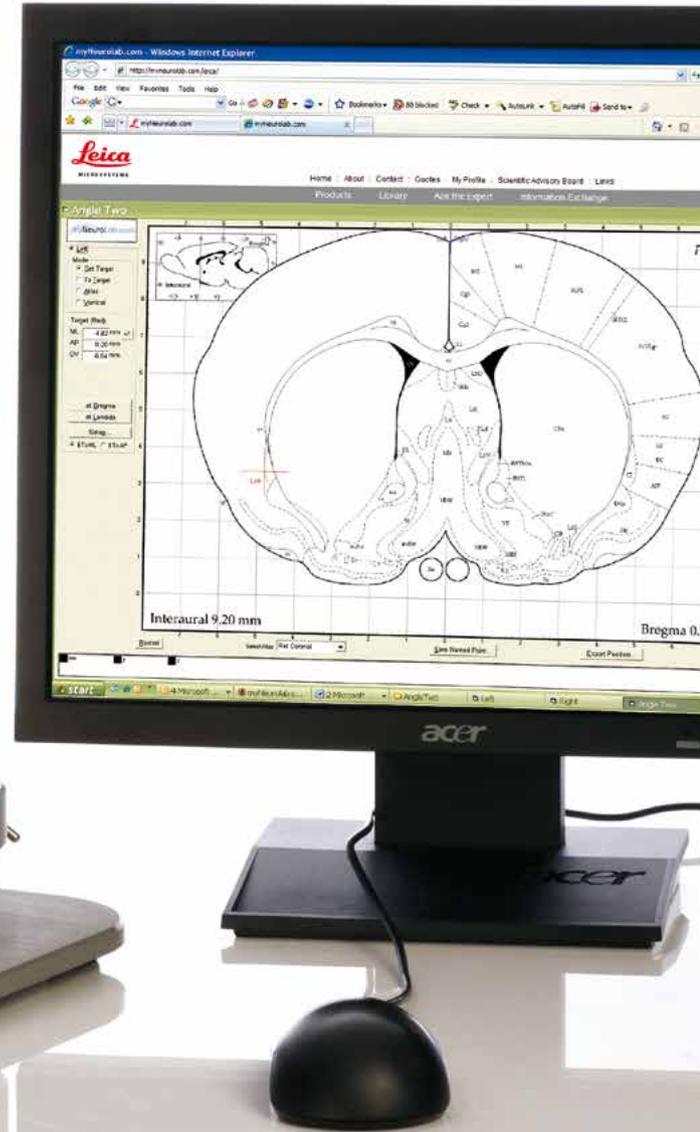


Advancing Cancer Diagnostics  
Improving Lives



# Stereotaxic Solutions

# A Complete System for Small-animal Brain Surgery

Stereotaxic surgery is easier, faster and promotes using fewer animals with our stereotaxic instruments.

Leica Biosystems offers a wide range of solutions for small-animal brain surgery. Manipulators, bases and species adaptors, as well as a wide range of accessories are available for all your laboratory needs.



## Visit [LeicaBiosystems.com](http://LeicaBiosystems.com) – the Source for Innovative Neuroscience

Visit [LeicaBiosystems.com](http://LeicaBiosystems.com) for a comprehensive range of products and expert information.

**Ask the Expert.** Got a question? Leica Biosystems experts can help with advice on many aspects of neuroscience and small-animal surgery.

**Request a Quote:** Fill a shopping cart and request a prompt quote from [LeicaBiosystems.com](http://LeicaBiosystems.com)

**Find Your Solution.** With a comprehensive product range covering most aspects of neuroscience, [LeicaBiosystems.com](http://LeicaBiosystems.com) can help with innovative solutions for many applications.

### SPECIAL APPLICATION INSTRUMENTS

Leica Biosystems offers a selection of probe holders, bases and species adaptors to suit most stereotaxic surgery requirements.

- Species Adaptable “U” Frame
- NanoInjector
- Impact One

### MANIPULATORS

Choose from three stereotaxic manipulators. Low cost vernier scale models, to full-featured digital stereotaxic models. Angle Two makes it practical to do every surgery from a different angle, removing the confound of path, with no loss of time or accuracy. Angle Two includes Virtual Skull Flat and Atlas Integration.

- Angle Two
- Digital with Fine Drive
- Vernier with Fine Drive

### ACCESSORIES

An extensive range of valuable and unique accessories is available to enhance stereotaxic accuracy and research results.

- Video Microscope Two
- Perfusion One and Two
- NanoInjector
- Impact One
- Manual Drill with stop

# Bases

Leica Biosystems features a selection of probe holders, bases and species adaptors to cover most common needs.

