



Top: □ □ ([Nanyuan](#)) gardens near Hsinchu.

Bottom: Assembled participants at the NCTS-ICAM meeting.



ICAM NEWSLETTER

Report from Hsinchu

ICAM Annual Meeting 2009

ICAM opened the 2019 science season with the annual meeting, held in January at the campus of the National Tsinghua University (NTU) in Hsinchu city, Taiwan. This was an extraordinarily enthusiastic and interesting meeting that left all participants in an upbeat mood.

Following ICAM tradition, the 3-day annual meeting was followed by a two day Frontiers meeting. This year, the meeting focused on Frontiers of Quantum Matter, and was co-organized by the National Center for Theoretical Studies (NCTS) and the Academia Sinica (ICAM node in Taiwan). The event was organized on the NTU campus and most guests stayed in the NTU Guest House.

Participants came from 14 different countries and represented 28 ICAM branches worldwide. The superb local organization was overseen by T. K. Lee and Chung-Hou Chung from Academia Sinica and National Taiwan University. They were ably supported by wonderful staff led by Cindy Wang.

Plenary talks were presented by Naomi Halas (Rice University) on Soft Matter, by Karine Gevorkian (Curie Institute) on Biological Matter and by Duncan Haldane (Princeton), Paul Canfield (Iowa State) and Eva Andrei (Rutgers University) on Quantum Matter. There was a session in memory of ICAM founder David Pines, with presentations by David Campbell, Laura Greene and Piers Coleman. David Schwab (CUNY) presented a lecture and led a group discussion on Machine Learning and Physics. Laura Greene (NHMFL, Florida) led a lively round-table discussion on Women in Physics with a panel of women participants from North America, Asia, Europe and Australia.

An important element of the meeting, were the two ICAM policy meetings, bringing together the Board of Governors and the Science Steering Committee, led by ICAM co-directors Piers Coleman and Rajiv Singh. Several issues related to the future of ICAM, including the breadth of Scientific Focus, Leadership Structure and Funding were extensively discussed.



Left: Meeting poster signed by all participants.
Right: Professor F. Duncan M. Haldane, 2016 Nobel Laureate in Physics, sharing his Nobel medal with Professor Chong-Sun Chu of NTHU, Taiwan.

Professor Duncan Haldane gave a public lecture on Topological Matter, which had a packed audience of diverse background. Duncan even brought a copy of his Nobel Prize medal to the event and allowed the young audience to hold it in their hands.

There were several wonderful dinners hosted in major hotels, where live music was provided by students from NTU. In addition, there was an afternoon excursion to the Taiwan Tea Garden at Nanyuan (see above), with a beautiful mountain setting besides a lake.



Top (L to R): David Schwab, Alex McCullom, Qian Niu and Duncan Haldane. **Center:** Panel on Women in Physics, Liling Sun, Karine Guevorkian, Suchitra Sebastian, Silke Paschen, Mei Yin Chou, Eva Andrei and Laura Greene. **Bottom:** T. K. Lee and Liling Sun, Silke Paschen and Natan Andrei

Science Highlights: from Photothermal cancer therapy to New Materials Synthesis

The meeting provided an awe-inspiring overview of the many exciting developments in emergence. Here is a taste of some of the topics that were presented. (Many more details, including videos of full talks can be found at the [website](#)). **Naomi Halas** described how the excitation of plasmons in nano materials could be used for a wide range of sustainability and societal applications, including state-of-the-art desalination and non-evasive photo-thermal cancer therapy. **David Schwab** introduced us to the fascinating links between machine learning and statistical mechanics. **Karine Gevorkian** gave a beautiful introduction to the physics of polymerization and growth in cells, showing how ideal gas models could be adapted to understand the growth of embryos. **Yuji Matsuda** showed Kitaev's fractionalized Majorana spin liquid had been identified from a quantized thermal Hall conductance. **Paul Canfield** took us on an earnest, but highly entertaining tour of the periodic table, highlighting three strategies at the heart of new materials physics: the study of specific compounds, the study of specific ground-states and what he called "the search of known and unknown unknowns". **Eva Andrei** gave an introduction to methods for manipulating the physics of Graphene, especially twisted Moire

Graphene. **Duncan Haldane** described his thoughts about how metrics are important in the fractional quantum Hall effect and perhaps, quantum critical points.

Policy Meetings and Discussions

Two very lively and up-beat policy discussions took place with the Board of Governors and the Science Steering Committee. **Rajiv Singh** presented the finances of ICAM, which at present is supported by about 300k of branch dues and 200k from the Moore Foundation QuantEMX grant. The current finances are in the black, supporting about 12 workshops and 2 schools per year, plus about 50 science exchanges between the ICAM/EPIQS network and the world at large. The number of ICAM nodes has recently increased, with new membership from **Arizona State, from Radboud University, the Taiwan Consortium, Nordita, Oak-Ridge National Lab/UTennessee and Leiden/Delft**. Key amongst the many topics that were considered was the **The Future of ICAM**, and the prospects for new **National and International funding**. The assembled community re-iterated its strong support for ICAM remaining an institution with a broad spectrum of interests across biological, soft and Quantum matter and energy, and voted unanimously to continue ICAM in its current structure.

Good Funding Prospects: RCNs and Key Joint Research Program

Piers Coleman reported on our current efforts to raise new funding for ICAM, describing the very encouraging trip to visit NSF DMR director Linda Sapochak in Washington last fall, and communications that we have had with NSF-China. NSF suggested we apply for three Research Coordination Networks in the NSF - one for our quantum, bio and soft matter thrusts, to support science exchange and also postdoctoral support. We will be organizing these applications in the near future. We also discussed with Liling Sun and Xi Dai, the preparation of a Key Joint Research Program application to the NSF-C, which we hope to also do this Spring. Rajiv and Piers would like to hear from other branch members about ideas for funding across the international ICAM Network.

Board of Governors and Executive Committee

At the meeting it was also decided to simplify the structure of ICAM, combining the separate Executive Committee into the Board of Governors. We will be contacting each branch to make sure that we have up-to-date membership lists for both the Board of Governors and Science Steering Committee.

Important ICAM Dates for 2019

ICAM encourages applications for Workshop Support, and QuantEmX science exchanges

Workshop Application Current Deadline February 28th 2019.

Next Application Window June 3-July 31 2019

QuantEmX Current Deadline Extended to Feb 28th 2019.

Next Application Deadline 30th April, 2019