

The HEMERA summer school

held at the Marsilius Kolleg* in Heidelberg/Germany from Sept. 9 to 13, 2019

(address: Im Neuenheim Feld (INF) Campus at Heidelberg, D-69120 Heidelberg, Germany)

(Version: March 6, 2019, red to be clarified)

Program:

Monday, Sept. 9, 2019

9:00 - 9:15 Welcome

9:15 - 10:45, Session 1 (Converner: Nathalie Huret): Background

1.1 C. Camy-Peyret, The history of ballooning, early science, past advances and discoveries, scientific interest, IPSL, France

1.2 P. Ubertini, Early and modern balloon science in astronomy, INAF, Italy

10:45 - 11:15 Coffee break

11:15 - 12:45, Session 1: Background

1.3 T. Deshler, Early and modern balloon science using small and medium, pressurized and unpressurized balloons, Uni. Wyoming, USA

1.4 V. Catoire, Early and modern balloon science using large unpressurized balloons, LPC2E, CNRS, France

12:45 - 14:00 Lunch break

14:00 - 14:45, Session 1: Background

1.5 A. Herzog, science using long duration balloons, LMD, France

14:45 - 15:30 Session 2 (Convener Pietro Ubertini): Atmosphere

2.1 T. Birner, The atmospheric structure, LUM Munich, Germany

15:30 - 16:00 Coffee break

16:00 – 17:30 Session 2: Atmosphere

2.2 N. Huret, Atmospheric dynamics I, CNRS France

2.3 A. Hertzog, Lagrangian observations, waves, microphysics, LMD, France

Tuesday, Sept. 10, 2019

9:00 – 9:45, Session 2: Atmosphere

2.4 A. Butz, Atmospheric radiation and radiative transfer, UHEI, Germany

09:45 - 10:30, Session 3 (Converner: Andre Vargas): Balloon system

3.1 **Kennt Andersson/Kanika Gahrg**, Flight physics & thermodynamics, SSC, Sweden

10:30 - 11:00 Coffee break

11:00 - 12:30, Session 3: Balloon system

- 3.2 S. Venel, The different balloon families and associated performances, CNES, France
- 3.3 Hakan/Per, Balloon components: equipped envelope; flight-train, on board/ground system and scientific payloads, SSC, Sweden

12:30 - 14:00 Lunch break

14:00 - 15:30, Session 3: Balloon system

- 3.4 I. Zenone, On-board services: platform structure, telemetry & tracking & remote control (TT & C), power supply, thermal control and pointing system, CNES, France
- 3.5 K. Walker, [Design of in-situ balloon experiment for atmospheric sampling](#), Uni. of Toronto, Canada

15:30 - 16:00 Coffee break

16:00 - 17:30, Session 3: Balloon system

- 3.6 [Design of scientific instruments remotely by www conference](#)
 - Barth Netterfield, Design of a balloon-borne imaging telescope for stratospheric balloon missions – (tbc) - U of Toronto
 - Adam Bourassa, Design of an Aerosol Limb Imager experiment for balloon flights (tbc) – Uni. of Saskatchewan, ASI/ASC Canada

Wednesday, Sept. 11, 2019

9:00 - 10:30, Session 3: Balloon system

- 3.7 [Per/Mikael Viertotak](#) Safety requirements: mechanical & electrical design of gondola and flight train, redundancy of house-keeping system, constraints on balloon facility location and on balloon trajectories, SSC, Sweden

10:30 - 11:00 Coffee break

11:00 - 12:30, Session 4 (Convener: Stephanie Venel): Balloon operations

- 4.1 A. Vargas, Site selection, launching methods; flight control; trajectory management and recovery, CNES, France

12:30 - 14:00 Lunch break

14:00 -18:00

Social activities/Options

- I. Visit to the castle
- II. Guided tour through the town
- III. Boat trip on the Neckar river

19:00 – 22:00

Summer school diner

Thursday, Sept. 12, 2019

9:00 - 10:30, Session 4: Balloon operations

- 4.2 P. Baldemar & A. Vargas, Specificity of CNES and SSC operation, SCC and CNES, Sweden/France
- 4.3 **Kristine/Philippe/Andre**, Other balloon operators and associated campaigns: CSBF, NSC, JAXA, etc. SSC/CNES, Sweden/France

10:30 - 11:00 Coffee break

11:00 - 12:30, Session 5 (Convener Flora Kluge): Applications (Aeronomy)

- 5.1 A. Kleinert et al., Hyperspectral Limb Sounding, KIT Germany
- 5.2 S. Payan, Balloon-borne mid-IR measurements, UPMC, France
- 5.3 A. Engel, Balloon-borne whole air and AirCore sampling, University Frankfurt, Germany

12:30 – 13:45 Lunch break

14:45 – 15:45, Session 5: (Light-weight balloon instruments and small balloons)

- 5.4 J. E. Leedham-Elvidge, AirCores in the UK: launching balloons on a small and crowded island, UEA, UK
- 5.5 T. Deshler, New aerosol instruments to maintain current in situ measurement capability with small rubber balloons, Uni. Wyoming, USA
- 5.6 N. Harris, Sensors for sondes - how many things can be measured? Uni. Cranfield, UK
- 5.4 Sonya Salam, Collection of organic particles in the stratosphere over Erange/Sweden, FH Aachen, Germany

15:45 - 16:15 Coffee break

16:15 – 17:45, Session 5: Applications (astronomy)

- 5.8 A. Lagg, Sunrise - a stratospheric solar observatory: Scientific highlights of two successful flights & outlook for the re-flight in 2021, MPS, Germany
- 5.9 L. Natalucci, Results from gamma-ray instrument probes on balloon flights and perspectives beyond 2020, INAF, Italy
- 5.10 M. Pearce, Hard X-ray polarimetry from a stabilised balloon-borne platform, KTH, Sweden

Friday, Sept. 13, 2019

9:00 - 10:30, Session 6 (Convener: Emma Elvidge): Outlook, future trends in the balloon systems, instruments and related science

- 6.1 N. Harris, Future developments for balloon observations of the atmosphere - a personal perspective, Uni. Cranfield, UK
- 6.2 T. Deshler, Profiling of the tropical tropopause layer with in situ instruments deployed from Strateole2 long duration balloons, T. Deshler, Uni. Wyoming, USA
- 6.3 F. Onori, A multi-wavelength view of the transient sky in astronomy, INAF, Italy

10:30 - 11:00 Coffee break

11:00 - 12:30, Session 6: Outlook Future research opportunities and programs

6.4 The HEMERA project, P. Raizonville, CNES, France (20 min)

6.5 M. Becker, The REXUS/BEXUS program, DLR, Germany (20 min)

6.6 Round table discussion (N. Harris, P. Raizonville, M. Becker, T. Deshler, P. Ubertini, and R. Roth)

12:30 - 14:00 Lunch&Farwell