

New Opportunities to Test Cosmology

Invited Lecturers:

Camille Bonvin (Geneva University)

Shirley Ho (Flatiron Institute, New York)

Benjamin Joachimi (U. College London)

Alessandra Silvestri (Leiden University)

SOC: **Hans-Walter Rix** (MPIA), **Björn-Malte Schäfer** (ARI), **Luca Amendola** (ITP)

Science Talk Speakers:

James Davies (MPIA), **Caroline Heneka** (ITP)

School program:

(as of Aug 28)

Monday, September 2

Time	Lecturer	Topic
08:30 – 09:30		Registration
09:30 – 10:00	LOC	Introduction & directions
10:00 – 11:00	Hans-Walter Rix	Basics of Cosmology: A brief Introduction
11:00 – 12:30	Alessandra Silvestri	Cosmological Foundations - I <ul style="list-style-type: none">- "standard" LCDM- Beyond the standard model- Late-epoch signatures of inflation
12:30 – 14:00	–	Lunch break
14:00 – 15:00	Alessandra Silvestri	Cosmological Foundations - II <ul style="list-style-type: none">- cosmological tensions- Late-epoch signatures of inflation
15:00 – 15:30	–	Coffee break
15:30 – 17:30	Bjoern-Malte Schaefer	Hands-on activities: SN cosmology

Tuesday, September 3

Time	Lecturer	Topic
09:00-10:30	Camille Bonvin	Large-Scale Structure - I <ul style="list-style-type: none">- Principles of LSS mapping with galaxy redshifts- What have we learned from existing surveys?
10:30 – 11:00	–	Coffee break
11:00 – 12:30	Camille Bonvin	Large-Scale Structure - II <ul style="list-style-type: none">- Correlating galaxy LSS with other tracers- What can next-generation galaxy surveys teach us?
12:30 - 14:00	–	Lunch
14:00 – 15:30	Camille Bonvin	Hands-on activity: Growth factor exercise
15:30 – 20:30	--	Tour @ MPIA & BBQ (transport organized)

Wednesday, September 4

Time	Lecturer	Topic
09:00-10:30	Benjamin Joachimi	Gravitational Lensing Cosmology - I <ul style="list-style-type: none">- Gravitational lensing theory- Single-object strong and weak lensing & cosmological applications
10:30 – 11:00	-	Coffee break
11:00 – 12:30	Benjamin Joachimi	Gravitational Lensing Cosmology - II <ul style="list-style-type: none">- Cosmic shear theory & methods- Cosmological constraints from lensing
12:30 - 14:00	-	Lunch
14:00 – 15:00	Benjamin Joachimi	Hands-on activity
15:00 – 15:30	-	Coffee break
15:30 – 16:30	Benjamin Joachimi	Hands-on activity cont'd
16:30 – 18:00	Alessandra Silvestri	Hands-on activity: Gravitational collapse

Thursday, September 5

Time	Lecturer	Topic
09:00 – 10:30	James Davies	The Euclid Mission and its first data
10:30 – 11:00	–	Coffee break
11:00 – 12:30	Luca Amendola	Theory & observations beyond the standard framework
12:30 – 14:00	--	Lunch
14:00 – 15:00	Caroline Heneka	HI cosmology
15:00 – 15:30	--	Coffee break
15:30 – 16:30	Shirley Ho	Machine Learning and Inference - I <ul style="list-style-type: none">- Forward modelling- Likelihood-free inference
16:30 – 18:00	Shirley Ho	Hands-on activity - I
19:00 & 19:30		Pub evening (pls arrive in two groups)

Friday, September 6

Time	Lecturer	Topic
09:00-10:30	Shirley Ho	Machine Learning and Inference - II "Fitting" simulations to data
10:30 – 11:00	-	Coffee break
11:00 – 12:30	Shirley Ho	Hands-on activity - II
12:30 - 14:00	-	Lunch
14:00 – 15:00	Hans-Walter Rix	Future projects and missions
15:00 – 15:30		Conclusions / farewell

For the daily **lunch menu** at university please check:

<https://www.stw.uni-heidelberg.de/en/node/9> for "Mensa Im Neuenheimer Feld 304"