## Mouse/Neonatal Rat Adaptor

Leica Biosystems offers base plates for the hypothermic anesthesia of neonatal rats. The bases feature a well that cools the plate with dry ice and alcohol. To create a stable three point hold for mice and neonatal rats, miniature earbars and incisor clamps are included. For adult mice, a gas anesthesia solution featuring a nose cone and gas flow is available.

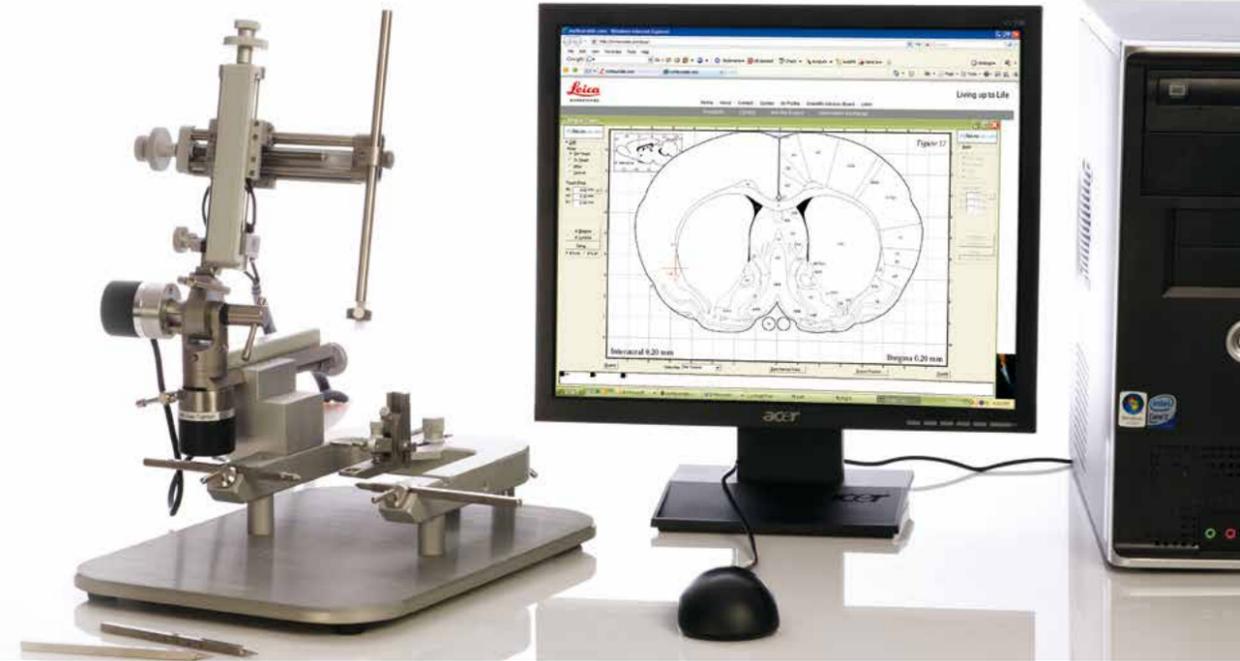
## “U” FRAME

The “U” Frame is the most popular frame due to its versatility and efficient size. The “U” Frame may be configured with one or two manipulators. This base comes equipped for adult rat surgeries. Several species adaptors are also available to use with mice and guinea pigs.



# Manipulators

Choose the stereotaxic manipulator that suits your application. Leica Biosystems has a solution for virtually any application, from advanced computer-guided systems to cost-effective Fine Drive equipped vernier instruments.



## ANGLE TWO

The Angle Two is the most technologically advanced animal stereotaxic instrument commercially available. It is a computer-guided stereotaxic instrument, yet it also maintains the manual tactile feel that allows neuroscientists to move the probe into the brain carefully. This can be configured with dual manipulators for bilateral experiments.

With the Angle Two, any approach angle can be achieved without losing accuracy and time. Thus, reducing human error significantly, allowing the use of fewer animals for technique standardization.

The encoder inputs to a computer from 5 axes allowing angled surgeries without any user calculations. Atlas Integration allows clicking on the target and watching the path the probe follows. Also, the target coordinates can be stored for future use.

A big plus for researchers is the ability to quickly and accurately vary the approach angle to avoid the possible confound of using the same repeated path to the target tissue.

Touch at Bregma and click! The instrument will show how far to move along each linear axis, correcting for tilt and rotation of the manipulator. Another unique feature is the ‘Virtual Skull Flat’ instrument correction software – the instrument corrects exactly for any deviation from skull flat orientation. Touch the probe at Lambda, click, and Angle Two will show how to reach the target with given head tilt and rotation of the manipulator.

