

## LabTutor for Education – Now Offering Even More

LabTutor®, ADInstruments' teaching software that guides students through every stage of their life science experiments, now includes new features and experiments to make laboratory sessions even more efficient and enjoyable.

### Electronic Submission

LabTutor v1.1 offers students several ways to save or submit their experiment reports:

- Via email to preconfigured or selected addresses
- Saved as soft copies to local or networked drives
- Printed hard copies

### New Experiments

LabTutor's latest experiment releases include: Blood Pressure, Breathing, The Diving Response, Electro-oculography (EOG), Reflexes and Reaction Times, and Respiratory Air

Flow and Volume (for more details, please see page 3).

### Free with Teaching Systems

LabTutor software is supplied free with all ADInstruments Teaching Systems, and is optimized for use with the latest

PowerLab Teaching units. Ask your ADInstruments representative for suitable configurations.

Existing education users can request a free copy of LabTutor at [www.adinstruments.com/LT](http://www.adinstruments.com/LT)



A LabTutor analysis page showing the results of volume changes during respiratory procedures

## Monitor ADI News with our RSS Feed

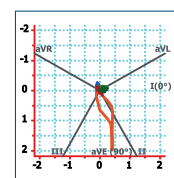
With the ADInstruments RSS News feed, you can receive the latest ADInstruments news without visiting our website.

RSS (Really Simple Syndication) is an XML formatted text file designed to simplify sharing content such as news headlines.

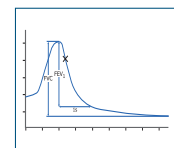
To subscribe to ADInstruments news, simply place the RSS feed from our home page in your internet browser as a bookmark. Click on headlines that interest you to keep up with new products, the latest software releases, upcoming exhibitions and more.

For more information, see [www.adinstruments.com/rss](http://www.adinstruments.com/rss)

## Chart Extension Releases for Windows®



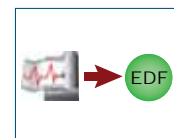
**Cardiac Axis v1.0 — New for Windows.** The Cardiac Axis extension automates the calculation of frontal plane electrocardiograms (ECGs) and vectorcardiograms (VCGs), and can also animate the instantaneous cardiac vector display at different speeds, including real time, medium and slow. A Macintosh version is also available.



**Spirometry v2.0 update.** The extension derives respiratory parameters based on flow and volume, and generates a flow-volume plot and spirometry reports. A Macintosh version is also available.



**Export QuickTime® v1.1.2 update.** The extension saves Chart files as QuickTime movies that can be viewed on QuickTime supported file formats for multimedia. A Macintosh version is also available.



**Translate EDF v1.2 update.** Translate EDF saves Chart files into European Data Format. It also allows users to read EDF files in Chart.

## ADInstruments Events

View our website for more listings.

### Chicago, IL, USA

17–18 August 2006, Student Laboratory Techniques Workshop

### Ribeirão Preto, Brazil

27–30 August 2006, 41st Congress of the Brazilian Physiological Society

### Amsterdam, Netherlands

30 August–2 September 2006, 24th European Conference on Microcirculation

### Dubrovnik/Cavtat, Croatia

20–24 September 2006, EUROTOX 2006/6th CTDC Congress

### Albuquerque, NM, USA

11–14 October 2006, NABT

### Chicago, IL, USA

11–14 October 2006, BMES

### Atlanta, GA, USA

14–18 October 2006, USA Neuroscience

### Seoul, Korea

14–18 October 2006, FAOPS

### Chicago, IL, USA

12–15 November 2006, American Heart Association Scientific Sessions

### Melbourne, Australia

26 November–1 December 2006, Australian Health & Medical Research Congress

### Taipei, Taiwan

7–8 December 2006, Chinese Society of Laboratory Animal Sciences

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# Small Animal Telemetry with Rechargeable Transmitters

ADInstruments, in conjunction with Telemetry Research Limited, offer a range of Telemetry Systems for use with small animals (180 grams and above).

These new systems feature wireless transmitters that can be recharged within the animal, minimizing experiment downtime and subject stress.

