Exoclimes Simulation Platform (ESP) Summer School 2019

UNIVERSITÄT BERN

CSH
CENTER FOR SPACE AND HABITABILITY

by Prof. Dr. Kevin Heng, CSH Director

(29th October 2018; updated: 26th March 2019)

I. Background, History & Motivation

The Exoclimes Simulation Platform (ESP) is a vision to provide the scientific community with publicly-available computer codes designed to simulate the climates of exoplanets, including radiative transfer, chemistry and fluid dynamics. It is based on the belief that a healthy exoplanetary atmospheres community should compete to publish the best ideas, rather than be constrained by proprietary software. It is also based on the belief that science should be reproducible and accessible to everyone who is interested.

The ESP was created in 2011 by Kevin Heng and Simon Grimm, then at ETH Zurich and the University of Zurich, respectively, in Switzerland. They later moved to the Center for Space & Habitability (CSH) at the University of Bern from 2013 onwards to start the Exoplanets & Exoclimes Group (EEG), which continues to develop and support the ESP till this very day. The main code developers of the ESP are the current and former students and postdocs of the EEG, but the long-term dream is for the exoplanetary atmospheres community to step in and collaborate with us. All of our codes are open source and hosted on Github (https://github.com/exoclime).

The next, exciting phase for us in this open-source movement is to teach the community how to use these codes, so that they may become both users and co-developers. To this end, we will conduct annual summer schools in Switzerland from 2019 onwards.

II. Application, Deadlines & Selection

The ESP summer school is aimed at students and postdocs who are interested in exoplanet science. Participants of the ESP summer school are competitively selected. To apply, please send a **one-page letter (use a maximum of 2 pages if you must)** with the following information:

1. Introduce yourself, stating your past and current universities/institutions, area(s) of study and Ph.D/postdoc advisor(s).
2. Describe your current and/or future ideas for your thesis work and explain how the ESP will help you in your work.
3. List the names, affiliations and email addresses of two professors or senior researchers who will be able to serve as references for you. We may solicit feedback from these individuals if necessary.

We will vet and select participants based on achieving topical, geographic and gender diversity, as well as a balance between the academic experience levels of the participants.

This letter should be in **PDF format** and sent to **Kevin Heng (kevin.heng 'at' csh.unibe.ch) by 31st December 2018**. Early applications are allowed and encouraged. Selected participants will be notified shortly and invited to pay the registration fee of 600 CHF. The various deadlines are listed below:

First announcement: 1st November 2018 (Thursday)
Application Deadline: 31st December 2018 (Monday)
Selection of Participants: 31st Jan 2019 (Thursday)
Registration Fee Payment Deadline: 28th February 2019 (Thursday)
Last Chance to Withdraw from ESP Summer School: 29th March 2019 (Friday)

Note that after 29th March 2019, we will be unable to refund your registration fee if you withdraw due to the policies of the Guarda Val hotel.

III. Venue & Registration Fees

The venue is the scenic Guarda Val hotel (www.guardaval.ch) located 1600 meters above sea level in Lenzerheide, Switzerland. Participants will fly into the Zurich (ZRH), Basel (BSL) or Geneva (GVA) airports (in order of increasing travel time by train to Lenzerheide) and take the local Swiss trains to Lenzerheide. To encourage close interaction, we are capping the number of summer school registrants to 30.

The registration fee for the inaugural ESP summer school is 600 Swiss francs (CHF), which includes hotel accommodation for 3 nights, all breakfasts (3), lunches (4) and dinners (3), and coffee/tea breaks. It does *not* include any alcoholic beverages/drinks. It does *not* include the travel expenses you will incur as you travel to and from Guarda Val. The actual cost for each participant exceeds the registration fee, which means *we are effectively already subsidising every student/postdoc attending the ESP summer school*.

