secretary)
Dr Chia Tet Fatt
Mrs Chua-Lim Yen Ching
Dr Diong Cheong Hoong
Dr He Jie
Dr Li Daiqin
Mr Lee Siew Lin
Mr Jacques See
Dr Sanjay Swarup
Dr Benito Tan
Ms Tan Aik Ling
Dr Tan Lay Pheng

Second Announcement

A second announcement will be released in early 2004 and will include detailed information on the following:

Registration and registration fees

(Reduced fees apply to SIBiol members/students)

Accommodation

Submission of Abstracts

Workshop on Life Science for Primary Science Teachers

He Jie

SIBiol Life Sciences Workshop Coordinator, 2003

Due to overwhelming response last year, the Singapore Institute of Biology organized another Life Sciences Workshop on “**The Microbial World**” for Primary Science Teachers from 30th May to 31st May 2003. The Workshop was held at the National Institute of Education, Nanyang Technological University. The main objective of the Workshop was to update knowledge and skills related to life sciences teaching, and consisted of a one hr introduction by Dr Tham Foong Yee, followed by two half days of hands-on activities which were conducted by Mr Timothy Tan, Ms Tan Aik Ling and Ms Tan Lay Pheng.

Fifty-one teachers from 12 primary schools attended the Workshop. From feedback received, more than 95% of the participants strongly agreed that “objective were achieved”, “the workshop was relevant and interesting” and that they had “...learnt useful ideas/skills”. About 90% of participants agreed that they could “...apply the ideas/skills learnt in my work”, although some felt that “There are not adequate facilities in schools to conduct the same activities.” Still others indicated that they had hoped for more time in the workshop, as they found “The duration of workshop (is) too short”.

More information and photographs available on the SIBiol website at <http://rnbr.nus.edu.sg/sibiol/galleries/microbial-30may2003/index.htm>



The laboratory was a hive of activity during the hands-on session



Mr Timothy Tan (second from the right) conducting the laboratory session

FOURTEENTH INTERNATIONAL BIOLOGY OLYMPIAD (2003)

Beverly Goh

*Co-leader, Singapore Team, 14th IBO
(2003)*

The 14th International Biology Olympiad (IBO) was held from 8 – 16 July 2003 in Minsk, Belarus. This was the third year Singapore fielded a team for the international competition. The Singapore team comprised the students: Mr Chew Guo-Liang (ACJC), Mr Ho Jiang Hai (HCJC), Mr Hong Enping (RJC) and Miss Shirleen Soh Ying Qi (VJC). The team was lead by Dr Shirley Lim and Dr Beverly Goh (SIBiol representatives), with Mr Goh Tor Heng (MOE representative). In this third year participating, our students again did us proud by bringing back one Gold and three Silver medals, resulting in Singapore being ranked 5th out of 41 participating countries.

Singapore's ranking in the IBO has consistently been within the top five countries. I think that the excellent performance of our students annually has largely been due to the fact that they are trained well. SIBiol has been fortunate to be able to draw upon a dedicated pool of biology academics from the Department of Biological Sciences, NUS and the Natural Sciences Academic Group of NIE/NTU who volunteer to mentor the students every year. Many of these mentors are also SIBiol members. After having attended one IBO, I can say with certainty that the training of our students makes a big difference between a silver or bronze medal in the Olympiads. On several occasions during this 14th IBO, when Shirley and I were involved as jurors in discussions to vote on whether to keep or remove some molecular biology or botany questions (which are not our area of expertise), we could vote objectively, confident that "our students should know the answer because they are smart and have been trained well" – i.e., the more challenging the question, the more likely our students would answer well.

The students in this year's team turned out to be a good bunch of diplomats for Singapore. They are natural all-rounders who love biology, are outgoing and sociable, and did not display any of the 'ugly-Singaporean' mentality we were

The Singapore Institute of Biology, with support from the National Institute of Education, Nanyang Technological University; Department of Biological Sciences, National University of Singapore; and Ministry of Education, sent a team of pre-university students to represent Singapore in the 14th International Biology Olympiad. Dr Beverly Goh, one of the team leaders from SIBiol, and the four participants (as a group) share with us their experience and feelings on the IBO in the following two articles.

More information and photographs available on the SIBiol website at <http://rmbr.nus.edu.sg/sibiol/ibo/index.html>

afraid of. Although I know all of them would have loved to come back with a Gold medal each, they took their rankings amongst the 163 participants in their stride, not lamenting their performance nor arrogant of their results. In fact, their most unanimous comment about the competition was that "it was fun", "the other participants are nice", "Belarus is a really lovely country" and they did not want to come back to Singapore! Let's hope that we will be able to find similarly bright students with a healthy outlook in life, to represent Singapore in the IBOs annually.

Voices of the participants

*Singapore Team: Chew Guo-Liang,
Ho Jiang Hai, Hong Enping and
Shirleen Soh*

Our journey began almost exactly a year ago, soon after our JC 1 promotional examinations, with the theory round of the Singapore Biology Olympiad in Oct 2002.

Thirty-two participants were selected for the practical round at NUS in Nov 2002, which covered aspects of biology such as microbiology, genetics, plant anatomy and animal diversity. In the end, 8 gold medals were awarded, with the seven Singaporean gold medallists were selected for additional training at NUS.