## ECG and Nerve Activity Systems

The ECG/Biopotential Transmitter (part of the Telemetry ECG/Biopotential System – Small Animal) has a sampling frequency of 2 kHz, and is ideal for recording any biopotentials, including ECG, EMG and EEG, in animals such as rats, guinea pigs and rabbits.

The Sympathetic Nerve Activity Transmitter (part of the Telemetry SNA System – Small Animal) operates with an 8 kHz sampling frequency and can be used to measure extracellular activity in nerves including the phrenic nerve.

## Reduce Experimental Downtime

The transmitters record continuously for up to 8 hours, and can be recharged within the subject by simply placing the animal on top of the Wireless Recharger Pad.

This feature is one of the systems' main advantages, as the transmitters do not need to be sent back to the manufacturer for battery replacement.



Small Animal Telemetry Systems include a PowerLab, Chart Pro, Transmitters, Receiver, Charger Pad and Controller.

## Reduced Cost of Ownership

The transmitter technology reduces costs by eliminating the need for specialized animal housing or isolation barriers.

By using one of twelve independent transmission frequencies, animals can be housed in close proximity or in the same cage with no signal interference.

## Complete Research Solutions

ADInstruments Telemetry Research Systems provide complete solutions. Each system is supplied with a PowerLab data acquisition unit that provides eight input channels and allows fast-sampling and computation rates (up to 200 kHz per channel, 400 kHz aggregate).

The Chart Pro software included with the system features an ECG Analysis Module, ideal for analyzing ECG signals collected from any animal species.

## Features and Benefits

- Fully implantable probes and transmitters
- *In Situ* rechargeable battery
- Long-term recording
- Reduced downtime
- High sampling frequency
- Transmission range up to 5 m
- No special caging required
- Fast acquisition and analysis

To find out more about our complete research solutions, visit our website or contact your nearest ADInstruments representative.

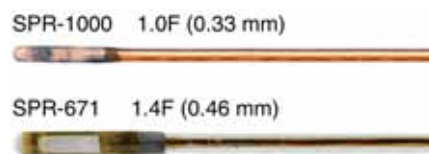
# SPR-1000: The World's Smallest Pressure Catheter

ADInstruments is pleased to offer the SPR-1000 Mikro-Tip® Catheter from Millar Instruments. At 1.0 French (F) size, it is the smallest sensor-tip pressure catheter on the market.

The SPR-1000 Mikro-Tip Catheter, used with an ADInstruments PowerLab data acquisition system and Bridge Amp, provides researchers with leading-edge technology to record and analyze high fidelity cardiovascular pressure signals in small animals such as mice and rats.

## Easier Access with High Accuracy

The 1.0 F size minimizes obstruction of blood flow in vessels and improves surgical access to the right ventricle, pulmonary artery and peripheral areas in small animals.



Magnified view of the Mikro-Tip Catheters

The patented catheter benefits include maintained signal integrity, no signal attenuation and the elimination of artifacts caused by catheter movement.

## Easy Acquisition, Powerful Analysis

With fast recording and computation speeds (400 kHz aggregate), PowerLab systems and Chart software let you record, calculate and display up to 16 channels of real-time data. Extracted parameters may include left ventricular

pressure, heart rate, systolic and end-diastolic pressure and more.

## BP Module: Fast Pressure Analysis

The ADInstruments BP Analysis Module is used for analyzing ventricular and arterial pressure recordings. It automatically detects, analyzes and reports a set of cardiovascular parameters from arterial or ventricular pressure signals, online or offline.

## Complete Solutions

ADInstruments provides complete Research Systems for cardiovascular pressure research with small animals.

For more information about Millar Mikro-Tip catheters, contact your local ADInstruments representative.

# LabTutor Experiments for Life Science Education

The latest release of LabTutor (version 1.1) includes more human experiments and new methods for submitting and saving student reports.

## Introduction to LabTutor

This exercise familiarizes students with LabTutor's components and features, as well as introducing the principles of data acquisition.

## Blood Pressure

Teach the classical techniques and principles of blood pressure measurement while visualizing pressure changes within the LabTutor software.

## Cardiovascular Effects of Exercise

Students measure ECG and finger pulse and compare recordings made before, during and immediately after exercise.

## Breathing

Examine the effects of breathing phenomena such as breath holding, hyperventilation and rebreathing on respiratory patterns and pulse rate.

