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INSIDE IBEC

The newsletter of the Institute for Bioengineering of Catalonia

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Happy 10th birthday, IBEC!

In June, IBEC started its celebration of a decade of research results at the institute

The preparations began a long time ago, but for most people the party kicked off with the 10th Annual IBEC Symposium on 6th-7th June, which began with a special session featuring presentations, a round table, music and a toast, and which was attended by many of IBEC's VIP guests.

While the majority of IBEC got to have a rest after the symposium, the seniors were busy with the ISC and Board of Trustees meetings. By Friday 9th, even after a week of early mornings and late nights, everyone found their second wind to enjoy IBEC's atmospheric birthday party in the UB gardens.

The heavy week may have been over, but it didn't mean the birthday celebrations were. Kids Day on 23rd June came next, and until the summer break the brand new IBEC corporate video – presented in 'edited highlights' form at the symposium – and infographics about IBEC's first ten years were shared via our social media channels.

Autumn began with a special public event to highlight the expansion of IBEC's neurobioengineering research with the arrival of Paul Verschure's SPECS group, including a talk by Nobel Laureate Edvard Moser, and in October, the IBEC Retreat will whisk the seniors off to a remote locale for an intensive couple of days of brainstorming. November will see IBEC's B-Debate at CosmoCaixa, and the year's events will culminate in another fabulous knees-up at the IBEC Christmas party. //



IBEC is seventh member of BIST

On 26th June 2017 the Board of Trustees of the Barcelona Institute of Science and Technology (BIST) approved the incorporation of IBEC as a new member.

IBEC will bring its expertise and excellent research in the confluence between biology and engineering to BIST, an initiative of six of Catalonia's research centres of excellence – CRG, ICFO, ICIQ, ICN2, IFAE, and IRB – to increase their levels of collaboration and build a joint scientific project together. BIST's strength is based on

the research capacity of its centres and its potential to promote cutting-edge research projects in multidisciplinary research.

With the addition of IBEC, the BIST community now comprises 2,347 people, including 147 group leaders, 565 postdocs and 588 predocs. 40% of them are of international origin, and 43% are women.

"The exciting and committed BIST community grows in capacity and potential with the incorporation of a new centre of excellence," said outgoing BIST director general Miquel A. Pericàs, director of ICIQ.

"We've made only a few first steps so far, but they've been firm and in the right direction."

Held at BIST's HQ at the Escola Industrial, the meeting also introduced new director general Gabriel M. Silberman, previously VP and Scientific Director of the company Cerebri AI and assistant professor at the University of Texas, and approved the incorporation of a new scientific member to the board, Prof. M. Carme Calderer from Edinburgh's Heriot-Watt University, who's currently at the University of Minnesota. //

Making headlines

IBEC's groups and their achievements have been cropping up in all sorts of places lately.

Nuria Montserrat is featured in *Time Out Barcelona's* special student edition for 2017 as an example of the region's leading researchers: she's a "key member of Catalonia's scientific community", according to the magazine (above).

A paper published by Samuel Sanchez's group, 'Flexible sensors for biomedical technology' was the second most accessed article published in *Lab on a Chip* in 2016, and has been included in the journal's 'Most Downloaded Articles 2016' collection.

IBEC junior group leader Lorenzo Albertazzi was a contributor to the 2017 edition of *ChemComm Emerging Investigators*, which is published annually by the UK's Royal Society of Chemistry. Now in its seventh year, the special issue showcases research carried out by internationally recognised, up-and-coming scientists in the early stages of their independent careers, and who are making outstanding contributions to their respective fields.

Finally, IBEC as a whole is one of just six centres listed under the heading 'Centros de Excelencia en Salud Humana' in the *Move to Spain* brochure (below) published by the Spanish government as part of their campaign to bid for the European Medicines Agency to relocate to Barcelona (#BCN4EMA). The other five are CNIC, CNIO, CRG, IRB and CNB. //



L-r: BEST postdocs Marija Vukomanovic, Livia Neves Borgheti Cardoso, Agostino Romeo, Diana Vilela, Lourdes Rivas, Rossella Castagna, Ricardo Hidalgo, Adrica Kyndiah, María García, Sílvia Mas and Carmen Hurtado del Pozo. Lei Wang will join IBEC soon.

