

The KIAS-APCTP Winter School on Statistical Physics: 16 Years of Education

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Fig. 1: The posters used for earlier KIAS-APCTP Winter Schools on Statistical Physics.

SYNOPSIS

In the winter of 2003-2004 the KIAS-APCTP Winter School on Statistical Physics began. Since then, it has become an ever more prominent annual event, serving to train graduate students, junior researchers, and the next-generation of scholars in advanced topics of statistical physics. The annual themes covered include interdisciplinary subjects ranging from computational methods to information theory and machine learning as well as the “canonical” advanced topics in equilibrium and nonequilibrium thermodynamics. Celebrating its 16th anniversary, the school has now become an important educational tradition for Korean statistical physics communities.

Statistical mechanics provides a powerful tool for understanding macroscopic systems on the basis of microscopic

laws governing the dynamics of their constituents. Its ever-increasing use is not limited to physical sciences but extends to biological, social, and information sciences, playing the role of bridgehead into interdisciplinary research.

Like many other countries in Asia after World War II, Korea was lagging far behind in many ways. It was not until 1952 when the Korean Physical Society (KPS) was launched, in the middle of the Korean War (1950-53). Despite its relatively short history and the lack of manpower after the Korean War, the Korean statistical physics community formed relatively early. One of the founding members of KPS, Dr. Soon-Tak Choh (1925-96), who was renowned for his work on the kinetic theory of dense

gases, is also known for his pioneering efforts to build the statistical physics community in this nation.

The KIAS-APCTP Winter School on Statistical Physics (hereafter Winter School) is one of the three major regular events in the Korean statistical physics community, since the KPS's approval of the Division of Statistical Physics in 1973. According to the frequency of the events, the Statistical Physics Monthly Meeting occurs most often, followed by the annual Winter School and finally the biennial Statistical Physics Workshop, which benchmarked the semiannual Rutgers Statistical Physics Conference.

While the Monthly Meeting and Workshop have aspects that are directly and indirectly inherited from Dr. Choh's legacy, the Winter School was most recently conceived, around early 2000. The first Winter School was organized by Dr. Yup Kim (Kyunghee University) and Dr. Hyunggyu Park (Korea Institute for Advanced Study) in the winter of 2003-2004. This annual event was intended to provide graduate students and early-career scientists from physics and related disciplines with the conceptual framework and analytical tools for advanced studies.

Throughout the 16 events so far, the Winter School has covered various topics, ranging from classical and contemporary interdisciplinary issues. Particular care has been taken to make the sessions oriented to be hands-on so that the participants can get practical experience with immediate application of the knowledge to his/her own research.

The Winter School has been composed of 15-25 hours of lectures combined with a series of seminars that are pertinent to the year's thematic focus. The instructors are carefully selected by the committee well before the school's opening. They are requested to prepare and disclose their lecture notes in advance of the start of the school. An important mission for the instructors is the design of several mini-projects to be chosen by semi-randomly assigned teams of students.

The Winter School normally starts on a Monday afternoon and concludes after lunch on Friday of that same week. The finale to this five-day-long event is the competitive exhibition of the mini-projects. After a thorough review of the presentations, some of those projects, which often later develop to become small research papers, are selected and receive honors from the KPS Division of Statistical Physics.

The venues for the Winter School rotates from seaside resorts, ski resorts, and Pohang, where the headquarters of the Asia Pacific Center for Theoretical Physics (APCTP) is located. From its inception, KIAS (Korea Institute for Advanced Study) and APCTP have been the main supporters of the Winter School. The KPS Division of Statistical Physics has also been a constant supporter.

With a packed schedule, the Winter School is also considered to be a good opportunity for social networking across generations and geographical divides. It is often both an exhaustive and exhausting week, but also a festive gathering at the same time, where the borders between work and play are not clearly demarcated. The participants have the opportunity to make the most of the unique atmosphere that the Winter School provides. Collaborations are constantly being formed and collaborators become old friends in the Winter School.



Fig. 2: The 15th KIAS-APCTP Winter School on Statistical Physics held in Pohang from January 8-12, 2018.



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