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International Biology Olympiad

Four Gold medalists: Justin Lim Yi Shen from Raffles Institution, Tang Fengjie from Raffles Institution, Jacy Mok Kai Lin from Hwa Chong Institution, Li Jiaqi from Raffles Institution

Singapore Junior Biology Olympiad

2016 marks the first year of the Singapore Junior Biology Olympiad, which caters to the secondary, as opposed to Junior College, students.

SIBIOL Workshops

SIBiol organised two workshops: the first on medical and laboratory skills for students and the second on infectious disease, for teachers.

SIBIOL Public Forum

SIBiol held its annual public forum on 30th July, featuring two speakers and with the theme of the forum as: "Climate Change and Us".

Message from the President

Dear Friends,

The Council Year 2015/2016 has achieved a big success. The 42nd SIBiol Council is proud to announce the best result ever obtained by Singapore in International Biology Olympiad (IBO) in Vietnam this July. Team Singapore garnered 1st (Top gold), 3rd (Top gold), 12th (Gold), and 21st (Gold) out of 253 participants all over the world, placing Singapore the first place of nearly 70 participating countries. This extraordinary outcome was achieved not only through the huge efforts of our students in Team Singapore, but also the mentorship from SIBiol members and our partners from DBS (NUS), NSSE (NIE/NTU), SBS (NTU), CPDD (MOE), as well as our enthusiastic SBO/IBO alumni providing guidance and training to the team.

This year is also commemorable for our first launch of Singapore Junior Biology Olympiad (SJBO) which involved the participation of 1029 students from 38 schools. SIBiol is grateful to the organizing committee A/P Lim Tit Meng (co-chair), Dr Beverly Goh (co-chair), Dr Goh Yan Yih, Dr Melissa Jane Fullwood, Dr Chen Zhong and Mr Stanley Quek and CMA for their assistance. I also thank Science Centre Singapore for hosting the practical round of SJBO.

As an affiliation of the Singapore National Academy of Science (SNAS), this year SIBiol is proud of contributing SNAS's official academic journal, COSMOS. I am editing a special issue of COSMOS on "Climate Change". I appreciate the manuscript submissions from SIBiol members and our friends in academia. In addition, Dr Adrian Elangovan organized a Public Forum with Science Centre Singapore themed on again "Climate Change". Dr Melissa Fullwood, Dr Deepak Babu, Mr Stanley Quek, and Mr Javan Lee conducted two workshops on Infectious Disease and IBO Practical Skills, respectively.

SIBiol also endeavored in many other frontiers. Research Trust Fund was awarded to Dr Theresa Su and Dr Paul Chen for their proposed research: the feeding ecology and behaviour of dotillid crabs in response to human disturbances. The SIBiol Book Prize was awarded to Saifoon Faheema (SP) and Low Zihao (NIE). Another piece of good news is the fostering of the partnership of SIBiol and Bio-Rad Laboratories Singapore Pte Ltd in promoting biology research and education in Singapore.

I would like to thank all Council members, especially the secretaries Dr Jani Tanzil and Dr Abigayle Ng, the treasurer Mr Yap Wei Liang Nicholas for their hard work in managing SIBiol's matters. Going forward, I look forward to new and continued supports from members and partners to bring our society to a new height!

Best regards,

Chen Zhong, President, 42nd Council
Assistant Professor, Natural Sciences & Science Education
National Institute of Education, NTU

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Singapore Wins at the 27th International Biology Olympiad

By Stanley Quek, Justin Lim, Tang Fengjie, Li Jiaqi, Jacy Mok

This year, our students have put in the finest of work and overcome many odds. After putting in countless of hours agonizing over textbooks and many sleepless nights worrying about everything that could go wrong, the team have overcome themselves and the competition.

