

Faculty of Science Newsletter 香港大學理學院通訊 計2

Highlights

Geologically Recent Sea-level Fluctuations Add New Twist to Evolution Story on "Darwin's Archipelago"

Galapagos from satellite view Photo coutesy: Jacques Descloitres, MODIS Rapid Response Project at NASA/GSFC

From **The Editor**

Dear readers,

3D printing is a new technology that can potentially change our production process. In this issue of Science@HKU, we report the science and technology behind 3D printing. We also discuss its advantages and limitations.

Besides, we hear from some of our alumni on how HKU Science Faculty has equipped them to conduct research in world-class universities and research institutes.

> Yours sincerely, **Professor Hoi Fung CHAU** Chief Editor

by Dr Jason R ALI, Department of Earth Sciences

http://www.scifac.hku.hk/newsletter · Published in October, 2014

The 16-island Galapagos archipelago in the eastern equatorial Pacific host one of Earth's most important biodiversity hot-spots. Famously, the land birds and reptiles provided Charles Darwin with key insights into Natural Selection, the mechanism that drives biological evolution. Today, the volcanic chain is arguably Earth's greatest natural biological laboratory attracting researchers from across the World who "mine" the animal and plant repository looking for ever deeper understanding.

Oddly, although most scientists are happy with the notion that the original ancestors of each of the reptile groups (tortoises, snakes, land iguanas, lava lizards, geckos) rafted/floated in from the Americas more than 900 kilometers to the east, few consider how the descendents came to be scattered across the archipelago. Their investigations focus on the present, the broader story apparently irrelevant.

Now, new research by The University of Hong Kong earth scientist, Dr Jason Ali, and his University of Sydney geologist colleague, Professor Jonathan Aitchison, is set to dramatically alter our view of Galapagos' biology. Their work offers a comprehensive explanation as to why certain species are present on particular islands and absent from others, and how they got there. The investigation, however, carries a twist for it provides a radical new insight into the evolutionary development of a key fraction of the island chain's species.





Galapagos land iguanas Photo courtesy: Peter Wilton

Highlights



The study, published in the Journal of Biogeography in April 2014, indicates that major shifts in sea level, caused by various climatic and geological processes, regularly reconfigures Galapagos' geography. The extreme lows drop the shore-lines somewhere between 130 and 210 metres. At these times, the islands in the centre and west of the chain ("core") coalesce into a mega-platform as illustrated in Figure 1 below. During these 10,000 year connection intervals, the long-isolated reptile forms are free to move around the new landmass. However, the sea-level rises that follow force them back on to higher ground where they are genetically trapped for around 90,000 years.

Key to understanding the overarching biological patterns and, crucially, any anomalies was Ali and Aitchison's realization that the various reptile forms might respond differently to their periodic "unleashing". They thus constructed a series of logic models to help interpret the data. The two most important ones considered the outcomes if (1) the reptiles could fully colonize the newly exposed landmass or, (2) if they were only able to expand their ranges by limited amounts. Critically, both make specific predictions, hence assigning each of the reptile forms to a particular category was thought to be straightforward. With scenario 1, "everything gets everywhere", and this accounts for the two racer snake species, as shown in Figure 2. With scenario 2, speciation is likely to take place on the peripheral/less accessible platform islands, whilst species reconsolidation will occur on the more central ones. This accommodates the lava lizards, land iguanas and geckos.



Galanagos tortoise Photo courtesy: Daniel Ramirez

Curiously, Galapagos' legendary giant tortoises are the only land-bound reptiles that cannot be explained by the modeling as they appear on the "core" and non-core islands. Research carried out by

molecular biologists indicates that their gene pools are hugely complex. It suggests that members of the various sub-populations were regularly swimming/ floating between islands and thus sharing their genetic material with their closely related neighbours. Moreover, in recent centuries, the tortoises, which were prized for their meat, were moved between islands by sailors and pirates for use as food stashes. Hence their story has an extra level of complexity.



Figure 1 Present day Galapagos Islands (left) and the archipelago when sea level is lowered by 145 m (right). Many of the western and central islands connect at these depths thus allowing the land-locked animals to move across the platform

A fundamental tenet of any scientific hypothesis is that it is amenable to testing and Ali and Aitchison have taken great care to outline one.

Prior to the DNA revolution, scientists related species to one-another by comparing their body parts an investigative discipline called comparative anatomy. The more similar organisms looked, the more closely they were thought to be related. In cases where it is obvious, for instance humans are nearer to hamsters than they are to hammerhead sharks, the technique still works.

