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MEDIA RELEASE

IBN Research Attachment Student Meets Nobel Laureates

18-year-old's award-winning research project brings her to the Nobel Prize ceremonies; Other students inspired to take up research scholarships

SINGAPORE, February 28, 2007 – Former Raffles Junior College student Sarah Ong Shu Ren was probably the only Singaporean teenager who had the pleasure of meeting the Nobel laureates and the Crown Princess Victoria of Sweden at last year's Nobel Prize Award Ceremonies. And she earned it through sheer passion and hard work.

While her classmates enjoyed family vacations and relaxed with their friends during their school breaks, Sarah would be working hard in the labs at the Institute of Bioengineering and Nanotechnology (IBN). She had been consistently 'giving up' her free time to pursue her interest for research, completing four research attachment stints under IBN's Youth Research Program (YRP), since she first interned at the Institute as a Secondary Three Raffles Girls' School student in 2003.

Her efforts have certainly paid off. Sarah won the Most Outstanding Junior College Science Student Award given out by the Imperial College Alumni Association of Singapore in September 2006. The award gave her the chance to participate in the week-long Stockholm International Youth Science Seminar (SIYSS) in December 2006, where she also attended the Nobel Prize Award Ceremonies. She was one of 24 SIYSS participants from 16 different countries, who flew to Sweden to learn about its science and culture. As part of the experience, Sarah met with Nobel laureates and spoke to them about their research. The 18-year-old said she benefited tremendously from these conversations. "I came to realize that it was their strong passion for research, not the Nobel prizes, which motivated them to work tirelessly in their fields."

On the same stage where the Nobel Prize winners were announced, Sarah also had the once-in-a-lifetime opportunity to present the project, "High Speed Size-exclusion Chromatography using Spherical Mesocellular Foam," which was conducted at IBN, under the supervision of IBN Research Scientist Dr. Yu Han and IBN Executive Director Prof. Jackie Y. Ying.

Sarah assisted Dr. Han in modifying the traditional method of producing siliceous mesocellular foam (MCF), a type of material that is potentially useful in catalysis and separations applications in the pharmaceutical industry. The size and structure of the MCF are important considerations in certain applications, and IBN is conducting research to produce spherical MCF samples for use in small, single chromatography columns to improve sample throughput and significantly decrease solvent usage.

Sarah had worked on the research project after her O-Levels in 2004. Even after she began her junior college studies, she continued with her research from March to July 2005.

With this project, Sarah garnered top awards in several other national and international competitions. In February 2006, she received the First Prize at the Taiwan International Science Fair in Taipei. She was one of two students selected by Singapore's Ministry of Education to represent the country at the competition, where she competed against 100 students from 10 countries.

The following month, Sarah won the Gold Award at the 2006 Singapore Science and Engineering Fair (SSEF), and qualified as one of four students selected to represent Singapore at the Intel International Science and Engineering Fair (ISEF), the world's largest science competition for high school students. At ISEF held in Indiana, USA, she was among 1,500 contestants from 47 countries. Sarah received US\$500 for her fourth placing in the Engineering category. She also earned the Special Award sponsored by Agilent Technologies, which offered her an attachment stint at its laboratory. Sarah has since started her attachment with the company, after completing her A-Level examinations last year. She is expecting her A-Level results this Friday (March 2).

Dr. Han said he was very impressed by Sarah's performance during her IBN attachment. "She is one of the best attachment students I have had the pleasure to work with," he said. "She is hardworking, independent and a fast learner. I was struck by her strong passion for research and thirst for knowledge."

Prof. Ying said it was important to expose students like Sarah to the exciting possibilities in scientific research at a young age. "Research is about passion and dedication in creating new scientific knowledge and exciting technology that can significantly and directly impact and benefit our society. I am delighted to see our youth, some as young as 14 years old, become inspired by their research attachment experience at IBN. As long as we can create the right learning environment for our young, I am sure Singapore can produce world-class talents in science and engineering."

Sarah is now involved in volunteer work with the Action for AIDS' Youth Outreach Programme, and will be traveling to Cambodia to teach English to young children in the rural areas.