First BEST fellows off to a flying start

All but one of the twelve new post-doctoral fellows recruited via IBEC's Bioengineering Excellence Scientific Training (BEST) International Postdoctoral Programme have already joined the institute.

The first call for the fellowship scheme closed in September 2016 and attracted 49 applicants from 22 countries.

BEST aims to attract experienced international researchers in the areas of nanomedicine, cell engineering and ICT for health, and the Marie Curie

COFUND support from the European Commission recognises the importance of the programme in boosting the institute's interdisciplinary and internationality. The successful BEST postdocs in this round have come from Brazil, Italy, Spain, Costa Rica, India, Venezuela, Serbia and China.

BEST is part funded by the European Commission under Horizon 2020's Marie Skłodowska-Curie Actions COFUND scheme (grant no. 712754) and the Severo Ochoa programme of the Spanish Ministry of Science and Competitiveness (SEV-2014-0425 (2015-2019)). //

Name IBEC's new co-working room!



Co-working space aren't just for bearded hipsters with man-buns and skinny lattes. The institute's own co-working room, managed by the Core Facilities Unit, opened on the 3rd floor of the Helix this spring.

"It's a quiet, bright common space that's been created to take up the challenge of growth in our institute and to have a backup space for students with specific needs, such as finishing their PhD theses," says Head of Core Facilities Isabel Oliveira. "Its open set-up offers

users the chance to share ideas, spread creativity, collaborate and network."

The only thing the new space doesn't have is a name. The idea is to continue the 'trees' theme IBEC used to name the towers' 11th floor meeting rooms (Baobab and Olivera), so if you can think of a suitable tree, or have an even better idea that's not tree-related, please email corefacilities@ibecbarcelona.eu.

If you want to use IBEC's co-working space, please send an request to the above e-mail address. //

This issue, we're showcasing Nuria Montserrat's Pluripotent Stem Cells and Activation of Endogenous Tissue Programs for Organ Regeneration group and Santiago Marco's Signal and Information Processing for Sensing Systems group. If you'd like your group to be showcased in "News from the Groups", please contact vleigh@ibecbarcelona.eu

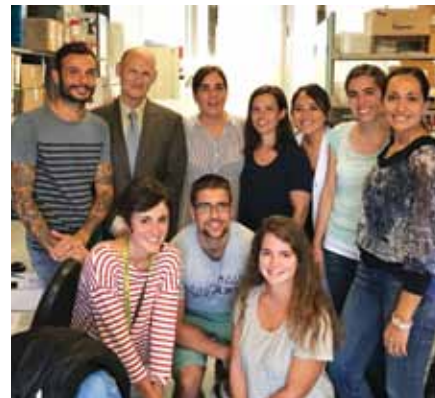
Nuria's group

At the beginning of the year Nuria Montserrat's senior researcher Elena Garreta was first author of a review published in the high-impact journal *Materials Today*. The paper, which also involved several other IBEC researchers from other groups, examined recent progress in de- and recellularization techniques combined with 3D bioprinting to create promising tissue constructs. Human donor organs can provide decellularized extracellular matrix scaffolds suitable for organ engineering, but what are needed are ways to properly reintroduce cells into these scaffolds and ensure their growth and functional activity. One option is to use human pluripotent stem cells (hPSCs), which offer major advantages compared with adult somatic or stem cells as cell sources for the generation of complex tissue structures. Targeted genome editing can also correct disease-related genes in cells taken from patients, providing an unprec-

edented source of suitable organ-specific cell types.

In June the group attended the 18th La Marató de TV3 symposium at the Institut d'Estudis Catalans, where they presented the results of a project that was financed by the telethon's 2011 edition devoted to regeneration and transplantation of organs and tissues. 'Medicina regenerativa per tractar l'anèmia de Fanconi: generació de cèl·lules iPSC específiques del pacient, lliures de la malaltia i capaces de diferenciar-se en progenitors hematopoètics i plaquetes' was coordinated by Nuria alongside Juan Antonio Bueren Roncero of CIEMAT and Jordi Surrallés Calonge from the UAB, and was one of 29 projects that shared the €8m in funds raised that year.