For allied forms, however, working out their relationships is less easy. Such is the case with the hundreds of cichlidfishes species in the East African lakes, or the dozens of nocturnal lemurs in Madagascar. Thus, biologists today often construct "family-trees" using differences in the species' DNA: the bigger the divergence, the greater the time since the two shared a common ancestor

Therefore, if the Galapagos model is correct, then the ages of the familytree branch points for the various reptile species and subspecies should immediately post-date the ages of the various sea-level lows (20k years, 138k years, 252k years, 342k years etc.) Shortly after these instants, populations on different patches of high ground were genetically isolated by the rising oceans. Crucially, this pattern should be easily discernible in future DNA molecular "clock" researches.



Galapagos' biota has long been recognized as special. Ali and Aitchison's proposal that a key part of the archipelago's biota has been forged in such a distinctive manner makes it even more so. Moreover, there are only a small number other island systems where the same process could have played out, perhaps the Canary, Cape Verde and Maldive groups. In all three cases, though, far fewer islands are involved. Galápagos is thus a truly unique biological laboratory; the study increases its significance as a scientific resource and enhances its conservational value.



Brainteaser

Prize: \$50 book coupon

(L) Deadline: December 31, 2014



Please email your answer together with your name and school (for students), to scinews@hku.hk. FIVE winners will be drawn randomly from the contestants who give the correct answer.

Question

In your opinion, what would be the most amazing or unexpected thing you would experience if you were to live in an hypothetical world whose speed of light were just 3 m/s? A book coupon will be awarded to each of the five contestants with most creative and original answers. Selected answers will be published in the next issue of the Newsletter.

Figure 2. Repeating patterns in the distribution various land-locked reptile Any species occurring on one of the western and central lands invariably occurs on all of them are the grey halos. The exceptions are the archinelago's giant tortoises.

Question of last issue

List all the prime(s) p for which is a rational number.

3

Answer

The answer is 11 For the details, please visit www.scifac.hku.hk/newsletter17_brainteaser

Direct Chemical Analysis of Living Human Body Surface Mand Breath Gas by Megavolt Electrostatic Ionization Mass Spectrometry

by Dr NG Kwan-Ming, Department of Chemistry

A simple and non-invasive analytical method for direct living human analysis has been developed by Dr Kwan-Ming Ng of the Department of Chemistry. This method allows direct detection of skin surface chemicals such as drugs and explosives from the human body, and is also able to detect volatile compounds in breath gas. The method has great potential to be adopted for applications such as security screening and medical diagnosis. In addition, this method also has the potential to be applied to the direct chemical analysis of daily life items such as food and luggage. Details of this new method and results have been published online in the Journal of The American Society for Mass Spectrometry in June 2014. Also, this new method has been spotted and reported in the online latest news of Science in July 2014.



This method detects analyte ions directly desorbed from a living human subject using a mass spectrometer, while the subject is electrostatically-charged by a Van de Graaff generator. This method integrates the strength of two apparently unrelated scientific instruments. The Van de Graaff generator is a well-known safe yet powerful electrostatic generator for

MASS SPECTROMETRY



application of megavolt electrostatic potential on living human, and is commonly displayed in science museum and taught in secondary school. The mass spectrometer is well-known for sensitive and specific detection of analyte ions, and is a standard instrument in many modern analytical laboratories.

During the analysis, the subject only needs to connect to the Van de Graaff generator and then points the region of analytical interest, such as fingers or any hand-held items, towards the inlet of a mass spectrometer. Ionization of analyte on skin surface is almost instantaneous when the Van de Graaff generator is switched on. Analyte ions will then be collected and analyzed by the mass spectrometer. The data, which in form of a mass spectrum, would reveal the abundance and identity of the analyte ions. For breath gas analysis, the subject is first electrostatically charged by the Van de Graaff, then he/ she could deliver the exhaled gas via a straw in front of the inlet of a mass spectrometer for analysis.



Direct analysis of whole living human body allows real-time monitoring of the biological status and biochemical profile of the subject. X-ray and MRI are two well-established direct analysis methods for living human body, and have contributed significantly to clinical diagnosis, biomedical research and forensic chemical analysis. The present research successfully introduces MS for the direct analysis of whole living human, and brings MS much closer to daily life analysis, via the use of simple instrument.

