NNPSS09 at Michigan State University
Final Report

The 2009 National Nuclear Physics Summer School (http://meetings.nscl.msu.edu/NNPSS09/) was held at Michigan State University in East Lansing, MI continuing the tradition to expose advanced graduate students and young postdocs to a stimulating and broad scientific program spanning most areas of modern nuclear science. Local organizers were W. Bauer, S. Conroy, H. Schatz (chair), and M. Thoennessen. The school consisted of sets of main lectures, complemented with seminars, cooperative learning groups and Q&A sessions. The scientific program was complemented by meal and coffee breaks as well as a tour of the National Superconducting Cyclotron laboratory and a number of social activities. We felt that the school was a great success, and we elaborate on some aspects in the following, while trying to give useful information for future school organizers:

Participants

The school was attended by 46 participants, of which only 8 were local students. We deliberately focused on attracting outside students to not impact the overall atmosphere of the school , and to avoid, for example, participants to group in their usual social settings.

We were quite happy with the diversity of the student population in terms of gender, home institutions, and physics background. Most participants were from the US, but we had a few attendees from Germany, France, India, Norway, Britain, and Spain. About a quarter of the participants were female, a result of a conscious effort in the selection process. Only 6 Students were from “west of the Mississippi”, despite a major effort of the organizers to increase that number by personally contacting colleagues in this area. Anecdotal comments indicated that the number of theory students was rather low (we did not track that) but this might reflect the actual distribution in the field. Nevertheless, one could in future schools make a deliberate effort to increase that number.

Lectures

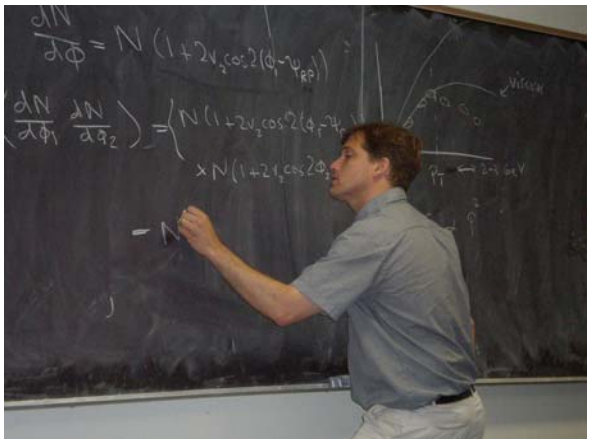
The lecture program consisted of 6 main lecturers, complemented with 7 Seminar speakers. The lecture notes are available online at http://meetings.nscl.msu.edu/NNPSS09/index.php?id=conference_details/material.php. The lecturers gave 4 1h lectures, the seminar speakers a single 1h seminar. Main lecturers were:

- Betsy Beise, University of Maryland **(Hadron Physics)**
- Alexandra Gade, Michigan State University (**Nuclear Structure**)
- Bob McKeown, Caltech (**Neutrinos**)
- Frank Timmes, Arizona State University (**Nuclear Astrophysics**)
- Bill Zajc, Columbia University (**Relativistic Heavy Ion Physics)**
- Hermann Wolter, Ludwig Maximilians Universitaet Muenchen (**Nuclear Reactions)**

The seminar speakers were:

- Timothy Chupp, University of Michigan (**Fundamental Symmetries**)
- John Hardy, Texas A&M University (**Fundamental Symmetries**)
- Dave Morrissey, Michigan State University (**Nuclear Instrumentation**)
- Witek Nazarewicz, University of Tennessee (**Nuclear Structure Theory**)
- Derek Teaney, Stony Brook (**QCD Theory**)
- Michael Wiescher, University of Notre Dame (**Nuclear Astrophysics Experiments)**
- Sherry Yennello, Texas A&M University (**Nuclear Reactions Experiments**)

We were extremely happy with the quality of the lectures. In the exit survey, the lectures were rated by the students on a scale to 1-5 and received average ratings ranging from 3.5 – 4.6.



Group discussions and Q&A

In this school we introduced elements of cooperative learning. At the beginning of each day the students were randomly grouped into groups of 4. The students then were reseated for the day, so that groups sat together (the room layout with chairs and tables helped – pairs of students in one row could turn around and share a table with the rest of their group in the back row). After each lecture and each seminar, a 30min period was devoted to group discussions about the lecture. Each group of 4 had to fill out a form with three rubrics: “Things we understood”, “Things we did not understand”, and “Questions”. These were then collected and handed to

the lecturers. At the end of each day we held a 1.5h Q&A session where the lecturers, using the feedback from the groups, would answer questions. These Q&A sessions were blackboard only, no powerpoint allowed.