She will begin her undergraduate study at Yale University, USA, in September this year and is considering pursuing a PhD with a science or engineering major. "IBN is very supportive of all its attachment students," she said. "I am very lucky to have joined its Youth Research Program, which gives youths the chance to be exposed to science and technology."

Other windows of opportunity have also opened up for other IBN research attachment students. Nineteen-year-old Alvin Tan Thong Lip underwent two IBN attachment stints in May and December 2004, and has since gone on to take up a Defence Science and Technology Agency (DSTA) scholarship to study materials science and engineering at Northwestern University, USA. Similarly, more than 10 YRP students have decided to

apply for research scholarships since the Institute's youth outreach program started in October 2003.

"I have always been interested in science, but I was not sure what a career in scientific research was really about, so I grabbed the attachment opportunity when it came along," said Alvin, a former National Junior College student who is currently serving his national service. "If there was one word to describe my attachment experience, it would be 'adventurous.' There were numerous obstacles and setbacks, but my mentor Dr Motoichi Kurisawa turned them into learning opportunities. I was so deeply influenced by his enthusiasm for science that I decided to take up a DSTA scholarship."

Vikas Reddy, 20, who joined the IBN attachment program after his A-Level examinations in January 2005, also chose the research path because of his attachment experience.

"I actually applied to IBN for a strange reason," Vikas said. "I wanted to convince myself that I could not take up research as a career largely because I get distracted easily. However, my five-month attachment confirmed just the opposite. I learnt that research is not about solving problems by hacking away in the labs; it is about creating solutions with ingenuity."

Inspired by his experience, Vikas took up the National Science Scholarship (NSS) awarded by the Agency for Science, Technology and Research (A*STAR) for his undergraduate studies at Cornell University, USA. The now second-year Mechanical Engineering student is also the founder of a student research group, Cornell MineSweeper, which aims to build technologies to detect landmines accurately, and in the process, free the deminers from danger and fatigue.

IBN Director and YRP Chair Noreena AbuBakar said she was delighted that the students' experiences at IBN had created such a deep impact on their lives. "In 2003 when I first established the youth outreach program, we only had 54 research attachment students in the first batch. Today, this figure has grown to over 600, which includes both students and teachers. We hope that our students will continue to pursue research as a career to make an impact on human lives."

A list of award-winning YRP attachment students is available in Annex 1. Please refer to Annex 2 for a fact sheet on the YRP.

About the Institute of Bioengineering and Nanotechnology (IBN)

The Institute of Bioengineering and Nanotechnology (IBN) is a member of the Agency for Science, Technology and Research (A*STAR). Established in March 2003, the Institute's mission is to establish a broad knowledge base and conduct innovative research at the interface of bioengineering and nanotechnology. Positioned at the frontiers of engineering, IBN is focused on creating knowledge and cultivating talent to develop technology platforms that will spur the growth of new industries. IBN also fosters an exciting, multidisciplinary research environment for the training of students and young researchers

to spearhead biomedical advancement in Singapore. For more information, visit www.ibn.a-star.edu.sg.

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Annex 1: Award-Winning IBN Research Attachment Students

Fourth Placing (Engineering Category) at Intel International Science and Engineering Fair (ISEF) 2006

<http://www.intelisef2006.org/>

“High Speed Size-exclusion Chromatography using Spherical Mesocellular Foam”

Student: Sarah Ong Shu Ren (Raffles Junior College)

Mentors: Dr. Yu Han, Research Scientist, and Prof. Jackie Y. Ying, Executive Director

First Prize at the Taiwan International Science Fair 2006

<http://www.ntsec.gov.tw/ntsec-english/activity/activity.asp>

“High Speed Size-exclusion Chromatography using Spherical Mesocellular Foam”

Student: Sarah Ong Shu Ren (Raffles Junior College)

Mentors: Dr. Yu Han, Research Scientist, and Prof. Jackie Y. Ying, Executive Director

Gold Award at Singapore Science and Engineering Fair (SSEF) 2006

<http://www.science.edu.sg/ssc/events.jsp?type=17&root=0&parent=0&cat=268>

“High Speed Size-exclusion Chromatography using Spherical Mesocellular Foam”