The Paper

Direct Analysis of Large Living Organism by Megavolt Electrostatic Ionization Mass Spectrometry: (HKU login required)

http://link.springer.com/article/10.1007%2Fs13361-014-0932-x

The News

Hair-raising Technique Detects Drugs, Explosives on Human Body:

http://news.sciencemag.org/chemistry/2014/07/hair-raising--detects-drugs-explosives-human-body



Direct detection of exogenous compounds in hum Megavolt Electrostatic Ionization Mass Spectrom

Behind the News

by Dr Bosco H K YUNG, Faculty of Science



Photo courtesy: printact.co

"Printing" is the common word used to describe the process of reproducing text or graphics on some surfaces (e.g., paper). The products are always 2-dimensional (2D) in this case. However, printing is in fact not limited to 2D, and it is possible to "print" 3D objects directly. This is what we called "3D printing", a recent attentiondrawing in science and technology that may revolutionize the manufacturing industry.

To produce a 3D-printed product, we first need to construct its 3D computer model for the 3D printer. This can be done by using 3D model construction software or 3D scanning, a technique used widely in engineering, medical, and even the entertainment industries. Details of 3D model construction are not covered in this article. After obtaining the model, the 3D printer can "print" the object accordingly. The printing is done in a layer-by-layer manner. Two of the common 3D printing methods are stereolithography (SLA) and fused deposition modelling (FDM) Special materials are used in these methods.

SLA is also known as photo-solidification. This printing method involves the process that turns a liquid material. called "resin", into solid by light. Resin is a kind of photopolymer, which its property will change when exposed to light. Typically, a photopolymer is a mixture of smaller molecular compounds (e.g., monomers) loosely attracted to each other by van der Waal's force, hence the liquid state. However, when they are put under certain frequencies of light (usually in the optical or ultraviolet range), bonding between these molecules are induced and they will form a large, rigid molecular structure which turns into solid. Using this property, one can produce a layer of solid in any pattern by "drawing" on a thin layer of liquid resin with a light beam. To increase the accuracy, laser (amplified and collimated light) is usually used in the process.

FDM is a method that directly puts down material layer-by-layer to form a 3D structure. In order to do so, the material should be in a "molten" form when it is used to draw a pattern. However, it should turn to solid quick enough such that substantial layers can be built on it. The common material used in this process is thermoplastic. Typical examples are polylactide (PLA) and acrylonitrile butadiene styrene (ABS). Thermoplastic softens at a certain high temperature, but returns to solid upon cooling. Therefore, during the printing process the material will be heated up such that it is soft enough to form desire patterns, but it will solidify shortly afterwards. The threshold temperature is technically called the glass transition temperature. Strictly speaking, this process of turning the solid thermoplastic into molten form is not regarded as "melting". It is because melting involves changing the molecular arrangement of a compound, usually from a highly-ordered crystalline structure (e.g., ice), to a less ordered structure (e.g., liquid water). On the contrary, in the current printing process the material does not really change its state. Even though the hardness of the material changes, the in-line molecular arrangement remains like a liquid (i.e. the molecular arrangement is less ordered).

3D printing has a lot of applications. It can be used in architecture, military, medical, and even space science. Some people has suggested that this technology is part of the "Third Industrial Revolution"

Acknowledgement:

The author thanks Ricky Leung and Data Ng for providing some information about 3D printing.







A Bridge to the World — **HKU Science Graduates** at World Class Universities and Research Institutes

Graduates of HKU Science have a good track record in competing internationally, and are always regarded as caliber individuals by other leading universities and research institutes in the world. The wide recognition of our graduates is greatly attributed by our comprehensive training in science, both quantitative and qualitative, and the diverse learning experiences, which facilitate them to pursue research at the frontiers of science. Let's hear from our graduates what they have benefited from our programme and how HKU Science bridges them to the world.

Dr NGAl Ming Yu

- Assistant Professor of Chemistry at the State University of New York at Stony Brook, U.S.A.
- 2013 Postdoctoral Associate at Harvard University, USΔ
- 2011 Croucher Postdoctoral Fellow at Stanford University, U.S.A.
- 2008 PhD graduate, University of Texas at Austin, U.S.A. 2003 BSc graduate (Chemistry)
- 2002-2003 Worldwide Exchange Studies at University of California, San Diego, U.S.A.

Dr Ngai's work was recognized with various awards and fellowships including: The William S Livingston Award for the Outstanding Graduate Student Academic Employee; the Presidential Green Chemistry Challenge Award; the Professional Development Award; and the Wendell Gordon Fellowship.