Twice weekly, we would meet a different professor at NUS for training on their topic of speciality. It was a most enriching experience: we crammed practically a whole year's work in university (perhaps even more) into these three months, on top of juggling our CCAs - most of which clashed exactly with the training schedule - and irate CCA teachers.

At the end of May, five team members (including one reserve) were chosen to represent Singapore at the International Biology Olympiad in Minsk, Belarus; and to undergo further residential training at NIE during the June Holidays.

The training at NIE was centred on the practical aspect of the competition. In the one and a half weeks there, we practiced sectioning plant parts, dissecting invertebrates, aseptic techniques and gram stains, and culturing microorganisms, all under the guidance of the professors at NIE.

More importantly, the training at NIE was the first real opportunity for us to bond as a team. Every night (that we didn't work too late), we would go out for dinner (and sometimes grocery shopping) together at Jurong point. Crowding around a laptop screen on selected nights to watch a movie in our dorms, trudging down to the pantry every morning, arms loaded with breakfast cereal, cups and bowls, coffee, Milo and milk powder, running round the campus in the evening counting the number of snails that we passed (and calculating their Poisson distribution) are but some of the memories we will cherish.

Finally began the last leg of our journey. We met up with A/Prof Shirley Lim, Dr Beverly Goh and Mr Goh Tor Heng at the airport to board our first flight to Frankfurt. From Frankfurt we boarded the connecting flight to Belarus. By then, those of us who still managed to stay awake chatted with our fellow passengers, almost all of whom were also headed for the IBO.

We touched down at Minsk Airport, and were greeted by a Belarusian folk dance and song. This was just a preview of our



Training with Dr Yeong Foong May, NIE.



Building bridges with Argentinean and Mexican participants - a peek at tomorrow's international biology community.

host's incredible hospitality. For the next one and a half weeks, we were treated to yet more cultural performances, nature tours, and ferried around in convoys of buses escorted by police. We had come for a competition, but got to enjoy much more!

The day after the opening ceremony was the day of our practical test, held at the newly constructed faculty of biology building, located near our hostel. There were four practical papers in total, focussing on four different topics: microbiology, plant (physiology, anatomy and systematics), genetics and animal (anatomy, morphology and systematics), lasting for four hours in total. In between the practical papers there were breaks where we got to know fellow IBO participants better over light refreshments.

Following a day of rest, we had our theory paper, also held at the faculty of biology building. In four and a half hours, we

were to utilise all the biological concepts and knowledge we had learned in the year of preparation to attempt well over a hundred multiple-choice and short answer questions. Many of the questions were unconventional, testing very fundamental principles of biology, and requiring us to really apply, rather than regurgitate what we knew. We emerged from the test somewhat dazed, but half glad that the competition elements of the Olympiad were finally over.

The subsequent days were filled with anticipation of our results. Various tours of the sights, sounds and nature of Belarus were held by the organizing committee, in an effort to relieve the participants of their anxiety. From the visits to the many monuments in and around Minsk, to the nature walks around the forests, lakes and bogs of Belarus, we learnt a lot about Belarusian life and their culture. The highpoint of these events was a

weekend stay at a youth holiday camp, situated next to a beautifully clear freshwater lake. During the day, we were either out boating on the lake, or sitting at the end of one of the jetties just enjoying the peace and serenity. At night, a carnival consisting of cultural performances, good food (and drink), and an outdoor disco party broke down all barriers between participants from different countries, as we ate and danced the night away.

By the time the results were announced in an elaborate closing ceremony on the last day of the Olympiad, we had enjoyed ourselves so much that whatever came would prove to be inconsequential. We all did well overall, with our team garnering three silvers and a gold. Singapore was ranked 5th amongst the 44 participating countries.

Our heartfelt gratitude goes out to all those who made this possible. Our trainers from NUS and NIE who prepared

us well for the theoretical and practical aspects of the competition: we would never have done so well without all of you; Mr Goh Tor Heng, the representative from MOE who handled all the logistical and administrative matters; and our parents, teachers and friends for all the encouragement. A very special mention for A/Prof Lim Tit Meng, A/Prof Shirley Lim, and Dr Beverly Goh: A/Prof Lim Tit Meng helped organise all our training sessions at NUS, and was a great source of encouragement during the entire training process. Apart from putting us through some rigorous (but thoroughly enjoyable and enriching) animal dissection sessions at NIE, A/Prof Shirley Lim and Dr Beverly Goh also accompanied us to Belarus as jury members of the Olympiad, staying up till (very) late going through our scripts, looking out for our welfare, and providing wonderful companionship in the fortnight that we were away from home. We are deeply indebted to both of you.

In the end, the treasures of the Biology Olympiad are not the silver and gold medals, nor the many souvenirs we were given by our fellow participants, nor even the trophy that each of us got (every single one of those beautiful glass trophies pictured broke in some way or another on the way back to Singapore). What are most precious to us are the friendships that were forged, both in preparation and competition, as well as our love for biology that was seeded and nurtured during the Olympiad. We look forward to seeing the future batches of Olympians following this path.

**4th SINGAPORE BIOLOGY
OLYMPIAD
November 2003
National Institute of Education,
NTU**

The 4th Singapore Biology Olympiad (SBO) will begin on 1 Nov 2003 with a theoretical test, from which candidates will be short-listed for a subsequent practical test round to be held on 12 Nov 2003. Both rounds will be conducted at NIE/NTU.

More information and photographs is available on the SIBiol website at <http://rmbn.nus.edu.sg/sibiol/ibo/index.html>