This year's team comprised of: Justin Lim Yi Shen from Raffles Institution (1st position, Gold Medal), Tang Fengjie from Raffles Institution (3rd position, Gold medal), Jacy Mok Kai Lin from Hwa Chong Institution (12th position, Gold medal), Li Jiaqi from Raffles Institution (21st position, Gold medal). The haul of 4 Gold medals has enabled Singapore to emerge as the first position in the 27th International Biology Olympiad amongst 68 delegations. This is the third year we have achieved 4 Gold medals, and the second time we have placed first as a team.

The jury team comprised of Dr Beverly Goh, Dr Chen Zhong, Dr Amy Choong, and Ms Tay Wee Beng. The Jury Team checks the practical and theory papers before they are given to the students, and ensures the students have been marked fairly after the exams.

The IBO Experience

This has been a really intense week, probably the most intense week I will experience for a long, long time. The practical and theory tests were all hellishly difficult (the most difficult I've ever seen), and the announcement of awards was absolutely nerve-wracking (my hands were spasming as the medals were being announced).

At the same time, it was the most fun and meaningful week I've ever had. This was my first time going to Vietnam, and I really appreciated the beauty of places like Trang An (even this amateur photographer could get pretty nice photos with "minimal" editing), and the rich culture of Bat Trang. Our guide, Linh, made it even more enjoyable with her friendliness; we really felt like Vietnam was our second home!

I also met many awesome people from so many countries (like Nikita, Ren Jie, ... , there are just too many to tag and I haven't added most people!), and did crazy stuff like dancing at social events (a first for me), and playing poker till past midnight. These are friends who I will never forget and really hope to keep in contact with. Leaving was pretty sad, to say the least.

Of course, I can't forget the people from Singapore who contributed tremendously to our success.

Dr. Beverly Goh, Dr Amy Choong, Dr Chen Zhong and Ms Tay: Thanks so much for being an amazing jury during our trip and for making sure that the long preambles were factually and grammatically correct (they would be unreadable otherwise) and that our papers were marked fairly!

All other professors – Dr Shawn Lum, Dr Ng Ngan Kee, etc: Thanks so much for all the lectures! They gave us lots of content knowledge which certainly came into use in one way or another.

All our alumni, i.e**. Stanley, Jing Hua, Ben See, March Ho, Javan, John Yap, Jonathan Tan, Hui Ting, Daniel Tan, Daniel Lim, Daryl Goh, Samuel Fong**: Thanks for your dedication in coming back to mentor us! You guys really saved this haphazard accident-waiting-to-happen from completely failing the practical during IBO (I only destroyed ONE box of micropipette tips! :P), and helped me to up my theory game by clarifying my numerous misconceptions and by teaching us new tricks (e.g identifying plants using stele types, which completely carried my plant practical). Thanks also for coming to the airport to send us off/welcome us back!

Dr Jeffrey Lee: Thanks for being a really great bio teacher! Your lessons in Y3/4 were my first exposure to hardcore bio content, and your awesome teaching made me appreciate and enjoy learning bio that much more! Thanks also for letting us use the RI lab during our various practices both before SBO and during the holidays, and for helping us to book classrooms. As I've said before, dissections would be so much less fun if we had to do them at home with forks, knives and toothpicks :P

Thanks also **to Dr Abigayle Ng** and the OpenLab lab techs, and to the Hwa Chong lab techs for also allowing us to use their equipment, and to other teachers from RI for reminding us about miscellaneous administrative work.

Last but certainly not least, thanks **Jacy, Jia Qi** and **Feng Jie** for being amazing teammates during this entire period! You guys are really cool, and helped me to chill and just enjoy Bio when preparing for this competition. I really appreciate how you guys didn't mug during our excursions like typical Singaporeans, and encouraged me to go and party; that made IBO all the more fun! Discussing Bio with all of you has also allowed me to understand many new Bio tips, tricks and concepts, especially since I was so horrible at practical and at molec bio in general. I really can't imagine a better team, and I'm so glad that all our efforts paid off :) I'll really miss having fun bonding sessions in the lab and totally nerding out with you guys without being judged :(Let's meet up during the barbecue, during SBO and during the selection camp next year to relive these IBO days and to train (read: torture) a new batch of juniors! :D

I guess I'm rambling, so, yeah, thanks everyone for all the well-wishes! This has been an awesome, unforgettable experience and I have absolutely no regrets (yet; haven't gone back to school to see what I need to catch up on after my long hiatus).