"My undergraduate experience proved that HKU is a supportive community full of valuable opportunities. Over the course of my studies at HKU, I was blessed with opportunities to work as a research assistant in research laboratories, to undertake in an internship at a pharmaceutical company in Mainland China, and to study abroad at the University of California at San Diego. All these opportunities had not only shaped and clarified my dream to become a professor at a research institute, but also helped me to find my faith in Christ. With the support and encouragement from professors in the Department of Chemistry at HKU, I received my PhD degree from the University of Texas at Austin, my post-doctoral training at Stanford University and at Harvard University, and my faculty position at the State University of New York at Stony Brook. My experience at HKU laid the foundation for realizing my dream."





- 2013 PhD graduate, California Institute of Technology, U.S.A.
- 2007 MPhil graduate
- 2005 BSc graduate (double major in Physics and Mathematics



"My days at HKU had been very enriching. The programme of Physics and Mathematics offered by HKU helped me build a solid foundation in Physics. It also helped me foster an interest in particle physics and let me understand that physics is beyond the esoteric symbols and formulae with which it is commonly associated. In particular, the Aberdeen Tunnel Experiment has given me first-hand experience in the building and running of a particle detector. This opportunity was very valuable, especially in Hong Kong, where research in fundamental physics is often considered impractical. With this experience under my belt, I got a head start in my academic career. I sincerely hope that I could one day return the favour to my alma mater and my hometown and inspire the next generation of curious minds."

MATERIALS RESEARC

EXPLORATION SCIENCE



Dr CHAN Hoi Shan Queenie

- Post-Doctoral Research Scientist, NASA Johnson Space Center, U.S.A. 2013-2014 Nature Conservation Officer, Agriculture, Fisheries and Conservation Department 2012-2013 Post-doctoral Research Fellow, Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Japan 2012 PhD (Astrobiology), Imperial College London, U.K. 2008 BSc graduate (major in Earth Sciences and minor in Ecology & Biodiversity) 2007-2008 Worldwide Exchange Studies at Australian National University,
- Australia 2006-2008 Summer Research Fellowship Scheme

"HKU has guided me to fulfill my dream, and the Department of Earth Sciences has piloted me through the acquaintance of geology of spectacular places around the world. I used to pass by HKU every day on the way to my secondary school. Looking through the West Gate, I could imagine the brightest young minds were educated there and got inspired, and wondered if that could be me. Learning that I was admitted in this outstanding university, I was so exhilarated that I couldn't help jumping at it! I reminded myself every day that I should endeavour to experience as much as I could.

I knew so little prior to my studies at HKU. After spending three years there, I still know very little about the world, but I have been equipped with the desire and decent techniques to learn more. HKU gave me the opportunity to witness the world and gain profundity beyond science. Teachers and researchers gave the best they could to cultivate young minds. I was lucky to be their research assistant and help collecting geologic samples outside Hong Kong. Those practical techniques still apply even I have made my way to NASA Johnson

Space Center in Houston USA., studying meteorite samples in the NASA facility. This reminds me of my tutors who spared no efforts to show me how to identify crystals under the microscope. I wish I could pass this enthusiasm on to the next generation - perpetuating the virtue and knowledge through generations. I think this is what education is."

Dr TONG Xiao Thomas

- 2013 PhD graduate (Statistics) at Harvard University, U.S.A.
- 2008 BSc graduate (major in Statistics and minor in Mathematics)
- Exchange study at University of California, Los Angeles, U.S.A. in 2007



"I benefited a lot from my undergraduate study at HKU. The rigorous and diverse curriculum provided me with a good statistical foundation and interpretation, from which I can have the ability to learn more advanced techniques in the graduate school. I also met lots of great professors at HKU. They did not only teach me good things about statistics and science, but also motivated me to think deeply and lead a happy life of being an intellectual."

Mr PENG He Brian

PhD student in gene regulation and computational biology at California Institute of Technology, USA

to reach!

IISA

2012 BSc graduate (double major in Statistics and Biochemistry, minor in Computer Science) 2010-2011 Worldwide Exchange Studies at University of California, Los Angeles, U.S.A. 2010-2011 Overseas Research Fellowship at University of California, Los Angeles, U.S.A. 2009-2010 Summer Research Fellowship

"Looking back to the years I spent in HKU, I would say it provided me with as many opportunities as possible. Thanks to the flexibility in course enrollment at HKU — I was able to explore a variety of scientific fields, broaden my horizon and also better understand what I am really passionate about. More importantly, the Summer Research Fellowship and Overseas Research Fellowship programmes allowed

me to receive hands-on trainings as a professional scientist, and the exchange study prepared me for my PhD study in the States in both academic and cultural aspects. I must admit my studies at HKU have benefited me far more than I expected and helped me proceed on to another stage of my career."