Student: Sarah Ong Shu Ren (Raffles Junior College)

Mentors: Dr. Yu Han, Research Scientist, and Prof. Jackie Y. Ying, Executive Director

Silver Award at Singapore Science and Engineering Fair (SSEF) 2006

“Investigation of Cancer Cell Migration and Deformation Using a BioMEMS Device”

Students: Lynette Soh Ling Hui (National Junior College) and Tammy Tsang Yun Ying (National Junior College)

Mentor: Dr. M. M. Maran, Research Scientist

Gold Award at Singapore Science and Engineering Fair (SSEF) 2005

“Novel Injectable Hyaluronic Acid-Phenol Hydrogels formed by Enzyme for Drug Delivery/Tissue Engineering”

Students: Alvin Tan Thong Lip (National Junior College), Serene Tang Ee Ling (Raffles Junior College) and Jeanne Gwendoline Duclos (Hwa Chong Institution (College))

Mentor: Dr. Motoichi Kurisawa, Senior Research Scientist

Silver Award at Singapore Science and Engineering Fair (SSEF) 2005

“The Protective Effects of Caroverine on Cisplatin-induced Hearing Loss”

Student: Vora Bimal Mayur Kumar (Raffles Junior College)

Mentor: Dr. Runsheng Ruan, Principal Research Scientist

Gold Award at the Nanyang Technological University (NTU) College of Engineering (CoE) Tech-Fair 2004

“A Novel Method for Breast Cancer Diagnosis”

Students: Lee Yong Yeow (NTU) and Nam Nguyen (NTU)

Mentor: Xu Guolin, Research Officer

Annex 2: IBN Youth Research Program Fact Sheet

The Institute of Bioengineering and Nanotechnology (IBN) began its Youth Research Program (YRP) in October 2003 with the objective of exposing young Singaporeans to cutting-edge scientific research in bioengineering and nanotechnology. The Program, established and chaired by IBN Director Noreena AbuBakar, aims to give students a first-hand experience in research, so as to instill in them an appreciation of the impact of biomedical research in their daily lives and to foster their interest in scientific pursuit. In addition, the YRP reaches out to teachers to help them incorporate the latest advances in science in their school curriculum. It also targets parents, who play a major role in nurturing their children's interests and career aspirations.

The YRP activities include:

- Open Houses
- Visits
- Workshops
- School Talks
- Career Fairs
- Research Attachments for students and teachers
- Development of Educational Kits

To date, more than 13,500 students and teachers from 167 schools have been involved in IBN's YRP. The Institute has organized 14 Open Houses and gave over 45 career talks at junior colleges, polytechnics and universities. So far, it has received more than 1,070 research attachment applications from students and teachers, some of whom are from the USA, Europe and other parts of Asia. Over 600 students and teachers have been on full-time attachments at IBN. They received a chance to carry out research for at least a month, under the supervision of IBN scientists. More than 60 of them have returned for subsequent attachments and some have gone on to win local and international awards for their IBN research projects (See Annex 1).

This year, the YRP has expanded its scope with the IBN Nano-Bio Kits (www.nano-biokit.com) to help teachers introduce concepts in bioengineering and nanotechnology to their students. Targeted at 15- to 19-year-old students, the Biological Fuel Cell, Thermo-Reponsive Hydrogel and Dielectrophoresis Chip Kits feature experiments and lessons on practical applications in nanobiotechnology, drug delivery, and medical devices. IBN has since sold over 90 sets of these Kits to interested schools ahead of their official launch on **March 9, 2007**. It had worked with some of these partner schools to field-test the Kits in school laboratories. Details of the Nano-Bio Kit launch will be sent to the media soon. The event will be held in conjunction with the Institute's Open House for Schools. Participants will be able to visit IBN's state-of-the-art facilities, view demos on its cutting-edge research and talk to IBN scientists to gain greater insight into biomedical research.

More information on the Nano-Bio Kits is available at www.nano-biokit.com. For further details on the YRP and its calendar of events, please log on to yrp.ibn.a-star.edu.sg.