



SFB SUMMER SCHOOL: Discrete Random Structures

SEPTEMBER 7-12, 2025

Pörschach, Kärnten, AUSTRIA

MINI-COURSE SPEAKERS:

Guillaume Chapuy (CNRS)

“Introduction to planar maps (randomness and enumeration)”

Abstract: We will introduce the basic techniques and concepts about enumeration of planar maps:

- Equations with catalytic variables, Tutte's formulas, Bousquet-Mélou Jehanne strategy.
- Bijective techniques, map-to-tree bijections.
- We will explore basic results about large random planar maps, via analytic combinatorics and via scaling limits of trees.

Exercise sessions will take the time to manipulate the basic concepts from the lectured. They will also propose a few more advanced problems for students wanting to explore some other topics: maps on other surfaces, maps and the symmetric group, maps and computer algebra.

Sunil Chhita (University of Durham)

“Random Domino Tilings”

Abstract: Random domino tilings have played a central role in developing a theory on dimer models. In this mini-course, we will introduce domino tilings for both a rectangular region and an Aztec diamond and discuss methods for exact simulation. We will then focus on the Aztec diamond, looking into local statistics and exploring the limiting statistical behavior.

Fabio Toninelli (TU Wien)

“Markov Chain Mixing: An Introduction”

Abstract: How fast can one sample a random instance from a very large discrete set? I will give an introduction to the theory of (total variation) mixing for Markov chains, with special emphasis on Markov chains on large discrete combinatorial structures, such as dimer and spin models.

The Summer School will start with dinner on Sunday evening and will end on Friday afternoon. This event is organized in the framework of the SFB F1002 and funded by the Austrian Science Fund (FWF).

Schedule 1st SFB Summer School, September 7-12, 2025, Pörtschach

Sunday, September 7, 2025

Day of Arrival at Hotel Dermuth

Hauptstraße 178, 9210 Pörtschach am Würthersee

Tel: +43 6461-205

<https://hoteldermuth.at>

Location of Workshop is at Grüner Salon at Parkvilla Wörth (a few mins walk from Hotel Dermuth)

19:30 Dinner

Monday, September 8, 2025

07:30-09:00 Breakfast at Hotel Dermuth

09:00-10:30 *Guillaume Chapuy - Minicourse Class I*

10:30-11:00 Coffee break

11:00-12:30 *Sunil Chhita - Minicourse Class I*

12:30-14:30 Lunch

14:30-15:15 **Exercise Class (G. Chapuy)**

15:15-15:45 Coffee Break

15:45-16:30 **Exercise Class (S. Chhita)**

16:30-16:45 Break

16:45-18:15 SFB meeting (for PIs only)

19:00 Dinner

Tuesday, September 9, 2025

07:30-09:00 Breakfast

09:00-10:30 *Fabio Toninelli - Minicourse Class I*

10:30-11:00 Coffee break

11:00-11:45 **Exercise Class (F. Toninelli)**

Afternoon off

For hike to Dobratsch: Coach leaves at 12:00. Please be on time for departure!

19:15 Dinner

Schedule 1st SFB Summer School, September 7-12, 2025, Pörtschach

Wednesday, September 10, 2025 !! UPDATE

- 07:30-09:00 Breakfast
- 09:00-10:30 *Guillaume Chapuy - Minicourse Class II*
- 10:30-11:00 Coffee break
- 11:00-12:30 *Sunil Chhita - Minicourse Class II*
- 12:30-14:30 Lunch
- 14:30-16:30 *Fabio Toninelli - Minicourse Class II (with coffee break in the middle from 15:15-15:45)*
- 16:30-18:30 Discussions
- 19:00 Dinner

Thursday, September 11, 2025

- 07:30-09:00 Breakfast
- 09:00-10:30 *Guillaume Chapuy - Minicourse Class III*
- 10:30-11:00 Coffee break
- 11:00-12:30 *Sunil Chhita - Minicourse Class III*
- 12:30-14:30 Lunch
- 14:30-15:15 *Exercise Class (G. Chapuy)*
- 15:15-15:45 Coffee break
- 15:45-16:30 *Exercise Class (S. Chhita)*
- 19:00 Dinner

Friday, September 12, 2025

- 07:30-09:00 Breakfast
- 09:00-10:30 *Fabio Toninelli - Minicourse Class III*
- 10:30-11:00 Coffee break
- 11:00-11:45 *Exercise Class (F. Toninelli)*
- 11:45-13:30 Lunch
- 13:30-15:00 Roundup discussion

Afterwards individual departure (if somebody wishes to extend a further night, this is possible upon availability but own funds need to be used – please let us know!)