> “ I really can't imagine a better team, and I'm so glad that all our efforts paid off. ”

The IBO Experience

"It's been a crazy week with killer practicals and theory tests but with all your help and support, we survived together."

It's been a long and challenging but fun journey throughout this IBO. I've learnt so many interesting new things, especially how much I still don't know about Biology - thank you to all professors and teachers, especially Dr Goh, Dr Chen, Dr Choong, Dr Ng, Dr Lum, Dr Chew, Ms Tay, Mrs Foo, Mrs Tay, Ms Liu, Mrs Lam and Mrs Cheong! I've got the opportunity to do so many experiments I've never done before. I've gotten to know lots of cool new friends. A big hello to all teams who participated in IBO and Nik, Nadezda, Sergei, Boss, Hoa and Linh, our really nice guide. It's been a crazy week with killer practicals and theory tests but with all your help and support, we survived together *:D*

Thank you to all friends from MGS and Hwach for your interesting Biology questions these years (you guys really made me think)!

To all members of the Singapore training team (Justin, Jia Qi, Feng Jie, Lois, Eric, Yanlong, Marion and Keene), congrats and thank you so much! I really enjoyed our time together at camp, whether it was training with you, laughing on the way back to the hotel or stressing out about tests.

A big thank you to all seniors who organized the camp, went out with us on outings, supported and encouraged us during self-practice sessions and even came to send us off at the airport! Special thanks to Troll Lord Jing Hua and Stanley (~ Hans Simisage Esla)!

To this year's SBO participants and next year's IBO training team, all the best! Study hard, understand rather than memorize, keep calm and enjoy this once-in-a-lifetime experience. *:)* The essential thing is not to have conquered but to have fought well ✌

Biology is awesome and I'll be back for more. See you during next year's training *;)*

IBO has truly been a unique journey for me, one that I never really expected and one that I could only hope to relive. Though our training camp was grueling and, at times, disheartening, I'm glad we went through it as it prepared us really well. This was especially true for stressful situations where we learnt how to prioritise our tasks. Nevertheless, we were still nervous leaving home, but our anxiety somehow faded away when we landed in Vietnam.

Our team honestly didn't feel like a stressful team bent on winning and studying all day and night. The whole journey was surprisingly calm except for a few hours before the papers. The team feels like family and we care so much for each other. Perhaps this was our "winning formula" that stopped us from panicking last minute :P

Our results were pleasantly surprising, and this would surely not have been possible without the training and advice of seniors and professors. Looking back, I have truly gained a greater appreciation of Bio, even in areas that I would not have imagined doing a year ago. Given how enjoyable our practice sessions were, with the freedom to do anything and everything in Biology, adapting back to normal life surely took a while. All in all, IBO was definitely a valuable, eye-opening experience and my gratitude goes out to everyone in SiBiol for making this possible.

"The team feels like family and we care so much for each other. Perhaps this was our "winning formula".

The IBO Experience

> “These tests were designed to stretch our boundaries and push ourselves to our limits. But that’s why we’re here – to challenge ourselves.”