## The Diving Response

Many marine animals show a marked bradycardia (reduced heart rate) during breath holding while submerged. This experiment investigates the effects of the human diving response on heart rate and peripheral circulation.



LabTutor pages. Clockwise from top left: blood pressure, reflex and reaction times, EOG and respiratory experiments.

## ECG and Heart Sounds

In this experiment, students record and examine characteristics of normal waveforms within the ECG. These can then be correlated to recorded heart sounds.

## ECG and Peripheral Circulation

Students simultaneously record ECG and finger pulse, and can investigate anastomoses, blood supply and the effect of coldness on peripheral circulation.

## Muscle

Electrical stimulation of peripheral nerves in the forearm allows the investigation of muscle recruitment, summation, tetanus and fatigue.

## Respiratory Air Flow and Volume

Using an ADInstruments flow-head, spirometry measurement of lung volumes and capacities can be made. Further investigations are made of pulmonary function (peak flow, FVC, FEV<sub>1</sub>) from normal airways as well as simulated bronchial restrictions.

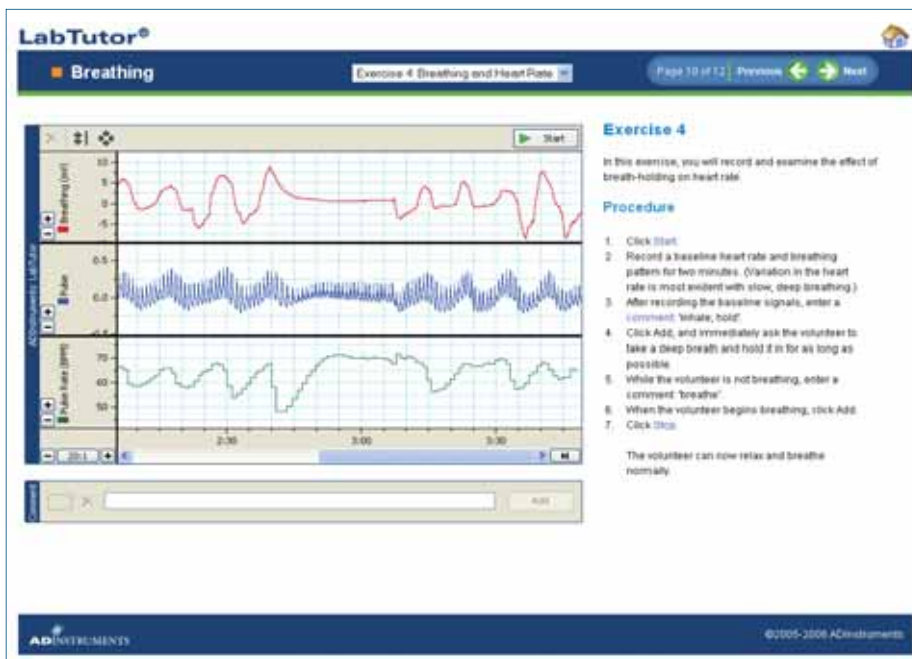
## Reflexes and Reaction Times

Students investigate their reflexes and responses to a variety of stimuli, including tendon-tap (myotactic reflex), light (papillary reflex) and flexion-withdrawal (palmaris-brevi contraction). Effects on reaction times are also examined.

## Electro-oculography (EOG)

EOG is the measurement of electrical activity involved with motor control of eye movements. This experiment investigates common EOG artifacts such as angular displacement, saccades and smooth tracking of eye movements.

New experiments are released regularly. Visit our Teaching website ([www.adinstruments.com/education](http://www.adinstruments.com/education)) to download the latest LabTutor updates.



This breathing exercise measures the effect of holding breath on pulse rate.

# Research into the Sensory Modalities of Sharks and Rays

On the edge of the Atlantic Ocean, researchers from the Florida Atlantic University's Elasmobranch Research Laboratory are using PowerLab to study the sensory modalities of elasmobranch fishes — a group of species better known as sharks, skates and rays.

