

O2k-Coaching Days - Basic 144th O2k-Workshop on high-resolution respirometry



2020 Jan 20th-22nd
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 to 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](#) (5th edition in prep.) and [Mitochondrial respiratory states and rates](#) provide a basic introduction to mitochondrial physiology, complementing the training course, and therefore we recommend their reading before. Finally, we will give you a brief introduction of the **O2k-Applications**, (e.g. ROS production measurement with Amplex[®] UltraRed, mt-membrane potential). The 144th workshop is a unique opportunity to learn about the new developments in HRR.

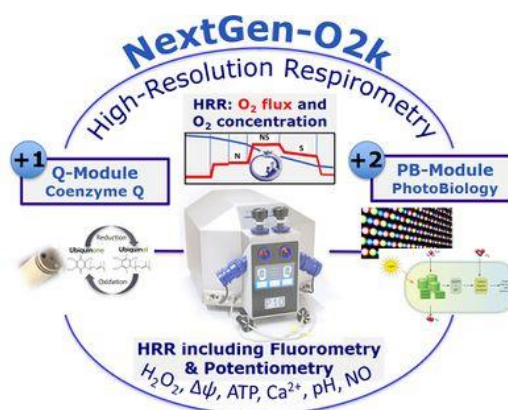


Lecturers and tutors

Carolina Doerrier	CSO, Scientific Motive Force, Oroboros Instruments
Diana Antunes	Scientific Quality Manager, Oroboros Instruments
Erich Gnaiger	CEO, Innovation Alchemist, Oroboros Instruments
Luiz Felipe Garcia-Souza	PhD student, Mitochondrial Adventurer, Oroboros Instruments
Luiza Cardoso	Postdoc, Mitochondrial Wizard, Oroboros Instruments
Manuela Passrigger	Laboratory Manager, Lab Guardian, Oroboros Instruments
Marco Di Marcello	Research Assistant, Research Magician, Oroboros Instruments
Maria Huete-Ortega	Principal Investigator, Algae Biotech Pioneer, Oroboros Instruments
Timea Komlodi	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 20

	Workshop	Weblink	Room
08:15	<i>Welcome - Get-together: Introduction of participants and their research interests</i>		
08:30-09:15	OroboPOS service and O2k instrumental setup - overview with videoclips	O2k-FluoRespirometer O2k-Videosupport	Oroboros O2k- Laboratory
09:15-09:55	Hands-on (2 groups) OroboPOS service and O2k instrumental setup	POS Service O2k-Start	Oroboros O2k- Laboratory
09:55-10:30	DatLab 7.4 overview	MitoPedia: DatLab DatLab 7 Innovations	Oroboros O2k- Laboratory
10:30	<i>Coffee / Tea</i>		Kitchen
11:00-11:30	Instrumental quality control 1: oxygen calibration	Gnaiger 2008 POS SOP: O2-calibration	Oroboros O2k- Laboratory
11:30-12:00	Hands-on: Instrumental quality control 1: oxygen calibration DL-Protocol: O2k-cleaning BeforeUse DL-Protocol: O2 calibration air	SOP: O2k-cleaning and ISS SOP: O2-calibration	Oroboros O2k- Laboratory
12:00	<i>Lunch break</i>		
13:00-13:30	Hands-on: Instrumental quality control 1: oxygen calibration (continuation). DatLab analysis DL-Protocol: O2 calibration air		Oroboros O2k- Laboratory
13:30-14:00	Instrumental quality control 2: Instrumental O2 background – overview with videoclips	SOP: O2 background TIP2k manual	Oroboros O2k- Laboratory
14:00-15:00	Hands-on: Instrumental quality control 2: Instrumental O2 background DL-Protocol: Instrumental O2 background TiP2k		Oroboros O2k- Laboratory
15:00	<i>Coffee / Tea</i>		Kitchen
15:30-17:30	Hands-on: Instrumental quality control 2 (continuation). DatLab analysis. DL-Protocol: Instrumental O2 background TiP2k		Oroboros O2k- Laboratory

2 Tuesday, Jan 21

	Workshop	Weblink	Room
08:30-09:15	Hands-on: Instrumental quality control 1: oxygen calibration DL-Protocol: O2k-cleaning BeforeUse DL-Protocol: O2 calibration air	SOP: O2k-cleaning and ISS SOP: O2-calibration	Oroboros O2k- Laboratory
09:15-09:45	Introduction to substrate-uncoupler-inhibitor titration (SUIT) protocols – fundamental principles. SUIT reference protocol: RP1&RP2	MitoPedia: SUIT	Oroboros O2k- Laboratory
09:45-10:00	SUITbrowser: how to find the best SUIT protocol for your research questions.	Oroboros SUITbrowser	Oroboros O2k- Laboratory
10:00	<i>Coffee / Tea</i>		Kitchen
10:30-11:45	Hands-on: 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	SUIT reference protocol SUIT-001 O2 ce-pce D003 SUIT-002 O2 ce-pce D007	Oroboros O2k- Laboratory