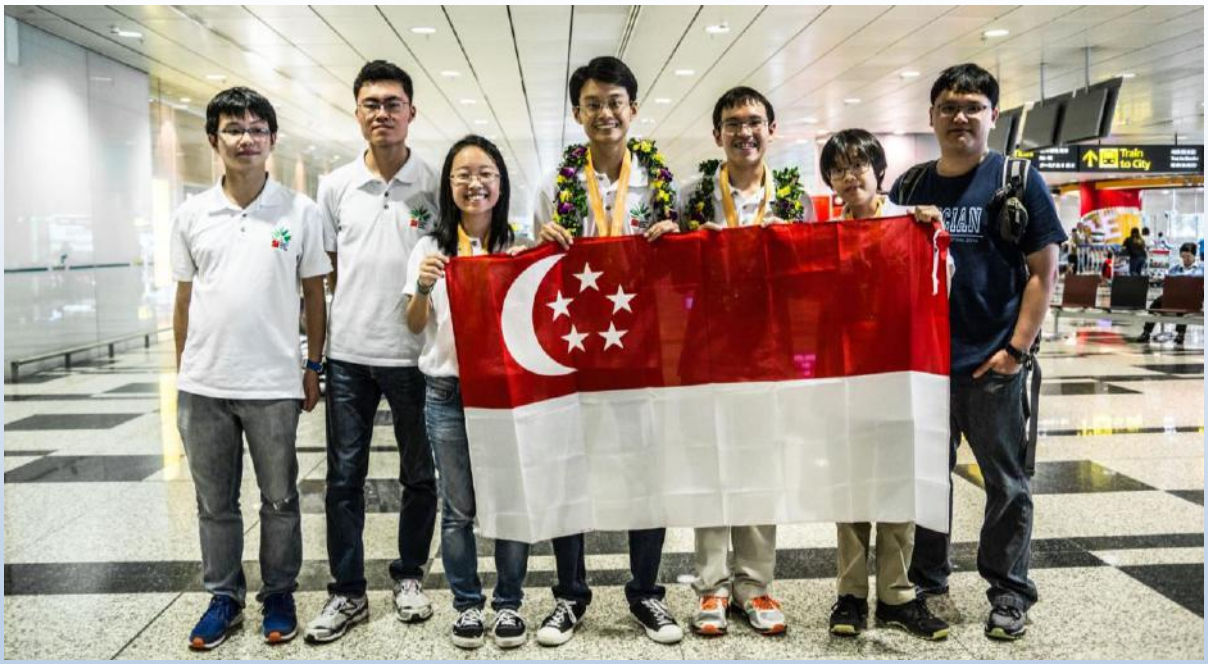
To me, IBO was always an impossible dream. I was just a little kid who liked to spend my days reading about immunology, cutting up prawns and (sometimes) looking at plants. Before the selection camp, I was anxious and doubtful. With 7 SBO gold medallists around, how can a silver medallist myself make the team? Yet, encouraging seniors and supportive friends made the week filled with joy and laughter, and we all emerged from the camp equipped with deeper knowledge, new friendships and purple-stained hands. (From the stains from the plant practical, haha!) After the results of the team were released, I was just really grateful to be given a second chance and an opportunity to go for the IBO.

Weeks of intense preparation began as we started our IBO-countdown. Come to the RI Open Lab and you’ll see us dissecting mealworms (they’re actually superworms), or pipetting food colouring into wells. Or, if you go to HCI, you’ll see 4 kids (+ 1 or 2 seniors) loitering around suspiciously – definitely NOT collecting plant samples to practice sectioning. Or sometimes you’ll see us buried behind stacks of books in the library, wondering what the heck is the Lotka-Volterra equation. Indeed, the journey leading up to the IBO was tiring, but fulfilling and worthwhile.

Then, the day finally arrived – we were off to Vietnam!! At the IBO, we soon realised that there was little studying we could do. It was time to make friends and have fun! From attempting to make pots at the pottery village, to the beautiful, calming boat ride at Trang An; from “dancing” (aka trying really hard to jump to the beat) at night to the 2am poker games, IBO was truly an once-in-a-lifetime experience. In the week, we immersed in the rich culture of Vietnam and experienced the warmth and hospitality of the Vietnamese, and made countless friends from around the world, even countries like Kyrgyzstan (do you know they speak Russian?)