## Electrical Discharge

Researcher Laura Macesis is examining the electric organ discharge properties of the lesser electric ray. This small ray uses its electric organs to both stun potential predators and communicate with other rays. Laura has created an insulated rubber glove with

stainless steel electrodes in the fingers and thumb. The glove enables her to grasp the ray and directly measure the voltage produced by the ray (up to 60 V) using an amplifier and PowerLab.

## Visual Fields

Mikki McComb is quantifying the visual field for both the Atlantic stingray and the clearnose skate.

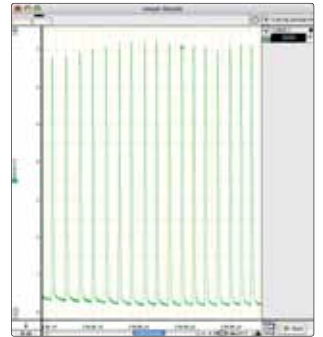
Recordings, using glass microelectrodes, are made of the field potential produced when the photoreceptor cells in the retina detect light. This method is also known as electro-retinography (ERG).

## Olfactory Sensitivity

The olfactory sensitivity of sharks and rays are commonly believed to be extraordinary. Tricia Meredith's research indicates that although sharks and rays are very sensitive to odorants, their sensory capabilities do not exceed those of some other fishes. She employs an electro-olfactogram technique measuring receptor cells field potential in response to amino acids and natural prey metabolites.

## More Information

To read more about these experiments, visit News at [www.adinstruments.com](http://www.adinstruments.com).



Top: Tricia Meredith at work  
Bottom: Electric organ discharge.

## Software Hints

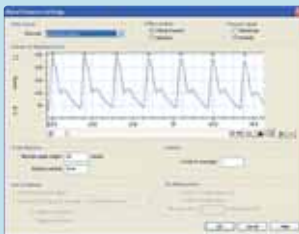
### Automatic Detection and Analysis of Cardiovascular Pressure Waveforms

Automatically detect, analyze and report cardiovascular parameters from arterial or ventricular pressure signals, either online or offline, using the MLS370 Blood Pressure Module. The Blood Pressure Module for Chart for Windows is available separately or as part of Chart Pro, and can be used to analyze human or animal data.

#### Step 1: Define the analysis type.

Choose Blood Pressure > Settings

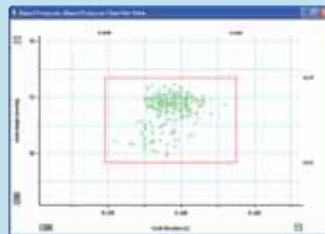
- Select Ventricular or Arterial Pressure to calculate specific waveform parameters.
- Select the settings required, then click OK to perform the analysis.



#### Step 2: View analysis and data windows.

From the Blood Pressure menu select:

**A. Classifier View** – this allows the selection of pressure cycles based on height and duration for analysis. The edges of the red box represent the classification limits. To include or exclude detected cycles in any analysis drag the limit edges with your cursor.



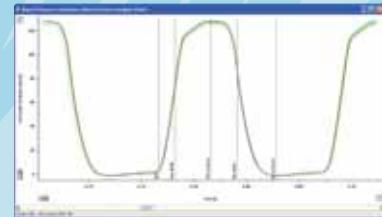
**B. Analysis View** (top right) – this displays pressure cycles with an average cycle displayed in black (select the number of cycles to be averaged in the Settings dialog). Each single or averaged pressure waveform can be viewed by using the scroll bar. The following parameters are detected and displayed in the Analysis View:

Ventricular parameters

- Maximum and Minimum Pressure
- Maximum dP/dt and Minimum dP/dt
- End Diastolic Pressure (EDP)

Arterial parameters

- Systolic and Diastolic Pressure
- Pressure at Dicrotic Notch



**C. Table View** – All parameters calculated by the Module are recorded in the Table View. This view displays one row for each averaged cycle. Click on a row and the corresponding Blood Pressure Analysis View and Chart View will also be displayed.

Select the parameters to display in the Table View Options Dialog. These include Contractility Index, Cycle duration, Tau, Heart Rate and Ejection Times.

To simultaneously view all analysis windows select Window > Tile

To purchase the Blood Pressure Module or Chart Pro, contact your local ADInstruments representative or visit our online store. An evaluation version of the module can be downloaded from the Chart 5 Modules page.

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