Reference: Crowley NA, Bloodgood DW, Hardaway JA, et al. Dynorphin Controls the Gain of an Amygdalar Anxiety Circuit. Cell Rep. 2016;14(12):2774-2783.

# Manipulators (continued)



## DIGITAL MANIPULATOR WITH FINE DRIVE

The Digital Manipulator with Fine Drive is the cost-effective way to achieve exceptional accuracy.

Its features include fine drive on the DV axis and a superior compression lock on the tilt.

There are three linear encoders on the linear axes. A display counter box shows the relative positions of each axis after zeroing at Bregma.

This instrument includes a fine drive with 10  $\mu\text{m}$  resolution on the vertical axis, making it an order of magnitude more precise than traditional 100  $\mu\text{m}$  instruments.

An alignment kit is available separately.

**Reference:** Okubo TS, Mackevicius EL, Fee MS. In vivo recording of single-unit activity during singing in zebra finches. Cold Spring Harb Protoc. 2014;2014(12):1273-1283.



## VERNIER MANIPULATOR

These Fine Drive equipped read-by-eye Vernier Manipulators are a stable, precise and proven solution for affordable small animal surgery.

To use a Vernier Manipulator the operator writes down the reading at the zero point (Bregma), adds or subtracts the target coordinates, then moves along each scale to the calculated result.

**Reference:** A Dynamic Relationship between Intracellular and Extracellular Pools of AB Salvatore Oddo, Antonella Caccamo, Ian F. Smith, Kim N. Green and Frank M. LaFerla, American Journal of Pathology. 2006;168:184-194.

# Neuroscience Accessories

Leica Biosystems offers a wide range of accessories to address most common needs. Included in the range is the Video Microscope Two – used instead of a surgical microscope; the Perfusion One and Perfusion Two sacrifice perfusion instruments; the Impact One for the study of head impact injury; the NanoInjector for injection protocols. Brain Blocker cubes for better sections.

We also offer rodent gas anesthesia equipment and animal histology equipment.



## PERFUSION ONE AND PERFUSION TWO

The Perfusion One and Perfusion Two are used for sacrifice perfusion, or the rapid removal of red blood cells for prompt fixation.

The Perfusion One and Perfusion Two avoid shrinkage and distortion by removing sodium from the extracellular spaces before the fixative arrives.

The Perfusion One manual pump sacrifice perfusion apparatus and the Perfusion Two automated sacrifice perfusion apparatus both enable significant improvements in the quality and reproducibility across sizes and species of animals.

For more information, please visit [www.LeicaBiosystems.com/pathologyleaders/sacrifice-perfusion-in-animal-research/](http://www.LeicaBiosystems.com/pathologyleaders/sacrifice-perfusion-in-animal-research/) "Sacrifice Perfusion in Animal Research".

**References:** Attentional Demands for Demonstrating Deficits Following Intrabasalis Infusions of 192 IgG-saporin. Joshua A. Burk, Matthew W. Lowder and Kathleen E. Altemose. Behavioural Brain Research Volume 195, Issue 2, 22 December 2008, Pages 231-238.

Systemic and Intrabasalis Administration of the Orexin-1 Receptor Antagonist, SB-334867, disrupts attentional performance in rats. Karen E. Boschen, Jim R. Fadel and Joshua A. Burk. Psychopharmacology, Volume 206, Number 2 / October, 2009.



# Neuroscience Accessories (continued)



## VIDEO MICROSCOPE TWO

The Video Microscope Two will improve your small animal stereotaxic accuracy by helping you locate and position your probe at the skull landmarks used as reference points with greater precision. It is a digital camera that connects to a computer for both image transfer and power via the USB port, fitted with a long working distance lens with zoom and fine focus features, and a stand that mounts on the back of your Leica Biosystems stereotaxic instrument. A base to mount it separately for other applications or instruments is available. The computer may be conveniently shared with Angle Two Stereotaxic Instrument. The zoom can be operated to display full screen an entire rat skull, or an area about 1 mm in diameter at high resolution. Working distance is about 7 inches, and the camera view can be angled to be unobtrusive in the manipulator movement range. Additional illumination is needed at highest zoom magnification. The LED illuminator is suitable for this application.



## IMPACT ONE

Impact One, device that mounts to a stereotaxic manipulator, allows unmatched control during the study of head impact injury. Developed by a Neuroscientist for Neurotrauma Research. The Impact One makes precisely controlled and positioned impacts on the skull, brain or spinal cord. This facilitates the study of the behavioral or anatomical effects of head impact and neuronal damage. Impact One has a remote actuator that mounts on the stereotaxic manipulator. Settings can be preset for impact velocity, penetration depth and dwell time.