Of course, there was still the competition element of IBO: 4 intense practical tests that we could barely finish, and 2 gruelling theory exams. These tests were designed to stretch our boundaries and push ourselves to our limits. But that’s why we’re here – to challenge ourselves ☺

IBO may be over, but the friendships and experiences will last. In particular, I would like to thank my seniors for their help in our trainings and for answering our incessant questions, from going through papers to teaching us gram staining; our professors who provided insightful trainings and brought us on awesome field trips; and most importantly, my teammates (Justin, Fengjie and Jacy) for being fun-loving, crazy, yet keeping me grounded all the time.



SIBIOL WORKSHOPS

Infectious Diseases Workshop – 20/2/16

Participants and coordinators of the SIBIOL Infectious Diseases Workshop at the Cancer Science Institute of Singapore

WHAT ARE INFECTIOUS DISEASES?

Infectious diseases are caused by pathogenic microorganisms such as bacteria, viruses, parasites and fungi. Most people would have had an infectious disease during their lifetime, whether it is the common cold or something more dangerous. Outbreaks of infectious disease have caused much alarm and panic, such as SARS and more recently, MERS.

QUESTIONS ANSWERED

- What makes infectious diseases so dangerous?
- What can we do to prevent such outbreaks?

SIBiol presented this workshop, where we focused on infectious diseases, one of the new topics that will be discussed in A level Biology in schools. This workshop featured a lab tour, and a simulated game modeling the spread of infection.

The Singapore Institute of Biology held a Teachers Professional development workshop by organizing the 'Infectious disease workshop' on the 20th of February 2016, Saturday, 2.30 to 6.30 pm at the Cancer Science Institute.

Stanley Quek, Deepak Babu and Melissa Fullwood ran this workshop in response to calls from teachers for new workshops on topics very relevant to the teaching syllabus. We covered topics such as bioethics, infectious disease, immunology, especially current topics such as SARS and MERS. We also ran a simulation of an infection using inexpensive materials such as purple cabbage juice as a pH meter and white vinegar as an acid.

The course was well attended and received. The topic is a relevant and useful one for schools as it is easy to see the relevance of our understanding of biology in combating infectious diseases, and important also for helping the general public fight infections.

SIBIOL WORKSHOPS

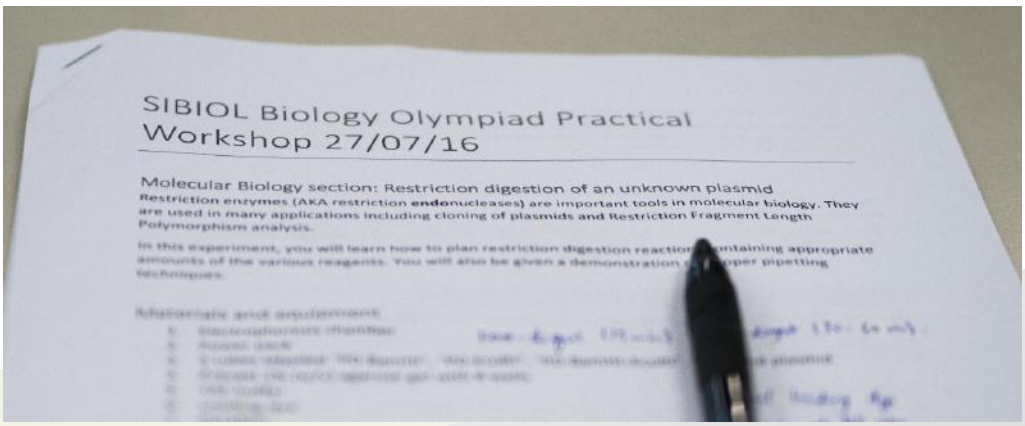
Biology Olympiad Skills Workshop – 27/7/16

Participants and coordinators of the SIBIOL Biology Olympiad Skills Workshop at NUS High School of Math and Science

BIOLOGY OLYMPIAD SKILLS

- Dissection
- Sectioning
- Using the spectrophotometer
- Species Identification
- Restriction digestion
- Gel electrophoresis
- Enzyme kinetics
- Time management
- Ability to follow instructions

A very important part of the International Biology Olympiad is the practical component. Mastering the various skills required by the practical round can contribute to the students' repertoire in their future scientific or medical careers. It has been observed in the annual Singapore Biology Olympiad that most students lack the basic laboratory skills required during research. This workshop aimed to train a few students from some schools, and equip the students with the knowledge they need to spearhead their own training programs in school.