We felt that this worked extremely well. This was the one aspect of the school that we received the most positive feedback on from lecturers and students. Bill Zajc even wrote a blog entry about it (see http://qgp.phy.duke.edu/2009/07/20/going-back-to-school/).

These group activities accomplished a lot of important things:

1. In the 30 min of group work the students started discussing the topics of the lectures among themselves. The room quickly was filled with lively discussions about physics, and student started to explain things to each other. Many of the questions the students had were actually answered by other students in their groups and never made it on the forms!
2. The activity brought out the real questions that students have. In a usual Q&A setting these are seldom asked.
3. All students can participate in developing the questions – typical Q&As are often dominated by a few people.
4. The students really got to know each other very well, not only on a personal level, but also in terms of their specific backgrounds. The random seating every day further fostered interactions among students as it prevented students clustering into smaller sub groups during the school.
5. The lecturers received instant feedback about their lecture. Many of the main lecturers actually adjusted their subsequent lectures to take into account what was understood, and what wasn't. Many commented that they were very motivated by the apparent interest of the students and the quality of questions asked.
6. The lecturers could design their Q&A session so as to address the set of questions that the student had as a whole in the most efficient way.

Poster sessions

We opted for poster sessions as the way for the students to present their research to each other. Posters were displayed permanently for 2-3 days in the same room were the coffee breaks were held. We were very impressed with the students clustering around the posters during each break. After 2-3 days a new set of posters was put up.

Student-Lecturer interactions

Student-Lecturer interactions are an extremely important aspect of the school. We tried our best to design the school to facilitate these interactions. The challenge is that the speakers tend to only stay at the school for a short time. We also had to compensate for the fact that the dormitories for student accommodations were not suitable for the lecturers. The following design aspects of the school facilitated student-lecturer interactions:

1. All meals, lectures, and coffee breaks were in the same building where the students were staying. Lecturers were told that attendance of Lunches and Dinners for the duration of their stay is mandatory.

2. Each day we assigned to each lecturer that was present a group of 4 students to have dinner together in the dining hall. Typically more students would join the groups, but this ensured that lecturers felt obliged to go to Dinner, that they were not "hijacked" by organizers or local faculty, and it helped the quieter students to get their share of student-lecturer interaction.

3. On two evenings we organized "Go to a bar with a speaker" events. Naturally not all speakers and students were interested in this, so this was not a required event, but most students and lecturers participated. This went very well, and enabled more informal interactions. It also helped to keep lecturers and students together beyond lectures and meals.

4. Lecturers were strongly encouraged to participate in all evening activities and most of them did for the days they were present. As most evenings had an activity this was rather effective.

Student-Student interactions

We felt that student-student interactions are as important as student-lecturer interactions. One goal of the school is that students get to know their future peers across the sub-disciplines of nuclear physics. Again we designed the school to maximize these interactions through a variety of measures:

1. All meals, lectures, coffee breaks were in the same building as the dormitories. Most students shared a room with another student. Students were able to take advantage of common rooms, and sport facilities.

2. We organized a rather busy evening program. Only one evening per week was without a social activity, though often the activity was only 1-2 hours. Besides the excursions, smaller evening activities included BBQ, ice cream social, bowling, “Go to a bar with a speaker”, and a tour of the National Superconducting Cyclotron Laboratory with a presentation about FRIB.

3. We organized 3 larger excursions – two evening excursions (Attending a baseball game and a dinner cruise) and one all day excursion with team building activities (Canoeing, followed by a visit to the famous Sleeping Bear Dunes with the possibility of a dune hike for the brave)

4. We established an NNPSS Facebook group for students and lecturers that became very popular. The organizers are still in touch with some of the students, and students are still communicating with some of their fellow participants, even months after the school is over. The Facebook group was also used by the students to organize evening activities and to share pictures taken during the school.

Exit Survey

We carried out an exit survey to obtain feedback on the school from the students (see Appendix). We feel this would be a valuable thing also for future schools. Some results were already reported above.

We were very happy to hear that the students rated their overall school experience very high (4.6 on a scale from 0 to 5) and that they were also very happy with the overall organization (4.6).

