

## **UK-Japan Silicon Nanoelectronics and Nanotechnology Symposium in Southampton (UK-Japan Si Nano<sup>2</sup>), 9-10 July 2015, University of Southampton, Southampton**

UK Scientific Lead: Dr Yoshishige Tsuchiya, University of Southampton

Scientific lead from Japan: Professor Shunri Oda, Tokyo Institute of Technology

Total number of participants: 106

The event provided an unprecedented opportunity to meet top Japanese and UK researchers at the University of Southampton, a leading institution of nanoelectronics and nanotechnology in the UK, and to strengthen the UK-Japan links for future collaboration. The symposium covered the topics related to the state-of-the-art and future of silicon nanoelectronics, including quantum technology applications, novel material electronics, and thermal and nanoelectromechanical applications. 14 invited speakers from UK and Japan top universities, research institutions and industries gave a talk, including four Japanese speakers invited with the support of JSPS. There is no doubt that silicon-based electronics is one of the most advanced technologies in the world and still in development for improving the device performance by active miniaturization. These days the nanoscale silicon devices are not only being used for Information and Communication Technology (ICT) but also playing a key role in electronics for environmental, medical and energy applications. The UK-Japan NANO<sup>2</sup> symposium provided remarkable opportunity where leading researchers in Japan and the UK working on silicon nanoelectronics and nanotechnology met up at the University of Southampton, a top institution in the UK on this research field and strengthened links between Japan and the UK for future collaboration. 4 invited speakers from Japan were supported by JSPS London. In addition 3 speakers from Japan and 7 speakers in the UK were invited. 106 participants in total attended and joined in the discussions.

First, opening remarks were given by Prof Hywel Morgan, Head of Nanoelectronics and Nanotechnology research group, University of Southampton and Ms Chigusa Ogaya, Deputy Director of JSPS London. In the plenary session on the 1<sup>st</sup> day 9 July, Prof Shunri Oda of the Tokyo Institute of Technology introduced a vision of intelligent communications based on silicon device technology in future smart society. The second session was on Si nanoelectronics for quantum technology, where 4 invited speakers, Dr Akira Fujiwara of NTT Basic Research Laboratories, Dr Karol Kalna of Swansea University, Dr Jonathan Fletched of National Physical Laboratory (NPL), and Prof Kae Nemoto of National Institute of Informatics (NII) talked about nanoscale single electron operational devices and future quantum technology applications. Then JSPS activities and their fellowship programmes were overviewed by Ms Ogaya and Mr Kamezawa of JSPS London. At the session of novel material electronics after lunch, Prof Bill Milne of the University of Cambridge and Dr Harold Chong of the University Southampton gave a talk on ZnO devices, while Dr Takayuki Iwasaki of the Tokyo Institute of Technology on diamond electronics and Dr Marek Schmidt of Japan Advanced Institute of Science and Technology (JAIST) on graphene devices. The last session on the day was dedicated to thermal and Micro- and Nanoelectromechanical Systems (MEMS/NEMS) devices, where Dr Zahid Durrani of Imperial College London talked about thermoelectric effects, Prof Hiroshi Mizuta of JAIST about graphene NEMS technology, Dr Dinesh Pamunuwa of the University of Bristol on NEMS computing, and Dr Hanna Sykulska-Lawrence of the University of Oxford on MEMS for space applications.

The second day 10 July started with a plenary talk by Prof Nobuyoshi Koshida of the Tokyo University of Agriculture and Technology on novel electron emitters and ultrasonic devices made of unique porous silicon nanostructures. Then Dr Aleksey Andreev of Hitachi Cambridge Laboratory and Dr Yoshishige Tsuchiya of the University of Southampton gave a talk on silicon quantum information devices. The following session was formatted in the PechaKucha style where a speaker was allowed to use only 20 slides and each slide advanced automatically after 20 seconds. 10 postdoc researchers and PhD students in Nanoelectronics and Nanotechnology group introduced the activities of the group across memory devices, photonics, and bio devices. The poster and networking session in the afternoon was presented by more than 30 posters by young researchers.

I believe the symposium was very successful for the purpose of strengthening existing networks and even of creating new links between UK and Japan. The programme was well-balanced with the structure that consisted of a series of the invited talks in Day 1 and the talks by young researchers and the networking poster session in Day 2. In particular the Day 2 was appeared to be valuable opportunities for young researchers to have discussion with Japanese top leading scientists in this topic. Apart from the scientific programme, we had a dinner reception in the evening of Day 1 where most of the invited speakers, JSPS visitors and Southampton academics attended for informal discussion on future collaboration. We also had laboratory tours to show the visitors our cleanroom facility, one of the largest R&D cleanrooms in the UK. In addition we continued discussion in the following Saturday with some of the Japanese invited speakers about possible joint grant application in future. I believe a real impact was made on the symposium participants, in particular on the young researchers in this field. I am really happy as this symposium had a lot of young researchers and students and played an important role to encourage them to work on this interesting research area. – **Dr Yoshishige Tsuchiya**



Symposium Participants