The group gained some new members, with a successful candidate in IBEC's first Bioengineering Excellence Scientific Train-



ing (BEST) postdoctoral fellowship call, Carmen Hurtado del Pozo, joining in April. In September 2017, the first-ranked of the INPhINIT PhD programme candidates, Lucia Selfa, will also join the group.

Most recently, the group had a visit from the Salk Institute's Juan Carlos Izpisua Belmonte (above, second from left), with whom they have had a long-term collaboration resulting in papers in *Cell* and *FEBS Journal*, among others. //



On the scientific front, Santiago Marco's Signal and Information Processing for Sensing Systems group had reason to celebrate in March when they published 'The differential plasma proteome of obese and overweight individuals undergoing a nutritional weight loss and maintenance

intervention' in *Proteomics Clin Appl*. With PhD student Sergio Oller as first author and in collaboration with Nestlé Institute of Health Sciences in Lausanne, Switzerland, where Sergio spent a research stay in 2015, the paper identified proteins associated with weight loss and maintenance and explored their relation to body mass index, fat mass, and insulin resistance and sensitivity.

In May the group attended the International Symposium on Olfaction and Electronic Nose (ISOEN 2017) which took place in Montreal, Canada. At the congress, undergraduate biomedical engineering students Alba Iruela and Suhyang Park, who are doing their practical work in Santi's group, took part in the SNIFFEST

competition and were one of five teams that got through to the final round.

As part of the ISOCS-SNIFFPHONE Winter Short Course in March, Santi gave a lecture in Ponte di Legno, Brescia, Italy, entitled 'Computational discovery of volatile biomarkers fingerprints: opportunities and risks'.

People-wise, the group is now home to one of IBEC's first BEST postdoctoral fellows, Silvia Mas, and has been collaborating internationally with researchers Jia Yan from the Southwest University in Chongqing, China, and Saeedeh Taghadomi-Saberi from Iran's Isfahan University of Technology.

Finally, the group recently acquired a GC-TCD instrument for a collaboration with Dr. Azpiroz from Vall d'Hebron about the potential of flatulence for the diagnosis of digestive disorders. //

ERC success for Lorenzo

The Nanoscopy for Nanomedicine junior group leader is the recipient of one of just seventeen Starting Grants awarded to scientists working in Spain, out of a European total of 406

Lorenzo Albertazzi's ERC project, "Design of Nanomaterials for Targeted Therapies Guided by Super Resolution Imaging" (NANOSTORM), plans to use super resolution microscopy to examine nanomaterials that have potential as therapies for cancer, and understand their interactions with their target: the diseased cells. Doing so will help identify the key principles that are needed to rationally design the next generation of targeted, super-efficient cancer treatments

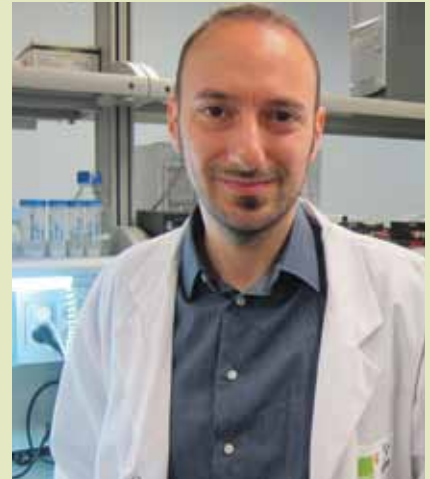
"Nanomaterials such as self-assembled nanoparticles and nanofibers have huge potential as cancer therapies," explains Lorenzo. "Nanotechnology-based drug delivery systems can identify the molecular markers of a disease very precisely and attack only the pathogenic cell popula-

tion, leaving the healthy cells alone."

So far, however, no targeted nanomaterial has been approved for clinical use, because there's a lack of knowledge about how these materials behave and react with their surroundings once they're in the body.

Lorenzo's group at IBEC is home to a Stochastic Optical Reconstruction Microscope (STORM) which offers unprecedented high-resolution imaging, even at the nanoscale. The NANOSTORM project plans to use STORM to image new, synthesized nanomaterials in the biological environment, unveiling their interactions with healthy and tumorous tissues at the single molecule level for the first time ever.

"If we can see how nanoparticles



respond in the body, we're much closer to being able to design better ones that target drugs much more effectively to tumors," says Lorenzo. "NANOSTORM will focus on prostate cancer in particular, but its principles of high resolution imaging of subcellular structures will be applicable to all sorts of cancers."

