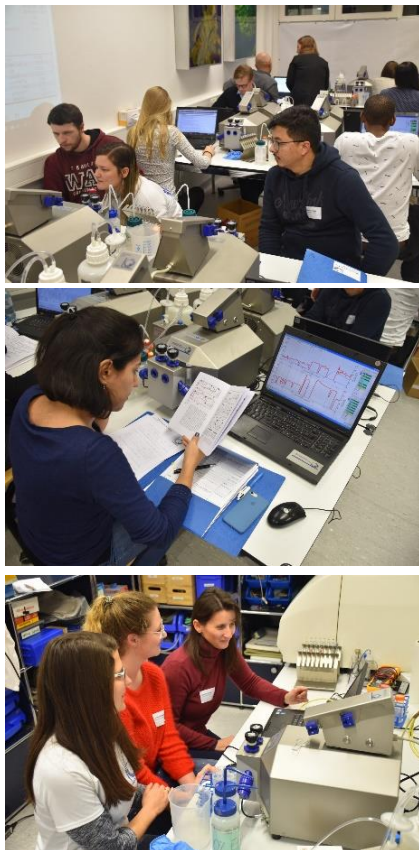


## O2k-Coaching Days - Basic 145<sup>th</sup> O2k-Workshop on high-resolution respirometry



2020 Jan 27<sup>th</sup>-29<sup>th</sup>  
Innsbruck, Tyrol, Austria



**O2k-Coaching Days - Basic** is a training course which provides a fundamental introduction to **high-resolution respirometry (HRR)** with the Oroboros O2k. We will give you an overview of the **O2k-FluoRespirometer**, including real-time analysis with **DatLab 7.4** and applications of the **Titration-Injection microPump TIP2k**. Hands-on sessions, using one O2k per participant, range from instrumental setup and service of the polarographic oxygen sensor (**OroboPOS**, instrumental quality control system which is an essential component of HRR) to respirometry experiments with substrate-uncoupler-inhibitor (SUIT) protocols. HEK 293T cells are used as a biological reference sample, which can be stored and shipped on dry-ice – introducing the **MitoFit Proficiency Test**. We will present the [Oroboros SUITbrowser](#), which helps you find the best SUIT protocol for your specific research questions. Many optimized SUIT protocols are available as DL-Protocols and will be shown at the Coaching Days. The [Blue Book](#) (5<sup>th</sup> edition in prep.) and [Mitochondrial respiratory states and rates](#) provide a basic introduction to mitochondrial physiology, complementing the training course, and therefore we recommend reading them beforehand. Finally, we will give you a brief introduction of the **O2k-Applications**, (e.g. ROS production measurement with Amplex<sup>®</sup> UltraRed, mt-membrane potential). The 145<sup>th</sup> workshop is a unique opportunity to learn about the new developments in HRR.

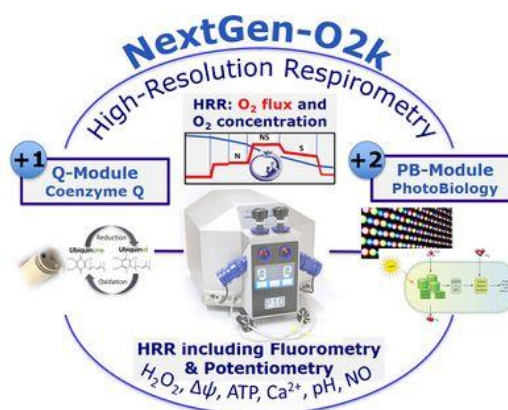


## Lecturers and tutors

<a href="#">Carolina Doerrier</a>	CSO, Scientific Motive Force, Oroboros Instruments
<a href="#">Diana Antunes</a>	Scientific Quality Manager, Oroboros Instruments
<a href="#">Erich Gnaiger</a>	CEO, Innovation Alchemist, Oroboros Instruments
<a href="#">Lucie Zdrzilova</a>	PhD Student, Charles University (CZ)
<a href="#">Luiz Felipe Garcia-Souza</a>	PhD student, Mitochondrial Adventurer, Oroboros Instruments
<a href="#">Luiza Cardoso</a>	Postdoc, Mitochondrial Wizard, Oroboros Instruments
<a href="#">Marco Di Marcello</a>	Research Assistant, Research Magician, Oroboros Instruments
<a href="#">Ondrej Sobotka</a>	PhD, Charles University (CZ)
<a href="#">Timea Komlodi</a>	Postdoc, Mitochondrial Explorer, Oroboros Instruments