An important question concerned how well we achieved the broader goals for the school. On a scale from 0 to 5, students were asked to which degree did the school

1. Increase your knowledge in the area you are working in (2.9)
2. Broaden your knowledge beyond your immediate field of work (4.2)
3. Enable new personal contacts to lecturers (3.2)
4. Enable new personal contacts to other students (4.4)

We feel these are very good results, indicating the main goals of the school, to broaden the students background in nuclear physics and to enhance their contacts within the field have been achieved.

In terms of balance of activities (lectures, group work, coffee, meals, interaction opportunities, social program, posters) no strong preference was given for any change. The most significant suggestion was a slight preference for more free time (0.6 on a scale from -2 to 2, with 0 being no change, -2 being less, 2 being more). In all other categories, the majority of students preferred no change.

One question concerned the criteria for the decision to attend this particular school. The two highest ranked criteria were “Range of Topics” and “Opinion of your advisor”. Also important were “Lecturers”, and, a bit lower ranked, “MSU’s reputation in nuclear science” and “Reputation of the NNPSS series”. Not very relevant were “Touristic attractiveness of location”, “Distance from home institution”. It seems that advertising in the science community (advisors) and scientific attractiveness of the location are more important than a pretty site, climate, and geographic location (at least for this group).

We also asked how the participants first heard about the school. For more than 50% it was their advisor or a senior colleague. A smaller role (20% each) played Web search and e-mail announcement directly from the school. This has interesting implications for future advertising of the school. Clearly e-mails to senior colleagues are the most important piece. We also used a graduate student e-mail list compiled from a few past conferences, which apparently was valuable. This is of course extremely difficult to maintain, but if the community (or INT?) would be able to do this it might be a very good tool to recruit participants for future schools. Clearly the printed poster had no measurable impact.

Appendix: Exit Survey

Exit Survey

2009 National Nuclear Physics Summer School

Criteria for your decision to attend this particular school.
Give numbers 1: most important, 2, 3, 4, 5, 6, 7, 8: least important

___ MSU's reputation in nuclear science

___ Touristic attractiveness of location

___ Not too far away from your home institution

___ Fee and overall cost

___ Lecturers

___ Range of Topics

___ Opinion of your advisor

___ Reputation of the NNPSS series

How did you hear about the school first (check one):

___ Saw Poster

___ Web search/browsing

___ Web listing (Site: _____)

___ Received e-mail announcement directly from school

___ From advisor or senior colleague

___ From fellow student

Outcomes 0-5: To which degree did the school (0 not at all, 1 little …. 5 a lot)

___ Increase your knowledge in the area you are working in

___ Broaden your knowledge beyond your immediate field of work

___ Enable new personal contacts to lecturers

___ Enable new personal contacts to other students

Quantitative balance of activities (-2 – 2)
(-2 want much less, …0 just right … 2 much more)

___ Number of lectures

___ Duration of lectures

___ Group work activities

___ Coffee breaks

___ Meal times

___ Speaker interaction opportunities

___ Student interaction opportunities

___ Excursions, games, and other extra curricular group activities

___ Free time

___ Time for posters

___ Student talks

Experience 1-5: Rate the school for (1: terrible … 3: average … 5: excellent)

___ Overall school organization

___ Organization of poster session

___ Website

___ Value of group discussions

___ Value of Q&A sessions

___ Selections of topics out of the range of topics that comprise nuclear science

___ Overall quality and effectiveness of lectures

___ Overall additional activities organized by school (Excursions, games, etc)

___ Overall experience (overall grade for school as a whole)

Experience 1-5: Rate individual activities (1: terrible … 3: average … 5: excellent)

Effectiveness and quality of individual lectures:

___ Timmes, Nuclear Astrophysics

___ Beise, Hadron Physics

___ Nazarewicz, Nuclear Structure Theory

___ Zajc, Relativistic Heavy Ion Physics

___ Wiescher, Nuclear Astrophysics Experiments

___ Chupp, EDM

___ McKeown, Neutrinos

___ Gade, Nuclear Structure Experiments

___ Yennello, Reactions Experiments

___ Wolter, Reactions Theory

___ Morrissey, Instrumentation

___ Hardy, Fundamental Symmetries

Individual additional activities

___ Go to a bar with a speaker

___ Bowling

___ Baseball Game and Fireworks

___ River Cruise

___ Canoeing

___ Sleeping Bear Dunes

___ Cherry Hut

___ NSCL Tour

Recommendation of what to improve

Recommendation of what not to do at the next school

Recommendation of what to add for the next school