Report on International Travel Support
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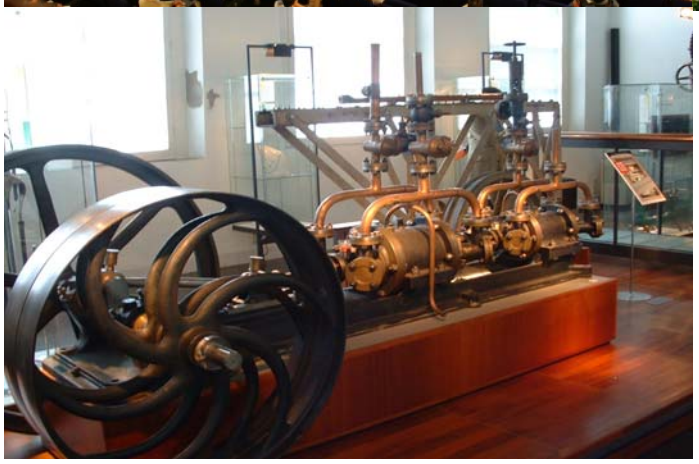
I wish to thank Associate Vice Provost for International Programs Dr. Julie Mostov, Anuha Mehra and the Committee on Faculty International Travel Support for this travel award that allowed me to represent Drexel University at the 25th International Conference on Low Temperature Physics (LT25) in Amsterdam, The Netherlands on Aug 6-13, 2008. This award made it possible for me to present our research "Energies and Entanglement in Multiply-coupled Phase Qubit Systems", promote Drexel's newly-established Low Temperature Laboratory to the international community and establish international contacts.

The conference is the largest international assembly of low-temperature physicists and convenes every three years. Around 1500 participants, including several Nobel Laureates, attended to discuss advances in superconductivity, superfluidity, quantum computing, quantum phase transitions, laser cooling, liquid helium physics and Bose-Einstein condensation. The conference also celebrated the centenary of liquid helium, the discovery which made possible a broad range of research at temperatures close to absolute zero. It began with the awarding of the Simon Memorial Prize to Y. Nakamura and Y-S. Tsai, for their ground-breaking research on establishing quantum coherence of superconducting devices called "charge qubits (quantum bits)" for quantum computing applications – a field where I specialize and had pioneered another class of qubits called "phase qubits" with collaborators at the University of Maryland. This was followed by daily plenary talks such as those by Nobel laureate Wolfgang Ketterle about superfluidity in a gas of strongly interacting fermions and by Subir Sachdev on how black holes can link quantum phase transitions with hydrodynamics. Of particular interest to me were the plenary talks by Andre Geim on a new material called "graphene" that may replace silicon, due to its record-high mobility, and Rob Schoelkopf's talk on Circuit Quantum Electrodynamics and Quantum Computing on a chip. During the following days, the most interesting plenary talks included John Clarke's work on SQUID-detected MRI in microtesla fields and several talks about a new class of superconductors with a higher critical temperature. Plenary talks were held in the morning, followed by parallel oral sessions but the most interaction occurred during the numerous poster sessions which were the main mode of presentation at the LT conferences. These informal discussions allowed me to meet with international colleagues, discuss results and implications of very recent experiments, stimulate collaborations and invite colloquium speakers.

As a result of this conference, our Quantum Device group at Drexel was able to publish a peer-reviewed article in the conference proceedings to be published in the Journal of Physics. Colleagues and I were able to obtain information during the conference that allowed us to submit a research proposal a few months thereafter. I was also able to successfully invite distinguished colleagues to give physics colloquia, including Bob Hallock (UMass, Amherst) to talk about two-dimensional helium mixtures and supersolids. I also established connections with Prof. Eun Seong Kim (KAIST, South Korea), who welcomed the opportunity of hosting Drexel co-op students in his laboratory.

Finally, on the occasion of one hundred years of liquid helium, I joined the other conference participants in visiting the birthplace of liquid helium, the renowned Kamerlingh Onnes Laboratory at Leiden, where Heike Kamerlingh Onnes won the race against Scottish physicist James Dewar to liquefy helium. Most of the original, historical equipment, such as the first liquefier and the 'big magnet', has since been moved to the Museum Boerhaave. We also visited this museum which had scheduled an exhibit called "The quest for absolute zero" for the occasion of the conference.



Clockwise from Left: A giant pump used to liquefy helium. 1500 low temperature physicists listen to plenary talks. The setup Onnes used to first liquefy helium in 1908. Visiting windmills at Leiden.