## NextGen O2k

Oroboros - as a driving force in mitochondrial physiology - extends the analytical and diagnostic power of high-resolution respirometry by integration of NADH- and Q-redox monitoring in the **NextGen-O2k**. We aim at establishing the Oroboros quality control management for dissemination to our worldwide O2k-Network laboratories. This will become an effective contribution to address the acute *reproducibility crisis* of scientific investigation. In the spirit of Open Science and global networking, we will enable data sharing across projects and institutions in an Open Access database on mitochondrial physiology and pathology, to resolve the *inflation crisis* and ultimately the *value-impact crisis* of present academic publication. This will support key developments in mitochondrial medicine. In addition, we expand our business to algal biotechnology and ecology with the photobiology module of the NextGen-O2k, widening our focus from medicine to environment and climate.



## Programme

### 1 Monday, Jan 27

	Workshop	Weblink	Room
08:15	Welcome - Get-together: Introduction of participants and their research interests		
08:30-09:15	<b>OroboPOS service and O2k instrumental setup</b> - overview with videoclips	<a href="#">O2k-FluoRespirometer</a> <a href="#">O2k-Videosupport</a>	Oroboros O2k- Laboratory
09:15-10:35	<b>Hands-on</b> (2 groups) OroboPOS service and O2k instrumental setup	<a href="#">POS Service</a> <a href="#">O2k-Start</a>	Oroboros O2k- Laboratory
10:35-11:00	<b>DatLab 7.4 overview</b>	<a href="#">MitoPedia: DatLab</a> <a href="#">DatLab 7 Innovations</a>	Oroboros O2k- Laboratory
11:00-11:30	<b>Instrumental quality control 1:</b> oxygen calibration	<a href="#">Gnaiger 2008 POS</a> <a href="#">SOP: O2-calibration</a>	Oroboros O2k- Laboratory
11:30-12:30	<b>Hands-on:</b> Instrumental quality control 1: oxygen calibration DL-Protocol: O2k-cleaning BeforeUse DL-Protocol: O2 calibration air	<a href="#">SOP: O2k-cleaning and ISS</a> <a href="#">SOP: O2-calibration</a>	Oroboros O2k- Laboratory
12:30	Lunch break		
13:30-14:00	<b>Hands-on:</b> Instrumental quality control 1: oxygen calibration (continuation). DatLab analysis DL-Protocol: O2 calibration air		Oroboros O2k- Laboratory
14:00-14:30	<b>Instrumental quality control 2:</b> Instrumental O2 background – overview with videoclips	<a href="#">SOP: O2 background</a> <a href="#">TIP2k manual</a>	Oroboros O2k- Laboratory
14:30-15:30	<b>Hands-on: Instrumental quality control 2:</b> Instrumental O2 background DL-Protocol: Instrumental O2 background TiP2k		Oroboros O2k- Laboratory
15:30	Coffee / Tea		Kitchen
16:00-17:45	<b>Hands-on:</b> Instrumental quality control 2 (continuation). DatLab analysis. DL-Protocol: Instrumental O2 background TiP2k		Oroboros O2k- Laboratory

### 2 Tuesday, Jan 28

	Workshop	Weblink	Room
08:30-09:10	<b>Hands-on:</b> Instrumental quality control 1: oxygen calibration DL-Protocol: O2k-cleaning BeforeUse DL-Protocol: O2 calibration air	<a href="#">SOP: O2k-cleaning and ISS</a> <a href="#">SOP: O2-calibration</a>	Oroboros O2k- Laboratory
09:10-10:10	<b>Introduction to substrate-uncoupler-inhibitor titration (SUIT) protocols</b> – fundamental principles. SUIT reference protocol: RP1&RP2	<a href="#">MitoPedia: SUIT</a>	Oroboros O2k- Laboratory
10:10-10:25	<b>SUITbrowser:</b> how to find the best SUIT protocol for your research questions.	<a href="#">Oroboros SUITbrowser</a>	Oroboros O2k- Laboratory
10:25-10:30	<b>Hands-on:</b> Instrumental quality control 1: oxygen calibration DL-Protocol: O2 calibration air	<a href="#">SOP: O2-calibration</a>	Oroboros O2k- Laboratory
10:30	Coffee / Tea		Kitchen
10:45-12:45	<b>Hands-on:</b> O2k-Demo experiment: Respiration of permeabilized cells: measurement of oxygen consumption with the reference protocol RP1 (SUIT-001) and RP2 (SUIT-002). DL-Protocol: SUIT-001 O2 ce-pce D003.DLP DL-Protocol: SUIT-002 O2 ce-pce D007.DLP	<a href="#">SUIT reference protocol</a> <a href="#">SUIT-001 O2 ce-pce D003</a> <a href="#">SUIT-002 O2 ce-pce D007</a>	Oroboros O2k- Laboratory