This latest grant puts IBEC's all-time ERC count up to twelve. //



HRS4R: Job Descriptions and Competencies defined

Within the Human Resources Strategy for Researchers (HRS4R) action "From Values to Excellence", IBEC's Job Descriptions (JDs) and Competencies have been defined. JDs describe 'what' gets accomplished in terms of results and responsibilities, while Competencies – aligned with IBEC's Values – describe 'how' work gets done, using knowledge, skills and attitudes.

JDs avoid ambiguities, foster a clear and fluent way of working, help to clarify and set goals, tasks and responsibilities for each position. JDs for predoc researchers, post-docs, senior researchers and Group Leaders were elaborated in working groups of researchers at all career stages. In addition, online questionnaires about each position were completed by further researchers. Finally, the JDs were validated by the Directorate, the HR Unit and an external consulting service.

In parallel, a Competency Dictionary outlining a set of core competencies common to all at IBEC, as well as specific competencies for research positions, was the result of five working groups and feedback

from the same sources. Core competencies common to all IBEC staff have been identified as **teamwork, communication, commitment, proactivity** and **collegiality**, while core competencies for researchers are **integrity** and **critical/analytical thinking**.

IBEC's JDs, Competencies and Values will be incorporated in the welcome pack of newcomers from now on, and will be used in the Interviewer Training course on November 14th for Group Leaders, senior researchers and Heads of Unit. Also in November, support services staff will be trained in Communication and Proactivity competencies in a 12 hour workshop. Other training courses on competencies for researchers are planned for 2018.

"Our JDs and Competencies are a reflection of how we define ourselves at IBEC," says Carol Mari, Head of HR. "They're not standard definitions, but have been described according to realities that are only found here. In practice, JDs and competencies are useful in selection, evaluation and feedback, compensation and development plans." //

Charter and Code: self assessment report

After two years implementing the HRS4R according to the European Charter and Code, in July IBEC's self-assessment report was prepared by the Monitoring Committee and sent to the EC for evaluation. The report outlined the implementation of the HRS4R's Action Plan, the status of each action, and other new actions that have been added; the results of the internal analysis of the current situation; the results and conclusions of the internal survey of June, in which 31% of IBEC participated; and the analysis of the EC's Open Transparent and Merit-based Recruitment (OTM-R) checklist.

The EC's feedback on our self-assessment report will help us learn from external experts to improve our HRS4R and Action Plan – a key part of IBEC's Strategic Plan, which lays the foundation for a research centre of excellence – before the external audit in 2020. – Carol Mari, Head of HR

IBEC ALUMNI: News, updates and achievements

In our regular section, we'll bring you news from IBEC's former researchers, students and staff. If you've got a story for the Alumni Section, please let us know!

Alumni session at 10th symposium



This year IBEC's 10th anniversary symposium featured, for the first time, an Alumni Session to highlight the research of young scientists who spent

their formative years at the institute and who have now gone on to outstanding scientific careers all over the world.

The first speakers in this inaugural

session was Riccardo Levato from the University Medical Center Utrecht, The Netherlands, who did his PhD and a postdoc in IBEC's Biomaterials for Regenerative Therapies group, and who left IBEC in 2015. He talked about his work using biofabrication to produce complex grafts for articular cartilage regeneration.

The second speaker was Santiago A. Rodríguez-Seguí from the Universidad de Buenos Aires in Argentina. Santiago, whose PhD thesis was supervised by Josep Samitier and Elena Martínez at IBEC and who left in 2010, gave an overview of epigenetic research and how this might help to understand human organogenesis, with special emphasis on his latest results showing how other signalling pathways might interfere with gene expression regulation during pancreas development. //

Locating the lost

Please remember to spread the word among your former group members and colleagues about IBEC's Alumni Network. Open to everybody who has spent more than three months at IBEC, the Network offers free access to events organized by IBEC (symposium, training courses, etc); speaker and networking opportunities at alumni seminars throughout the year; alumni workshops held at IBEC; the IBEC Alumni Association mailing list, a communication tool; an associated Linked-In network with up-to-date profiles of alumni, as well as IBEC information such as news and jobs; an IBEC alumni webpage with information on the association and people profiles; and a way to hear about alumni news and success stories, and keep in contact.