IV. Summer School Schedule

Time	Session	Remarks
	11th June 2019 (Tuesday)	
11:00-12:00	Arrival & meet-and-greet	Hotel rooms are ready only at 15:00 as stated on the official hotel website.
12:00-13:30	**3-course lunch**	
13:30-14:00	Checking and preparation of laptops	Lead: Simon Grimm
14:00-15:00	Overview of the ESP	Lecturer: Kevin Heng
15:00-15:30	**Coffee/tea break**	

Time	Session	Remarks
15:30-17:00	Ice-breaker + round-table discussion	Each participant/lecturer introduces herself/himself, including describing what her/his research interests and goals are. It is up to each participant to decide whether to use visual aids (slides, handouts, etc).
17:00-18:00	Hands-on session	Free interactions between participants and developers
19:00 onwards	**3-course dinner**	
	12th June 2019 (Wednesday)	
08:30-09:30	HELIOS (radiative transfer)	Lecturer: Matej Malik
09:30-10:30	HELIOS-K (opacities)	Lecturer: Simon Grimm
10:30-11:00	**Coffee/tea break**	
11:00-12:00	LX-MIE (Mie scattering)	Lecturer: Daniel Kitzmann
12:00-14:00	**3-course lunch**	
14:00-15:00	HELA (machine learning retrieval)	Lecturer: Chloe Fisher
15:00-16:00	**Coffee/tea break**	
16:00-17:00	HELIOS-R	Lecturer: Daniel Kitzmann
17:00-18:00	Hands-on session	Free interactions between participants and developers
19:00 onwards	**3-course dinner**	
	13th June 2019 (Thursday)	
08:30-09:30	VULCAN (chemical kinetics)	Lecturer: Shang-Min Tsai
09:30-10:30	FastChem (equilibrium chemistry)	Lecturer: Daniel Kitzmann
10:30-11:00	**Coffee/tea break**	
11:00-12:00	THOR (general circulation model)	Lecturer: Joao Mendonca
12:00-14:00	**3-course lunch**	
14:00-15:00	Using THOR	Lecturer: Russell Deitrick
15:00-16:00	**Coffee/tea break**	
16:00-18:00	Hands-on session	Free interactions between participants and developers
19:00 onwards	**3-course dinner**	
	14th June 2019 (Friday)	

Time	Session	Remarks
09:00-10:00	GENGA (N-body dynamics)	Lecturer: Simon Grimm
10:00-10:30	**Coffee/tea break**	
10:30-12:00	Round-table discussion and feedback session	Participants provide feedback on codes, what can be improved, etc.
12:00-14:00	**3-course business lunch**	**Hotel check-out is officially at 11:00**
End of ESP Summer School 2019		

V. Ground Rules

The ESP summer school is a professional setting. We expect the participants to conduct themselves in a professional, civil, responsible and punctual manner. We expect the participants to exercise intellectual empathy when interacting with the other participants.

Before attending the ESP summer school, you should ensure that you have a functioning laptop that is able to run Linux and Python. We will provide remote login access to our dedicated computer servers at the University of Bern to provide access to GPUs.

You will bring this functioning laptop along with you to the ESP summer school. We will not be responsible for providing any power adaptors or computing equipment.

All expenses associated with alcoholic drinks are *not* our responsibility. It is *your* responsibility to pay for these drinks immediately after each meal (lunch, dinner) and also during the evening social/ interaction hours (after 21:00).

VI. Lecturers & Topics

Prof. Dr. Kevin Heng (Bern): introduction and general overview
Prof. Dr. João Mendonça (Copenhagen): the THOR general circulation model (GCM)
Dr. Russell Deitrick (Bern): using THOR
Dr. Matej Malik (Maryland): the HELIOS radiative transfer code
Dr. Simon Grimm (Bern): the HELIOS-K opacity calculator and public database
Dr. Daniel Kitzmann (Bern): the FastChem chemical equilibrium, LX-MIE Mie scattering and HELIOS-R nested-sampling retrieval codes
Dr. Shang-Min Tsai (Oxford): the VULCAN chemical kinetics code
Chloe Fisher (Bern): the HELA random-forest atmospheric retrieval code

Other team members present: Dr. Pierre Auclair-Desrotour (Bern), Andrea Guzman Mesa (Bern), Dr. Kaustubh Hakim (Bern), Dr. Jens Hoeijmakers (Bern/Geneva), Sinan Li (Bern), Maria Oreshenko (Bern), Urs Schroffenegger (Bern)