2016 INAUGURAL SINGAPORE JUNIOR BIOLOGY OLYMPIAD

2016 INAUGURAL SINGAPORE JUNIOR BIOLOGY OLYMPIAD

Fun with Microscopes: a photo series

2016 is the first year for the newest initiative of SIBiol: the Singapore Junior Biology Olympiad. The alumni of the Biology Olympiads have always been vocal about how much they have learnt from the entire experience, and how enriching it has been for them; the professors, in agreement with the alumni, have also been pushing hard for the creation of a Junior Olympiad, which would open this experience to younger students.

This inaugural competition is important for establishing the tone for the future Junior Biology Olympiads; in this competition, we want to allow students to exercise their natural ability for observation and adventure, rather than just relying on what they have already learnt in their own textbooks. We want to send a specific message: that Biology Olympiad is not simply about the memorization of facts, or the mindless repetition of practical techniques. Instead, we view this Junior Biology Olympiad as a chance to show students how new wonders are discovered, to allow them to use their natural tendencies for curiosity, to illuminate the patterns in front of their eyes. These are the ideals that increasingly emphasized, especially at the international level. We hope that through the training they will receive and the challenges that they will face, we will show them a new world outside the classroom, one which will definitely improve their school days.

This year's competition started in May, with the online Theory round. The test was uploaded onto a quiz website, allowing students to log in and complete the tasks in their respective schools. The participating students (Secondary 2 to Secondary 4 and their equivalents) had their minds stretched as they tackled "O" level, "A" level, and even IBO standard questions. The students' results in this first round determined their individual rankings for the Olympiad, and determined the top 5 teams who would be eligible for the practical round, which was held at Science Centre Singapore.

We wanted to allow the schools to get a better understanding of the training and selection for the International Biology Olympiad. As such, instead of prescribing that the top four from each school would enter the practical round automatically, the top 7 to 9 names were submitted to the school, which had the responsibility to train and select the final team.

The students arrived early on the day of the Practical round. Some came with Campbell textbooks and others with notes; it was only natural, for these students were those that had excelled at the Theory round. But we wanted to go one step further – to engage them in using their academic knowledge not as an ends in itself, but as a basis for further observation and adventure in the scientific landscape. As far as possible, the practical was set as a series of unconventional yet enjoyable challenges, as an opportunity for the students to explore and expand their limits.

Fun with Microscopes, continued.

For the first half of the practical, the main task for the students was for them to design a dichotomous key from scratch; they were given free reign of the Science Centre's Ecogarden, so that they could better identify and collect arthropods for their dichotomous key. While the students were initially hesitant, in the course of the three hours, we saw them begin to loosen up and enjoy themselves – where at the start they had to be encouraged to overturn rocks, after an hour they had to be cautioned not to reach too far lest they accidentally fall into the pond. The students applied an intense concentration to their construction of the arthropod dichotomous key, as well as in their examination of plant morphological features. In the whirl of activity, the first three hours passed in a blink of an eye, with most teams barely managing to complete their papers.

Riding on the momentum of the first half of the Practical round, the students were quick to get down to work for the second half, showing the same keen absorption in their preparation for the final graded component: a presentation on the theme of conservation biology. We saw the teams allocate the preparation work efficiently, some drafting out a script while other members worked on polishing the slides. At the end of the three hours of preparation, a collective sigh of relief was heard as the thumb drives containing their slides were collected, and lunch was made ready for the students.