<b>12:45-13:00</b>	<b>Hands-on:</b> O2k-cleaning after use DL-Protocol: O2k-cleaning AfterUse	<a href="#">SOP: O2k-cleaning and ISS</a>	Oroboros O2k- Laboratory
13:00	<i>Lunch break</i>		
<b>14:00-14:30</b>	<b>Hands-on:</b> O2k-cleaning after use (continuation) DL-Protocol: O2k-cleaning AfterUse		Oroboros O2k- Laboratory
<b>14:30-15:30</b>	<b>DatLab 7.4 analysis:</b> Introduction and new features	<a href="#">Oxygen flux analysis</a>	Oroboros O2k- Laboratory
15:30	<i>Coffee / Tea</i>		Kitchen
<b>16:00-17:30</b>	<b>Individual DatLab analysis + summary</b>		Oroboros O2k- Laboratory

### 3 Wednesday, Jan 29

	Workshop	Weblink	Room
<b>08:30-10:00</b>	<b>MitoFit proficiency test</b> <b>Hands-on:</b> Instrumental quality control 1: oxygen calibration DL-Protocol: O2k-cleaning BeforeUse DL-Protocol: O2 calibration air	<a href="#">SOP: O2k-cleaning and ISS</a> <a href="#">SOP: O2-calibration</a>	Oroboros O2k- Laboratory
10:00	<i>Coffee / Tea</i>		Kitchen
<b>10:30-12:15</b>	<b>MitoFit proficiency test</b> <b>Hands-on:</b> O2k-Demo experiment: Respiration of permeabilized cells: measurement of oxygen consumption with the reference protocol RP1 (SUIT-001) and RP2 (SUIT-002). DL-Protocol: SUIT-001 O2 ce-pce D003.DLP DL-Protocol: SUIT-002 O2 ce-pce D007.DLP	<a href="#">SUIT reference protocol SUIT-001 O2 ce-pce D003</a> <a href="#">SUIT-002 O2 ce-pce D007</a>	Oroboros O2k- Laboratory
<b>12:15-12:45</b>	<b>Hands-on:</b> O2k-cleaning after use DL-Protocol: O2k-cleaning AfterUse	<a href="#">SOP: O2k-cleaning and ISS</a>	Oroboros O2k- Laboratory
12:45	<i>Lunch break</i>		
<b>13:45-14:00</b>	<b>Hands-on:</b> O2k-cleaning after use (continuation) DL-Protocol: O2k-cleaning AfterUse	<a href="#">SOP: O2k-cleaning and ISS</a>	Oroboros O2k- Laboratory
<b>14:00-14:45</b>	<b>DatLab analysis</b>	<a href="#">Oxygen flux analysis</a>	Oroboros O2k- Laboratory
14:45	<i>Coffee / Tea</i>		Kitchen
<b>15:00-15:30</b>	<b>O2k-Applications - overview</b>		MiPart
<b>15:30-16:00</b>	<b>The Bioblast wiki, MitoFit Preprint Archives, O2k-Network and MitoEAGLE</b>	<a href="#">MitoFit Preprint Archives</a> <a href="#">O2k-Network</a> <a href="#">www.bioblast.at</a>	MiPart
<b>16:00-17:00</b>	<b>Proficiency test: DatLab analysis summary</b>		MiPart
<b>17:00-17:30</b>	<b>Feedback &amp; conclusions</b>		MiPart
17:30	<b>Farewell activity</b>		MiPart