Visit <http://alumni.ibecbarcelona.eu> for more details, or to sign up. //

Where are they now?

Anita Kosmalska was in the Cellular and Molecular Mechanobiology group at IBEC from 2012 to 2016. Now she's a Strategic Projects Manager at the Institute of Photonic Science (ICFO).

"I've always been very ambitious, wanting to challenge myself to new heights or achieve difficult goals," says Anita, who started her scientific career with a biotechnology degree at the Technical University of Lodz in Poland. "During my PhD interview at IBEC I got a feeling that I could be surrounded by amazing people with a strong desire for challenging assumptions in their fields; that unless it breaks a thermodynamic law, they believe it's possible!"

Anita wasn't disappointed. During her

time at IBEC she published a *Nature Communications* paper as first author.

"The very nature of the degree taught me to be a team player, a problem solver, and helped me gain great presentation and communication skills, apart from having an analytical mind and perseverance."

Anita has now branched off away from research, but her PhD was essential for such a move. "Doing my PhD at IBEC helped me develop valuable transferable skills, which are held in high regard by employers," she says. "In the next few years I hope to master my management skills and take the most profit from all of the amazing possibilities that my new position gives me to continually step into unknown territories." //



NEWS from the PhD COMMITTEE

A busy start to 2017 for IBEC's student reps

The IBEC PhD Committee's activities for 2017 began with the co-organization, together with ASBTEC, of a Bioengineering Workshop at the PCB in February. The committee's programme of social events started with another edition of Labs Tour on 3rd March, a chance for newcomers and old hands alike to discover IBEC labs they might never have had any contact with. Afterwards there was a *pica-pica* and time for networking and a bowling session.

Later that month, the committee organised the annual Calçotada, a delicious Catalan tradition that's eagerly awaited by anyone who lives here. This fourth edition on 18th March took place at Merendero Font de les Planes, a picnic area about 20

minutes from the city. Around 25 people enjoyed the day.

Two months later on 18th May, 18 participants exchanged their lab coats for laser guns for a Laser Tag session at Play-Point, where three teams played two exciting games.

Just before the summer break, the 5th IBEC Beach Volleyball tournament took place on Friday 16th June at "Nova Icaria" beach, with 7 teams taking part, and during the same month the Committee participated in the organization of the activities



The PhD Committee at the 10th IBEC symposium

for the IBEC 10th anniversary party.

All events organized by the IBEC PhD Committee are open to all IBEC members, not just PhD students, and participation in the activities isn't mandatory – you can just come and watch!

If you'd like more information about the committee, please send an email to phdcommittee@ibecbarcelona.eu //

OUTREACH NEWS

How will you contribute your ten hours?

IBEC's outreach events in the first half of 2017 have included the Youth Mobile Festival (YOMO) at the Mobile World Congress on 27th February to 2nd March, at which the Biomaterials group presented an interactive stand about bioengineering for cardiac regeneration; the Saló de l'Ensenyament on 22nd March; the Festival de la Nanotecnologia (10alamenos9) in April; the Fira Recerca en Directe on 3rd-6th May; the Festa de la Ciència on 27th-28th May; and the second edition of BIYSC, the Barcelona International Youth Science Challenge, on 12th-19th July.

To comply with the requirements of both

the IBEC PhD Certificate of Excellence and the BEST International Postdoctoral Programme, IBEC PhDs and BEST postdocs are required to carry out at least 10 hours of



outreach. This can include giving talks, volunteering at fairs, mentoring high schoolers, or even writing for the outreach blog. You need to keep track of your hours yourself, but the Communications department can provide certificates of participation.

Please look out for the regular calls for volunteers, or fill in the outreach availability form for 2017-2018 that was sent out on 26th June. Feel free to get in touch with ibeccommunications@ibecbarcelona.eu if you have any questions. //

Left: IBEC's BIYSC students hard at work, supervised by Jesús Ordoño and Soledad Pérez

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// Since May, the **attendance of PhD students at seminars and PhD Discussions Sessions** is being monitored to comply with the requirements of the IBEC PhD Certificate of Excellence. When you attend an event, be sure to swipe your key card with the person on duty.

