



## Course on High-Resolution Respirometry

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# International Course on High-Resolution Respirometry: Oxygraph-2k, TIP-2k and DatLab 4.



**9-13 December 2004** Schröcken, Vorarlberg, Austria

The 29<sup>th</sup> Course on High-Resolution Respirometry for the first time presented **DatLab 4.1**, and included applications of the **TIP-2k** in demo experiments with the **Oxygraph-2k**. In addition to overview presentations on high-resolution respirometry and its applications, specific emphasis is placed on hands-on practical sessions to introduce the technical and operational details of the concept and method.



Experienced tutors guided small working groups step-by-step through the approach of high-resolution respirometry. Four Oxygraph-2k, three TIP-2k and four PCs were available to provide everybody with a do-it-yourself opportunity for both hardware and software.



The course took place in Hotel Mohnenfluh. During lunch breaks, sufficient time was available for skiing (the skiing lifts opened on Friday, 10<sup>th</sup> December), relaxing walks and talks, to enjoy the refreshing scenery of the alpine environment, or use the spare time for specific tutorials.

DatLab 4 effectively changed the structure of our O2k Course, since now we accomplish data analysis on-line during the experiment, providing final results and their graphical presentation by the end of an experimental run. Thus we gain sufficient time to see the new Titration-Injection microPump TIP-2k in action and practice its simple and automatic operation.



## Lecturers and Tutors

Garedew Assegid  
Gnaiger Erich  
Haffner Brigitte  
Hütter Eveline

## Programme

### Thursday, 9. December



Welcome reception at the **OROBOROS INSTRUMENTS** office, Schöpfstr. 18 (ground floor), between 13:30 and 16:00.

**16:00** Departure: 2 hour drive from Innsbruck to Schröcken, via Arlberg Pass (St. Anton, St. Christoph), Flexenpass (Zürs, Lech), from Warth across the Tannberg Pass (Salober, lake Kalbelese), to Schröcken. Usually the road from Lech to Warth is closed in winter, but now open due to exceptionally low snowfall.

**18:00-19:00**

Check in at Hotel Mohnenfluh, dinner.

After dinner: Setting up the instruments with a glass of wine.

### Friday, 10. December



**09:00 – 12:45** From switching on the Oxygraph-2k to the experimental result.

- Oxygraph-2k demo experiment with DatLab 4;
- Oxygen calibration ( $R_1$ );
- Addition of cells and closing the chamber;
- "Phosphorylation control titration": Routine respiration, oligomycin-induced state 4o, uncoupled state 3u, inhibition by rotenone and antimycin A;
- FCCP titrations with the TIP-2k.

13:00 – 16:00

Alpine walks and talks.

**16:15 -19:00**

Instrumental background test and on-line correction.

19:00

Dinner

**20:30**

The elements of high-resolution respirometry.

### Saturday, 11. December

**09:00 - 11:45**

**Working groups: Hands-on experiments with the Oxygraph-2k.** Practical Session 1.

12:00 – 16:00

Ski break (bus leaves at 12:11 from Hotel Tannberg); alpine walks and talks; tutorials.

**16:15 - 18:30**

**Working Groups: Hands-on experiments with the Oxygraph-2k.** Practical Session 2.

19:00

Dinner

**20:30**

**Tutorials.**

## Sunday, 12. December

09:00 - 11:45	<b>Working groups: Hands-on experiments with the Oxygraph-2k.</b> Practical Session 3.
12:00 - 18:30	Walk from Salober to Körbersee. Hiking boots are recommended. Lunch at Hotel Körbersee - <a href="http://www.koerbersee.at">www.koerbersee.at</a> . Welcome at the <i>Alpmuseum uf m Tannberg</i> .
19:00	Dinner at Hotel Mohnenfluh. -



Batzen [www.alpmuseum.at](http://www.alpmuseum.at)

## CONTENTS: OVERVIEW ON HIGH-RESOLUTION RESPIROMETRY

**Introduction: Mitochondrial and cellular respiratory physiology – new challenges for high instrumental performance.**

**High-resolution respirometry – what makes the difference? Presentation of the OROBOROS Oxygraph-2k**

- Low oxygen and measurement of cellular oxygen consumption – pushing the limits of detection.
- Optimum system design - the OROBOROS Oxygraph-2k.
- On-line recording of oxygen concentration and flux; linear slope versus oxygen flux as a function of time.
- The concept of high-resolution calibrations – instrument demonstration.

**OROBOROS Oxygraph-2k and TIP-2k: On-line instrumental performance**

- Instrumental background: measurement and correction as a function of  $pO_2$ .
- High resolution of respiratory flux at various steady-states.
- Conceptual and methodological advantages of measurement at physiological low levels of oxygen.
- High time resolution for kinetic analyses: Determination of the time constant, dynamic corrections.

**Polarographic oxygen sensor and Oxygraph service**

- Cleaning of anode and cathode.
- Electrolyte and membrane application.
- Oxygraph-2k and TIP-2k: instrumental maintenance.

**DatLab 4 – the specialized software for High-Resolution Respirometry: Data acquisition and analysis.**

## Contact

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 high-resolution respirometry

Oxygraph-2k



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 Cooperation and Feedback in Science

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