Mr LUO Jie Roger

- PhD student at California Institute of Technology, U.S.A. 2014 BSc graduate (double major in Physics and Mathematics)
- 2013-2013 Worldwide Exchange Studies at University of California, Los Angeles, U.S.A.
- 2013-2013 Overseas Research Fellowship at Stanford University, U.S.A.



2012-2013 Summer Research Fellowship

"Not until the end of my undergraduate journey at HKU that I realized I would step into the next critical stage of my scientific career. I was attracted to HKU's Science programme by its flexible syllabus and abundant learning opportunities available. The exchange programme sent me to a very top physics institution and broadened my horizon, enhancing my understanding of both life and researches in U.S.A. Research-oriented progammes including Overseas and Summer Research Fellowships gave me a glimpse of realistic challenges in different fields, helping me know where my passion lied. They also allowed me to meet some nice supervisors who showed me the way ahead. These are all great trainings for students to become professional researchers. In summary, my quality study at HKU has been far more beneficial than what I expected and prepared me well for my scientific career."







Mr CHU Chun Kit John

PhD student in Chemistry at Colorado State University

2010 BSc (Chemistry), HKU

2009-2010 Visiting student at Cambridge University, U.K 2009 Summer Research Fellowship 2008 Overseas Research Fellowship at University of Waterloo, Canada 2008 Science Student Ambassador

"I am a proud HKU graduate! The experiences I had at HKU were beneficial to my current PhD studies in the United States. With support from the Overseas and Summer Research Fellowships, I had gained research experiences which were an avenue to my engagement in international research. I also gained many research skills, like logical and critical thinking, which are significantly helpful in my current PhD studies. After the overseas





experiences I had in Canada and England, my social and scholastic interactions with others in the United States are never hindered by differences in culture. My undergraduate studies at HKU prepared me well for my graduate studies outside Hong Kong and brought my dream as a future scientist closer

Mr SHI Yuan

PhD student at Princeton University, U.S.A. 2012 BSc graduate (double major in

- Mathematics and Physics, minor in Chemistry 2010 Summer Research Fellowship
- at Department of Chemistry 2010-2011 Directed studies in both
- Mathematics and Physics



- 2011 Overseas Research Fellowship on atmospheric sciencat California Institute of Technology, U.S.A. and published a research paper entitled "A decadal microwave record of tropical air temperature from AMSU-A/agua observations" at Springer 2011-2012
- 2011-2012 Worldwide Exchange Studies at King's College London, U. K.
- 2009 Research project at Department of Chemistry 2008-2009 Preparatory study at Peking University, Mainland China

"When I was first admitted to HKU, I had no idea what exactly I wanted to do. I was just curious about the world and always wanted to learn more. To me, HKU was like a market fair where I could freely walk around and look for interesting things. I studied three different science subjects and took many "irrelevant" but interesting classes. I worked on guite a few projects with many different people and traveled around the world while doing exchange studies. I mixed with friends of diverse backgrounds and became a global citizen.

Having been to many leading universities around the world, I would say HKU is a unique one that offers ample opportunities, provided that you work hard and know how to pick yourself up and carry on. Having spent two years in the graduate school at Princeton University, I am still thrilled by the experiences at HKU that made me grow and prepared me for the future yet to come. Not only did I gain knowledge and skills in different disciplines, but I also learnt one important life lesson: looking ahead makes you know the way; looking down makes you stand still on the ground; looking away because sometimes you need to give up; looking behind so that the wisdom has time to catch up; and listening to others so that you can see a bigger world beyond which you could ever travel."

Students' Corner



Mr Ll Xinyu

PhD student in Physics at the Columbia University, U.S.A.

2012-2013 Internship at Perimeter Institute for Theoretical Physics, Waterloo, Canada

2012 BSc (Mathematics/Physics)

2010 Overseas Research Fellowship at Mullard Space Science Laboratory, University of College London, U.K.

"The three years' study at HKU has left me with precious memory. Dedicated professors inspire students' curiosity and passion for exploration. Students are also given an opportunity to do research at an early stage. I was actively involved in many research projects while taking regular courses. These experiences played an important role in my determination to pursue an academic career."