// IBEC has received the "**Bonus de Siniestralidad**", an incentive for

companies that have a low accident rate, for the second year running. It's awarded to organizations which invest in effective measures for the prevention of occupational accidents and diseases. The first year, the bonus was 5% of IBEC's social security payments, and this year the percentage increased to 10%. This will be fully reinvested in projects aimed at

preventing occupational hazards.

// IBEC took part in its first outreach event abroad at the **Coventry Life Vitality Festival** in the UK on 1st-2nd October. The institute's participation in the public festival of ageing, where staff and researchers manned a stand about regenerative medicine, was supported by EIT Health.

IBEC PEOPLE



In July 2017 **Paul Verschure** and his Synthetic Perceptive, Emotive and Cognitive Systems group (SPECS) transferred their affiliation from the Universitat Pompeu Fabra to IBEC. ICREA research professor Paul received both his MA and PhD in psychology, and his scientific goal is to find a unified theory of mind, brain and body through the use of synthetic methods and to apply such a theory to the development of novel cognitive technologies. He has pursued his research at different institutes in the USA (Neurosciences Institute and The Salk Institute, both in San Diego) and Europe (University of Amsterdam, University of Zurich and the Swiss Federal Institute of Technology-ETH).

AWARDS AND HONOURS

As well as receiving the Fundació Catalana per a la Recerca i la Innovació (FCRI)'s Premi Nacional de Recerca al Talent Jove 2016 in a ceremony in March (right), Smart-nano-bio-devices group leader and ICREA research professor **Samuel Sánchez** has broken his own Guinness World Record for the smallest jet engine. His and Xing Ma's latest nanotube, 220nm or 0.00022 millimetres in size, has been recognized by the ultimate authority in record-breaking achievements. Previously, Samuel and his collaborators from IFW Dresden held the record until this year, with a 600nm tube.



Biomaterials for Regenerative Therapies senior researcher **Oscar Castaño** has achieved a tenure track lecturer position at the University of Barcelona through the Serra Hunter programme. Oscar will join the university group of IBEC director **Josep Samitier** in the Electronics department of the Faculty of Physics and teach biomedical subjects while still continuing to collaborate closely with his IBEC group and other colleagues at the institute.



Elena Martínez, IBEC's Junior Group Leader selected in the 2013 tenure track programme, has been successfully consolidated as Group Leader following a positive evaluation by the ISC. The tenure track programme aims to support career development by helping young researchers establish their own independent research lines.

Nanoscale Bioelectrical Characterization group leader **Gabriel Gomila** is now a Full Professor in the Department of Electronics of the University of Barcelona.



Gabriel's PhD student **Helena Lozano** received a Best Lecture Award at the 8th International AFM BioMed Conference in Krakow, Poland, on 4th-8th September. Two weeks previously, on 23rd August, she had also received a prize for her poster at the "Biochemical Society Focused Meeting: Extracellular Electron Transfer" at the University of East Anglia in the UK.

UPCOMING EVENTS

Wednesday 18th October

IBEC Seminar: Arpita Upadhyaya
Push, pull and sense: Forces and mechanosensing in immune cells'
Baobab Room, IBEC

Tuesday 24th – Wednesday 25th October

IBEC Retreat: Strategy brainstorming session for GLs and directorate
Montserrat Hotel & Training Center

Friday 27th October

PhD Discussion Sessions: Berta Gumí (Nanoprobes & nanoswitches); Natalia Feiner (Nanoscopy for nanomedicine)
Baobab Room, IBEC

More details at www.ibecbarcelona.eu

More news on the web...

You can keep up-to-date with the latest news and events at IBEC by visiting www.ibecbarcelona.eu



Articles or ideas, please!

Is your group starting a new project? Perhaps something interesting has happened in your research area, or you've had an interesting visitor. Is there an important change that people should know about, or a deadline? Maybe you'd just like to find out what the IBEC community thinks about something, or you have a request. If you have an idea for InsideIBEC or would like to write an article yourself, contact vleigh@ibecbarcelona.eu.



IBEC in pictures

Ciencia Divertida® kept the more than 70 children who attended Kids Day on 23rd June entertained with their science show. The small visitors – the children or nieces and nephews of IBEC and IRB staff and scientists – also enjoyed some hands-on science activities at the event, which is held annually at the PCB. Many thanks to all the many volunteers who helped out on the day.



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