**References:** Detection of Traumatic Axonal Injury with Diffusion Tensor Imaging on a Mouse Model of Traumatic Brain Injury. C.L. Mac Donald, K. Dikranian, S.K. Song, P.V. Bayly, D.M. Holtzman, & D.L. Brody *Experimental Neurology* 205: 116-117, 2007.

Electromagnetic Controlled Cortical Impact Device for Precise, Graded Experimental Traumatic Brain Injury. David L. Brody, Christine Mac Donald, Chad C. Kessens, Carla Yuede, Maia Parsadonian, Mike Spinner, Eddie Kim, Katherine E. Schwetye, David M. Holtzman, Philip V. Bayly. *Journal of Neurotrauma* Apr 2007, Vol. 24, No. 4: 657-673.

The Novel Apolipoprotein E-Based Peptide COG1410 Improves Sensorimotor Performance and Reduces Injury Magnitude following Cortical Contusion Injury. Michael R. Hoane, Jeremy L. Pierce, Michael A. Holland, Nicholas D. Birky, Tan Dang, Michael P. Vitek, Suzanne E. McKenna. *Journal of Neurotrauma*. Jul 2007, Vol. 24, No. 7: 1108-1118.



## NANOINJECTOR

For injection protocols, Leica Biosystems offers the stepper motor-driven NanoInjector for the precise rate and volume for injections into the brain. The NanoInjector includes an actuator and a controller. The actuator mounts directly on the stereotaxic manipulator. A clamp offset adaptor is included. It holds a Hamilton 700 series syringe (not included). A stepper motor pushes or pulls the plunger at a controlled preset rate and to a specific volume. The stereotaxic instrument is used to position the needle tip from Bregma to the target.

**Reference:** Anorexia Induced by Activation of Serotonin 5-HT4 Receptors is Mediated by Increases in CART in the Nucleus Accumbens. Alexandra Jean, Grégory Conduetier, Christine Manrique, Constantin Bouras, Philippe Berta, René Hen, Yves Charnay, Joël Bockaert and Valérie Compan. *PNAS* October 9, 2007 vol. 104 no. 41 16335-16340.



## MANUAL DRILL WITH STOP

The Manual Drill facilitates making burr holes in a skull for probe entry without dipping into the cortex. The Manual Drill has an outer cylinder affixed to the stereotaxic instrument and an inner cylinder that can move up, down or around without wobble. The drill bit is installed on the inner cylinder which hangs by a stop. The surgeon operates the stereotaxic instrument to lower the bit to the bone, then lets the tip rest on the bone and lowers a preplanned additional amount. The inner cylinder moves up and pushes the stop away from the outer cylinder. When manually rotating the spokes, the drill will cut until the stop is against the outer cylinder. The hole depth is limited to the distance the stereotaxic was moved down following bone contact.

(Manipulator is not included with the drill).



## CRYOJANE

The CryoJane Tape Transfer System enables collecting every section, without loss, and moving them to a slide exactly as they appeared in the block before cutting, no folding, flipping, or lost pieces. Place a piece of tape with a special adhesive over the flat surface of the block, cut the section as you would have without the tape, and the tape will lift off with the section attached. Place on a specially coated slide, and flash with the intense UV unit supplied. The UV acts to polymerize the adhesive, securely anchoring the tissue section to the slide. Peel away the tape, and the section is transferred to the slide exactly as it was on the block.



Leica Biosystems brings together instruments and consumables covering all aspects of neuroscience, from Stereotaxic and Perfusion Instruments to Sample Preparation through to Imaging. Leica Biosystems is your Neuroscience partner.



## LEICA BIOSYSTEMS

Leica Biosystems is a global leader in workflow solutions and automation, integrating each step in the workflow. As the only company to own the workflow from biopsy to diagnosis, we are uniquely positioned to break down the barriers between each of these steps. Our mission of "Advancing Cancer Diagnostics, Improving Lives" is at the heart of our corporate culture. Our easy-to-use and consistently reliable offerings help improve workflow efficiency and diagnostic confidence. The company is represented in over 100 countries and is headquartered in Nussloch, Germany.

**Leica Biosystems brings together products, quality and support. This complete solution helps you reduce the risk of human error, streamline workflow, reduce the number of animals needed, and retain all parts of every section for the slide, all while achieving data with less variability.**



**Contact your Leica Biosystems representative today to learn more about our Sterotaxic Solutions.**