The afternoon was capped off with the closing ceremony, which consisted of the students' presentations, and when the jury had given their feedback for the presentations, the prize presentation. Finally, there was a panel of International Biology Olympiad alumni, taking questions from the student audience and returning responses that, as an aside and to some murmured laughter, invited and cajoled the students into aiming to enter the International Biology Olympiad. For the Singapore Junior Biology Olympiad is not a terminal event; as a national secondary level competition, as opposed to its international, A-level counterpart, its main objective is not a cross-examination of the students. Rather, we hope that all the participating students would take away from this Olympiad a more intuitive and deeper understanding of biology, and we hope in conveying that for the subsequent Junior Biology Olympiads as well.

That's all. Thank you!

SJBO 2016 Photos

18 August morning – practical session

Students ready to catch arthropods in the Ecogarden at the Science Centre

Students examining a supposed arthropod they caught in the Ecogarden

SJBO 2016 Photos

18 August afternoon – award ceremony

Prof. Lim Tit Meng closing the ceremony with a congratulatory speech

Mr. Stanley Quek facilitating the IBO alumni panel discussion

SJBO 2016 Photos

With thanks to all who helped!

A thank you to Dr. Savita Sharma (left) the science centre staff

Another thank you to our judges, who are also SIBiol council members

SIBIOL PUBLIC FORUM 2016

What has Climate Change got to do with Rice?

Speech by Professor Prakash Kumar

The recent years have witnessed a worldwide rise in temperature, one of the most pronounced markers of climate change. In Singapore, the urban landscape drives the average temperature up twice as quickly as the global rate. As such, the issue of climate change is increasingly pressing and the discussion of which now expands in both relevance and urgency.

Accordingly, the Singapore Institute of Biology held its annual public forum at the Science Centre Singapore on the 30th of July, from 10 a.m. to 1 p.m, with the theme for this year's discussion being "Climate Change and Us". Professor Prakash Kumar from the National University of Singapore (NUS) conducted the first talk: "What has Climate change got to do with rice?", and Dr. Karenne Tun from the National Parks Board (NParks) followed up with the presentation: "Reef in hot water – the impact of the 2015–2016 El Nino on coral reefs around the world." All in all, the two-part programme drew an attendance of about eighty audience members.

The public forum opened with a thorough review, by Prof. Prakash, of the impacts of climate change on rice. The content was technical, reaching into the molecular mechanisms by which rice interacts with the environment (eg. in submergence tolerance and in drought) and covering the genomic techniques for improvement of genetically modified (GM) rice. At the same time, it was well balanced by its framing in a more local perspective, with the discussion remaining rooted to Singapore's considerations. Singapore imports nearly over ninety percent of the food it consumes, and rice, as a staple food of Singapore, was highlighted as vulnerable to climate change. The concern of food security, given its pertinence to Singapore, was thus underscored all throughout. In this way, as per the theme of "Climate Change and Us", the usual coverage of climate change was extended one step further in order to relate to "Us" – the society and the public.

Dr. Tun, in turn, gave a snapshot of how environmental and societal circumstances – El Nino, urban development – can pan out into the current phenomena of coral bleaching. Where the first presentation supplied depth, this second presentation provided as counterpart a sense of breadth. Dr. Tun delivered an overview of climate change that swept across time: first, the two mass coral bleaching events that have marked our recent timeline. Then, the unfolding future, overcast with the shadow of a third global coral bleaching event and the rise of ocean water levels. And again, the discussion circled back regularly to Singapore. Singapore, while undeniably a vulnerable coastal community, is also as a site of innovation, seen in the establishment of coral nurseries off Pulau Semakau. The response from the audience to this news was encouraging, with an MOE secondary school teacher asking for possible resources with which to educate her students; Dr. Tun listed some educational and outreach avenues from NParks.

Indeed, there are many avenues for the public to learn about – and by which they can get involved with – issues like climate change and conservation ecology. This annual forum is but one way to supply the knowledge and awareness that serve as prerequisites for such public involvement, to the eventual end of building a larger community of people who care about and who act on these issues.