11:45-12:00	Hands-on: O2k-cleaning after use DL-Protocol: O2k-cleaning AfterUse	SOP: O2k-cleaning and ISS	Oroboros O2k- Laboratory
12:00	<i>Lunch break</i>		
13:00-13:30	Hands-on: O2k-cleaning after use (continuation) DL-Protocol: O2k-cleaning AfterUse		Oroboros O2k- Laboratory
13:30-15:00	DatLab 7.4 analysis: Introduction and new features	Oxygen flux analysis	Oroboros O2k- Laboratory
15:00	<i>Coffee / Tea</i>		Kitchen
15:30-17:30	Individual DatLab analysis + summary		Oroboros O2k- Laboratory

3 Wednesday, Jan 22

	Workshop	Weblink	Room
08:30-10:00	MitoFit proficiency test Hands-on: Instrumental quality control 1: oxygen calibration DL-Protocol: O2k-cleaning BeforeUse DL-Protocol: O2 calibration air	SOP: O2k-cleaning and ISS SOP: O2-calibration	Oroboros O2k- Laboratory
10:00	<i>Coffee / Tea</i>		Kitchen
10:30-12:15	MitoFit proficiency test Hands-on: 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	SUIT reference protocol SUIT-001 O2 ce-pce D003 SUIT-002 O2 ce-pce D007	Oroboros O2k- Laboratory
12:15-12:45	Hands-on: O2k-cleaning after use DL-Protocol: O2k-cleaning AfterUse	SOP: O2k-cleaning and ISS	Oroboros O2k- Laboratory
12:45	<i>Lunch break</i>		
13:45-14:15	Hands-on: O2k-cleaning after use (continuation) DL-Protocol: O2k-cleaning AfterUse	SOP: O2k-cleaning and ISS	Oroboros O2k- Laboratory
14:15-14:45	DatLab analysis	Oxygen flux analysis	Oroboros O2k- Laboratory
14:45-15:15	O2k-Applications - overview		MiPart
15:15	<i>Coffee / Tea</i>		Kitchen
15:30-16:00	The Bioblast wiki, MitoFit Preprint Archives, O2k-Network and MitoEAGLE	MitoFit Preprint Archives O2k-Network www.bioblast.at	MiPart
16:00-17:00	Proficiency test: DatLab analysis summary		MiPart
17:00-17:30	Feedback & conclusions		MiPart
17:30	Farewell activity		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
Buoso Chiara	AT Innsbruck Weiss G - Medical University Innsbruck, Innsbruck (AT)
Beleza Jorge	PT Porto Beleza J - University of Porto, Porto (PT)
Carter Kristen	US MS Jackson Cornelius DC - University of Mississippi, Jackson (US)*
Chamkha Imen	SE Lund Elmer E - Lund University, Lund (SE)*****
Coldewey Sina	DE Jena Coldewey S - Jena University Hospital, Jena (DE)*
Esper Trembl Ricardo	DE Jena Coldewey S - Jena University Hospital, Jena (DE)*
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Griffiths Kate	UK Glasgow Selman C - Glasgow University, Glasgow (UK)*
Hussein Rawya	SE Lund Elmer E - Lund University, Lund (SE) *****
Linzi Jin	CN Beijing Huawei - Huawei, Beijing (CN)*
Neu Charles	DE Jena Coldewey S - Jena University Hospital, Jena (DE)*
Pereira Rita	PT Porto Beleza J - University of Porto, Porto (PT)
Place Nicolas	CH Lausanne Place N - Université de Lausanne, Lausanne (CH)*
Li Nora	SE Lund Elmer E - Lund University, Lund (SE) *****

*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.orooboros.at/index.php/O2k-Manual>

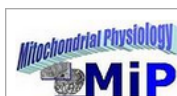
O2k-Procedures – <http://wiki.orooboros.at/index.php/O2k-Procedures>

>**3,400 O2k-Publications** – <http://wiki.orooboros.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 Summit 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@orooboros.at

» 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




»explore

- O₂ consumption
- H₂O₂ production
- mt-Membrane potential
- ATP production
- pH, Ca²⁺, NO

»mitochondria and cells

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



Oroboros O2k-FluoRespirometer
High-Resolution Respirometry

The Oroboros Ecosystem