Faculty News

Departments

HKU Science Ranks Top in 2014 Quacquarelli Symonds (QS) World University Subject Rankings

According to the 2014 Quacquarelli Symonds (QS) World University Subject Rankings, HKU Science ranks top among the world's top universities. Our achievements are summarized as follows:

School of Biological Sciences

ranks 42nd in the field of "Biological Sciences"

Department of Chemistry

 ranks 35th and 51st-100th in the fields of "Chemistry" and "Material Sciences" respectively

Department of Earth Sciences

• ranks 34th in the field of "Earth and Marine Sciences"

Interdisciplinary Major Environmental Science

• ranks 51st-100th in the field of "Environmental Sciences"

Department of Mathematics

• ranks 45th in the field of "Mathematics"

Department of Physics

• ranks 101st-150th in the field of "Physics and Astronomy"

Department of Statistics and Actuarial Science

 ranks 19th in the field of "Statistics and Operational Research"

The rankings are based on research citations, alongside reputational surveys of over 90,000 academics and graduate employers worldwide. For further information about World University Subject Rankings, please visit http://www.topuniversities.com/subject-rankings

Teachers





Organization of Chinese Physicists and Astronomers (OCPA) Achievement in Asia Award, for his important contributions to the physics of spin and valley pseudospin in 2-dimensional transition metal dichalcogenides.

7 Professor Chi Ming CHE,

Dr Hui Wai-Haan Chair of Chemistry, was awarded the

Bronze Bauhinia Star by the

HKSAR Government for his

The award is presented annually to a physicist/astronomer (or a team of Physicists/Astronomers) of Chinese ethnicity working in Asia with outstanding contributions in physics/ astronomy. The other co-winner of this prize is Dr Han Yilong of the Hong Kong University of Science and Technology.

Miss JIANG Bo Sheila

- PhD student in Economics, University of Chicago, U.S. A. 2013 BSc graduate (double
- major in Mathematics and Economics)
- 2011-2012 Exchange Study at University of California, Berkeley, U.S.A.



"Faculty of Science provides students with various undergraduate research, exchange and internship opportunities. No matter whether you are interested in academia or to work in the industry, the Faculty always offers you the opportunities of wonderful experience. My exchange study at UC Berkeley greatly enriched my college life, and helped me get better access to graduate school."

Achievemen/s

Professor Vivian W W YAM, Philip Wong Wilson Wong Professor in Chemistry and Energy, received the Chinese Chemical Society 4th Award for Outstanding Contribution to Chemistry. The award is established



to recognize the significant contributions and impacts on research of Chinese Chemists.

7 Professors Min SUN and Guochun ZHAO of Earth Sciences were listed as top researchers



in the field of Geosciences in Thomson Reuters's report of "The World's Most Influential Scientific Minds: 2014". Like other top researchers on the list, they have earned their distinction by publishing the highest number of articles that rank among those most frequently cited by fellow researchers. The Intellectual Property and Science business of Thomson Reuters is the world's leading source of intelligent information for businesses and professionals.

Students



↗ Mr WANG Zhen, a PhD student working on aquatic toxicology and water quality management at the School of Biological Sciences under the supervision of Professor Kenneth Leung, had won "The Best Poster Award" at the 9th Society of Environmental Toxicology and Chemistry (SETAC) Asia/Pacific 2014

Conference which was held in Australia during 14-17 September 2014. The title of Wang Zhen's presentation is "Effects of unionised ammonia on tropical freshwater organisms: implication on temperate-to-tropic extrapolation".

toxicology and PhD studing anagement at has enter ogical Sciences Final of on of Professor Three M won **"The Best** Competitive 9th Society challengi Toxicology and students via/Pacific 2014 world in of the stimulation of the standard

↗ Mr DENG Zhuo, a PhD student in Physics, has entered the Grand Final of the U21 Three Minute Thesis Competition 2014, challenging research students all over the world in communicating the significance of the



the significance of their projects in just three minutes. Deng's presentation is entitled "Who stole my electrons? – Electron Loss Process in 3rd Generation Solar Cells."

Others

P Hokuto IWATANI, Postdoctoral Fellow of School of Biological Sciences received the **Paleontological Society of Japan Best Article Award** for his research paper entitled "Temporal changes of Plio-Pleistocene Ostracoda from the Takanabe Formation, Miyazaki Group, Southwest Japan" (Paleontological Research 15 (4), 269-289). Dr Iwatani is under the supervision of Dr Moriaki Yasuhara of the School.

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