12^{th} HGSFP Winter School

Obergurgl 2019

Final Report

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This document concludes the 12th HGSFP Winter School that took place at the University Center in Obergurgl from 16th to 20th of January 2019. In total, 48 graduate students from Heidelberg and 10 lecturers participated in the five-day event. The aim of the Winter School was to give students the opportunity to get insights into other research fields in Heidelberg apart from their own field. In the course of this, one of the focal points was the scientific exchange between the students themselves and students and lecturers in a friendly atmosphere. To this end, we organized a scientific programme consisting of 10 lectures given by speakers from Heidelberg and other universities and two poster sessions with elevator talks (see Appendix A).

Participant Selection

As expected, we received more applications for the school than spots were available. We therefore had to select participants from the pool of applicants, which we wanted to perform as fair as possible. We felt it was important to be both transparent about and accountable for our selection. For this reason, we imposed a selection algorithm, laid open the complete procedure (with anonymized data)[1], and explain what decisions went into the selection. In the following, we give an overview on how we selected the participants for the HGSFP winter school 2019.

Asking The Right Questions

Designing the application form was perhaps the most difficult task, and it is at this stage that conference organizers will already want to put serious thought into the goals of the workshop and the ideal mix of participants to achieve those goals. It should be obvious, but you will only be able to include categories in your selection that you actually ask for.

Pre-selection

Excluding speakers, we have 52 spots for the meeting. Our participant selection proceeded in two parts. In the first part, we rejected candidates outright who were either (1) duplicate entries or (2) candidates who had informed us that they would not be able to come. Two spots were reserved for the HGSFP representatives. Finally, we pre-selected the organizing committee, who needs to be present at the school. Thus, a total of 8 participants (6 organizers, 2 representatives) were pre-selected. We then anonymized our applicant pool by replacing names and other identifying information with a unique identifier.

Participant Selection

For the remaining 52 - 8 = 44 slots, we used the software `entrofy` to optimize our participant set based on a set of well-defined criteria on which the organizers agreed. It's worth

[1] https://github.com/matiscke/HGSFPschoolParticipantSelection

noting here that this discussion took place before performing the selection, which then depended entirely on the goals for the selection and was independent of the input data set.

Target Distributions

The targets define the fraction of participants in the final output set who share the same value of a property (e.g. 25% of participants should be affiliated with the HGSFP branch "Fundamental Interactions and Cosmology"). The target fractions must sum up to be smaller or equal to 1.0 for each category. If the target fractions sum to a value smaller than one, the algorithm will try to fill up categories to at least the given fractions, and will ignore that category for the rest of the optimization procedure. The resulting mix of participants in the final set for this category will thus be a combination of the input fractions and the distribution in the input sample, conditioned on the constraints set by the remaining categories. Below, we will go through each category one by one and lay out our reasoning for the categories chosen. The justification for our choices is an abbreviated version of a longer discussion the organizing committee had before starting the selection procedure. We should note at this point that there is no "correct" way to choose target fractions; the target fractions must necessarily always be a function of the objectives and goals of the workshop, as defined by the organizers.

Selection Goals

Broadly, the goals we defined for the HGSFP Winter School 2019 for participant selection are the following:

- enable every HGSFP student to attend one winter school during their PhD:
  - $\Rightarrow$ strongly favor applicants that have not attended a HGSFP winter school before
  - $\Rightarrow$ favor applicants that are longer into their PhD (since the clock is ticking...)
- Reflect the student numbers of the different HGSFP branches
- Increase the participation of underrepresented minorities (in our case this translates to an effort for gender equality)

HGSFP branch
For the branch attribute, we aim to reflect the distribution of the overall branch affiliation

Previous Winter School Attendance
Derived from our top requirement, the acceptance of applicants with previous attendance of a winter school should be an exception. We decided if we allow previous attendees at all based on the oversubscription of the school. The latter was not very high, we therefore

decided to accept applicants with previous attendence only via the waiting list. We enforce this criterion further below and do not solve for this parameter.