## O2k-Workshop: OUR COMMON AIMS

- **Mitochondrial physiology:**  
Study mitochondrial function in the **context** of cell physiology and pathology
- **Instrumental performance – the O2k:**
  - 🕒 Learn **high**-resolution respirometry
  - 🕒 Gain **hands-on** experience
  - 🕒 Extend to O2k-**Multi**Sensor applications
- **Excellence in research:**
  - 🕒 Instrumental **quality** control
  - 🕒 Experimental design for **innovation**
  - 🕒 Data analysis meeting **superior standards**

OROBOROS INSTRUMENTS O2k Mitochondria and cell research



## List of participants

Participant	Institution
<a href="#">Banni Aml</a>	<b>CZ Hradec Kralove Cervinkova Z</b> - Charles University, Hradec Kralove (CZ)***
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<a href="#">Filippi Celine</a>	<b>UK London Filippi C</b> - King's College Hospital, London (UK)*
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<a href="#">Handl Jiri</a>	<b>CZ Pardubice Rousar T</b> - University of Pardubice, Pardubice (CZ)**
<a href="#">Hofmann Julia</a>	<b>AT Innsbruck Gnaiger E</b> - DSL-Oroboros Research Lab, Innsbruck (AT) *8
<a href="#">Huepfl Sebastian</a>	<b>AT Innsbruck Oroboros</b> - Oroboros Instruments, Innsbruck (AT) *24
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<a href="#">Pilotti Andrea</a>	<b>IT Udine Grassi B</b> - University of Udine, Udine (IT)*
<a href="#">Torres-Quesada Omar</a>	<b>AT Innsbruck Gnaiger E</b> - DSL-Oroboros Research Lab, Innsbruck (AT) *8

\*Asterisks indicate the number of O2k instruments in the participant's lab.

## Venue and Accommodation

### Oroboros O2k-Laboratory

Schoepfstrasse 18, 6020 Innsbruck

> [How to get there](#)

### Hotel suggestion:

Basic Hotel Innsbruck

> <https://www.basic-hotel.at/en/>



## More details?

Gnaiger E (2019) Mitochondrial pathways and respiratory control. An introduction to OXPHOS analysis. 5th ed. Mitochondr Physiol Network 24.05. Oroboros MiPNet Publications, Innsbruck:96 pp. » [Full text in Bioblast](#)

**O2k-Manual** – <http://wiki.oroboros.at/index.php/O2k-Manual>

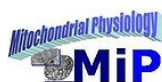
**O2k-Procedures** – <http://wiki.oroboros.at/index.php/O2k-Procedures>

>**3,400 O2k-Publications** – [http://wiki.oroboros.at/index.php/O2k-Publications:\\_Topics](http://wiki.oroboros.at/index.php/O2k-Publications:_Topics)

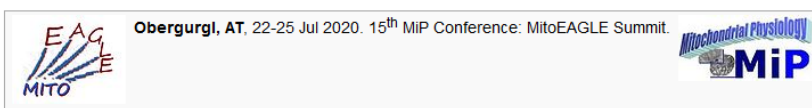
## COST Action CA15203 MitoEAGLE



**MitoEAGLE Mitochondrial respiratory states and rates. MitoFit Preprint Arch doi:10.26124/mitofit:190001.v6**  
[Mitochondrial respiratory states and rates](#)



## MitoEAGLE Obergurgl 2020



## MitoFit Preprint Archive



**The Open Access preprint server for mitochondrial physiology and bioenergetics**

Articles can be submitted by Email as a pdf file with embedded figures accompanied by the abstract as a word (text) document.

**Send to: [javier.iglesias-gonzalez@oroboros.at](mailto:javier.iglesias-gonzalez@oroboros.at)**

» [https://www.mitofit.org/index.php/MitoFit\\_Preprint\\_Archives](https://www.mitofit.org/index.php/MitoFit_Preprint_Archives)

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### Mitochondria and cell research

O2k-Workshops are listed as [MitoGlobal Events](#)



## To find solutions

- Cancer
- Diabetes
- Aging
- Neurodegeneration
- Cardiovascular
- Exercise physiology

Oroboros O2k-FluoRespirometer  
High-Resolution Respirometry

**»explore**

- O<sub>2</sub> consumption
- H<sub>2</sub>O<sub>2</sub> production
- mt-Membrane potential
- ATP production
- pH, Ca<sup>2+</sup>, NO

**»mitochondria and cells**

- Isolated mitochondria
- Tissue homogenate
- Permeabilized muscle fibers
- Permeabilized cells
- Living cells

### The Oroboros Ecosystem