Reef in hot water – the impact of the 2015-2016 El Nino on coral reefs around the world

Speech by Dr. Karenne Tun

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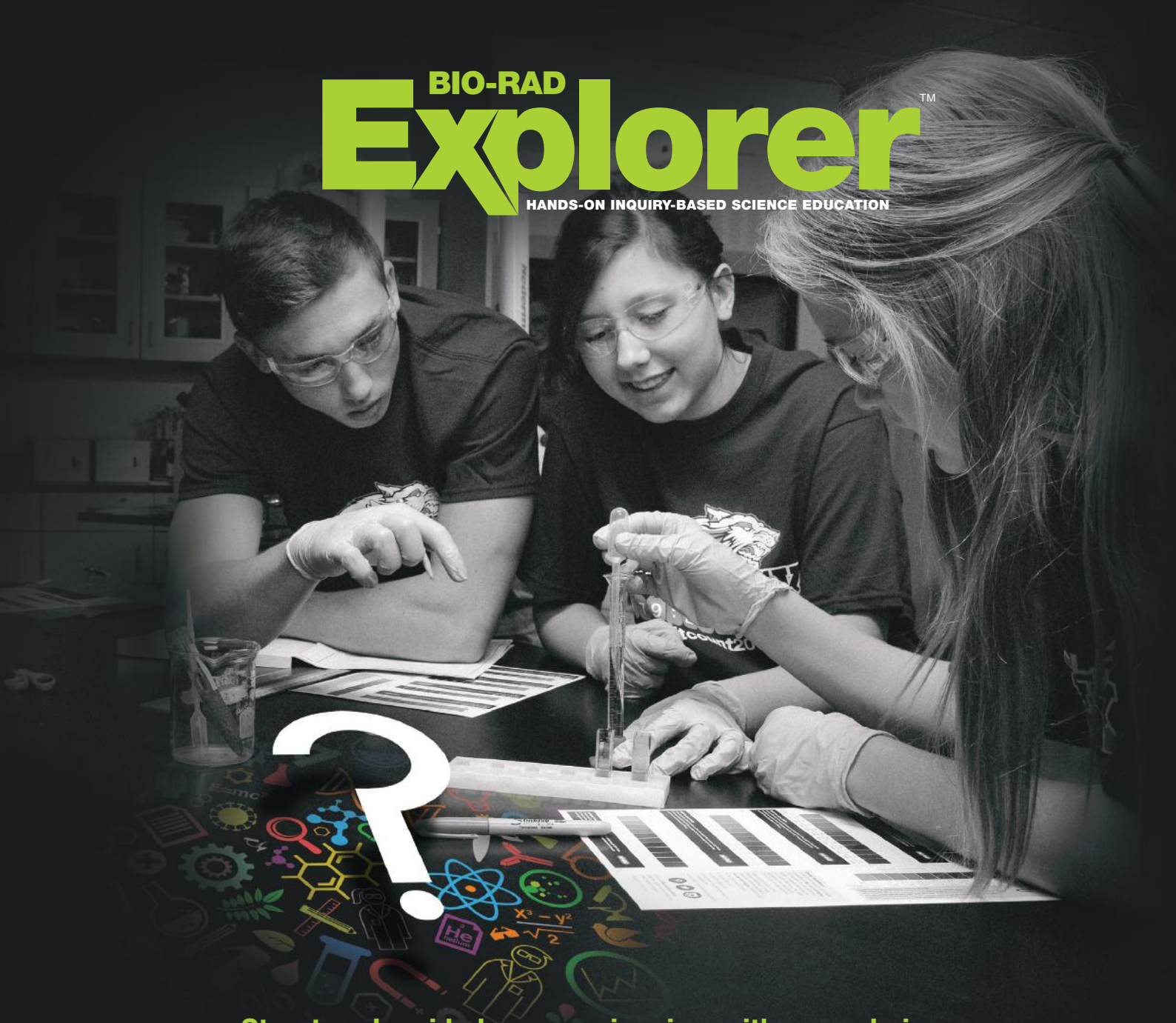

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