Gender Identity
Any social engineering involving gender is necessarily subject to scrutiny. Our choices here reflect our beliefs about what we would like the Winter School to be: We recognize that underrepresented minorities are particularly underrepresented in physics, which is reflected in the number of non-male PhD students. We also recognize studies that show that diverse groups outperform groups lacking diversity among several axes. Representation is important: we believe that minority participants might feel more comfortable participating if they do not feel singled out based on their gender.

Realizing that an equal representation of genders cannot be realized given the input set, we choose to set a goal fraction of female participants slightly higher than the corresponding share in the HGSFP and allow a sufficient margin for the option "Don't identify with either".

PhD Duration
We aimed to give senior PhD students that have not participated in a Winter School before an advantage in the selection, since they have less or no opportunities to re-apply next year.

Aside from the organizers and representatives, the entire procedure was performed entirely without names and based only on the candidates' responses and the complex optimization of the participant selection with respect to our goals. After the selection, all applicants were informed about the outcome and applicants in the 'accepted' list were asked to confirm their attendance within a specified period. Not all participants accepted our invitation on the first round. Free spots were filled with applicants from the waiting list on a first-come, first-served basis with regard to our notification emails.

More detailed information about our selection procedure and an interactive Jupyter notebook that includes the original code can be found on
https://github.com/matiscke/HGSFPschoolParticipantSelection.

Lectures

Poster Sessions

Venue

Travel

Social Event

Final Remarks

In summary, the winter school was a great success. We are confident that the goals of the school were achieved, and the very positive feedback of students and lecturers strengthens this impression. The organizers are very thankful for the great organizational and financial support of the HGSFP for this event and we hope that the tradition of the winter school will be carried on in the future.

Time	Wednesday 16.01.	Thursday 17.01.	Friday 18.01.	Saturday 19.01.	Sunday 20.01.
07:30	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast
08:30 - 10:15	Arrival in Obergurgl	**Strongly Coupled Systems and the Applied Physics of Black Holes** C. Ewerz	**Building Planets - A Journey along 40 Orders of Magnitude** T. Birnstiel	**Strongly Coupled Systems and the Applied Physics of Black Holes** C. Ewerz	**Radiation Biology: Physics at the Forefront of Cancer Therapy** J. Seco
		High-Precision Tests of Quantum Electrodynamics - The g-Factor F. Köhler-Langes	**Unlocking Changes in Ocean Dynamics** F. Hemsing	**High-Precision Tests of Quantum Electrodynamics - The g-Factor** F. Köhler-Langes	**Prospects and Challenges of Quantum Computing** M. Gärttner
		Josephson Junction Based Superconducting Electronics S. Kempf	**Hot QCD Matter Produced in Ultra-Relativistic Heavy-Ion Collisions** S. Masciocchi	**Josephson Junction Based Superconducting Electronics** S. Kempf	**Galaxy Formation and Cosmology** T. Buck
10:30 - 15:30		Break	Break	Break	Break
17:00 - 18:45		**Building Planets - A Journey along 40 Orders of Magnitude** T. Birnstiel	**From Snow to Avalanches – A Journey through Scales and Phase Transitions** A. Capelli	**Radiation Biology: Physics at the Forefront of Cancer Therapy** J. Seco	Departure
		Unlocking Changes in Ocean Dynamics F. Hemsing		**Prospects and Challenges of Quantum Computing** M. Gärttner	
	Dinner at 18:00	**Hot QCD Matter Produced in Ultra-Relativistic Heavy-Ion Collisions** S. Masciocchi		**Galaxy Formation and Cosmology** T. Buck	
19:00		Dinner	Dinner	Dinner	
20:00 - open End	Social Event	Elevator Talks	Elevator Talks	Introduction to the HGSFP	
		Poster Session	Poster Session		