**Climate change and heat stress in agriculture with a focus on animal production**

**ABIES Doctoral school / Biosphera course**

**Organizers:**

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**Week 1 - 8-12 September**

**Monday 8th of September– General concepts**

9:00-9:30

Introduction to the course (Eliaou Sellem, INRAE, Pascale Chavatte-Palmer, INRAE)

9:30-11:00

Heat stress and climate change : a global perspective (Erwan Personne, AgroParisTech)

11:00-12:30

Heat waves (Pedro Herig-Coimbra, INRAE)

14:00-16:00

Concepts of stress and adaption (Pete Hansen, University of Florida)

**Tuesday 9th of September - Measurements**

9:00-12:00

Heat and Temperature and their measurements (Pete Hansen, University of Florida)

13:00-17:00

Practical work: Meteorological measurements on site in Palaiseau (Patrick Stella & Sébastien Saint-Jean, AgroParisTech)

**Wednesday 10th of September – Physics - Indirect/secondary effects of increasing heat**

9:00-12:00

Thermodynamics, heat production through ATP and energy value of feedstuffs, Thernoneutral zone (Pete Hansen, University of Florida)

13:00-14:30

Plant health and Climate Change (Marie-Odile Bancal, AgroParisTech)

15:00-17:00

Heat stress, health and reproduction in humans (Pascale Chavatte-Palmer, INRAE)

**Thursday 11th of September– Indirect/secondary effects of increasing heat**

9:00-10:30

Conduction/convection, radiation, evaporation (Pete Hansen, University of Florida)

11:00-12:30

Effects of heat stress in plants (Meije Gawinowski, AgroParisTech)

14:00 - 15:30

Agroecological practices to mitigate heat stress of crops (Sébastien Saint-Jean, AgroParisTech)

**Friday 12th of September – Increase in heat temperature**

9:00-12:30

Personal work

14:00-17:00

Student presentations and discussion

**Week 2 – Heat stress : focus on ruminant production and mitigation effects**

September 29th to October 3rd

**Monday 29th of September– Ruminant systems**

9:00-9:30

Introduction to the course (Eliaou Sellem, INRAE, Pascale Chavatte-Palmer, INRAE)

9:30-12:30

Intensive vs extensive production and geographical considerations in ruminants (Geof Dahl, University of Florida)

14:00-15:00

Production and heat stress in dairy cattle (Geof Dahl, University of Florida)

15:00-16:00

Reproduction and heat stress in females (Pete Hansen, University of Florida)

16:00-17:00

Reproduction and heat stress in male ruminants (Eli Sellem, INRAE)

**Tuesday 30th of September– Genetic selection to reduce heat stress**

9:00-10:30

Genetic selection to reduce heat stress in animals (Aurélie Vinet, INRAE)

11:00-12:30

Genetic selection and genome editing to reduce heat stress in animals (Pete Hansen, University of Florida)

14:00-15:30

Genetic selection to reduce heat stress in plants (Karine Alix, AgroParisTech)

**Wednesday 1st of October – mitigation of heat stress ; DOHAD and epigenetics**

9:00-10:30

Adapting animal facilities in cattle (Geof Dahl, University of Florida)

11:00-12:30

Adapting animal facilities in small ruminants (Morgane Lambert, IDELE)

13:30-15:00

DOHAD concept (Pascale Chavatte-Palmer, INRAE)

15:30-17:00

Epigenetic mechanisms in mammals (Eli Sellem, INRAE)

**Thursday – Transgenerational effects**

9:00-12:00

Effects of heat stress on pregnant cow and calf (Geof Dahl, University of Florida)

13:30-15:00

Effects on placenta (Pascale Chavatte-Palmer, INRAE)

**Friday – Wrapping up**

9:00-12:30

Personal work

14:00-17:00

Student presentations and discussion