

Living up to Life

*Leica*  
MICROSYSTEMS

# Leica AM6000

The New Standard for Micromanipulation

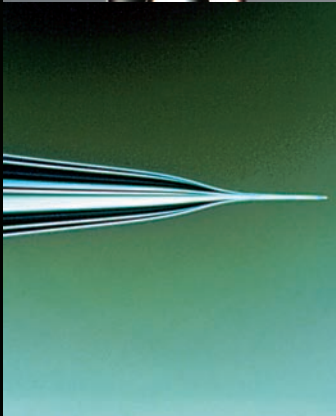


Intelligence  
Brilliance  
Convenience  
Integration

Photo: M. Okabe, Osaka University (J)



C. Mehnert, Center for In-Vitro Fertilization, Giessen, (D)



# The New Standard for Micromanipulation

Leica Microsystems and Eppendorf present the second generation of their successful micromanipulator series. As the successor to the Leica AS TP Transgenic Platform, the AM6000 Advanced Micromanipulation system is based on Leica's latest development – the Leica DMI 6000 B inverted microscope. Users of the AM6000 will benefit from all of the advantages of this fully automated research microscope and its integration with Eppendorf's electrical micromanipulators.

## Intelligent system operation

The intelligence of the Leica AM6000 is impressive. The manipulation system lets you observe and manipulate specimens simultaneously. Using the contrast or illumination manager, the AM6000 provides razor-sharp, brilliant images. And the Eppendorf manipulators feature many useful functions to facilitate your work.

## Experience and innovation – the art of creating brilliant images

The transmitted light axis supports all transmitted light methods – and more. Let the integrated Leica interpupillary interface and its unparalleled possibilities surprise you. The new fluorescence axis offers all of the brilliance, depth of field, and resolution that you expect from a light microscope.

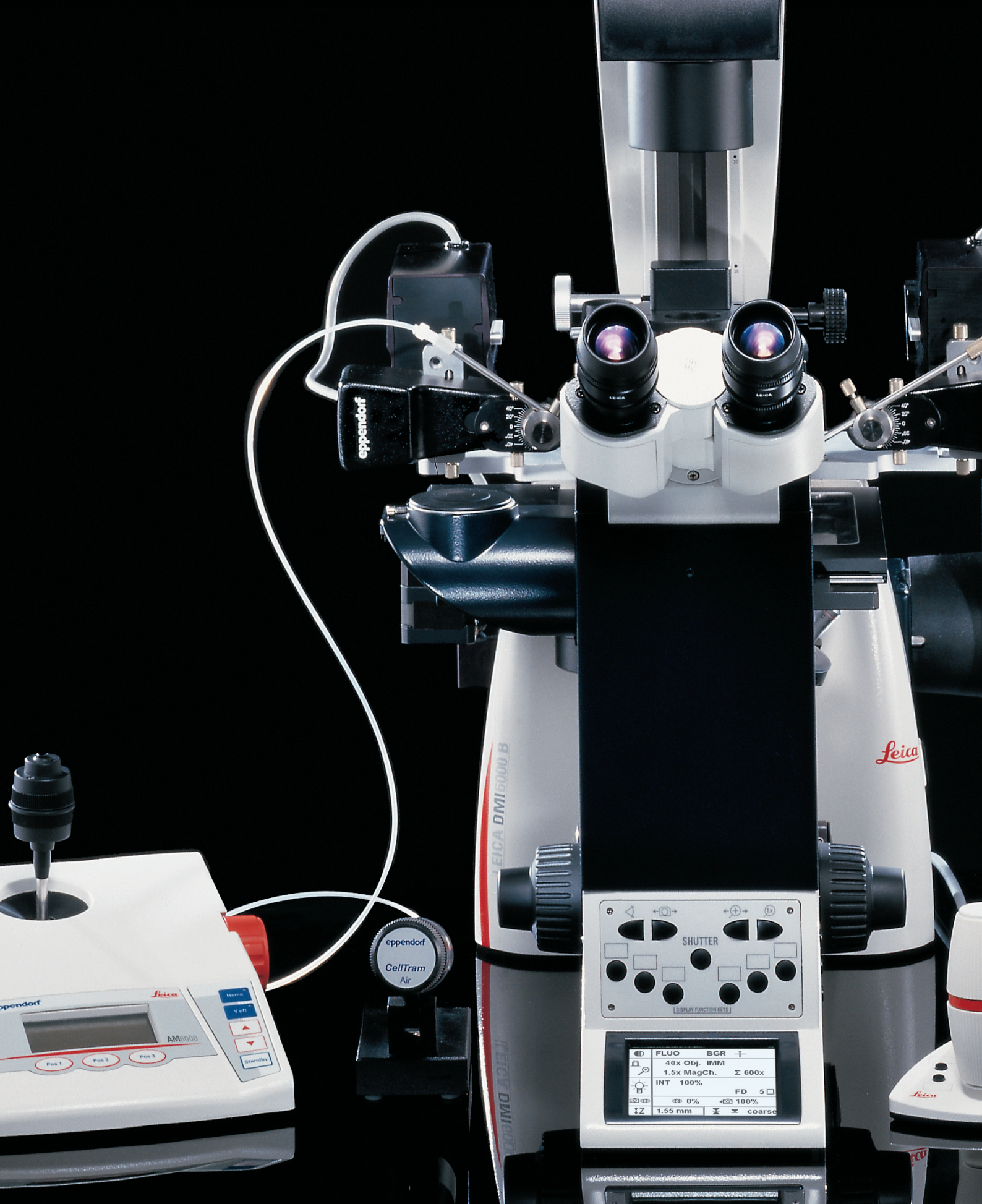
## Experts call it ergonomics. We call it convenience.

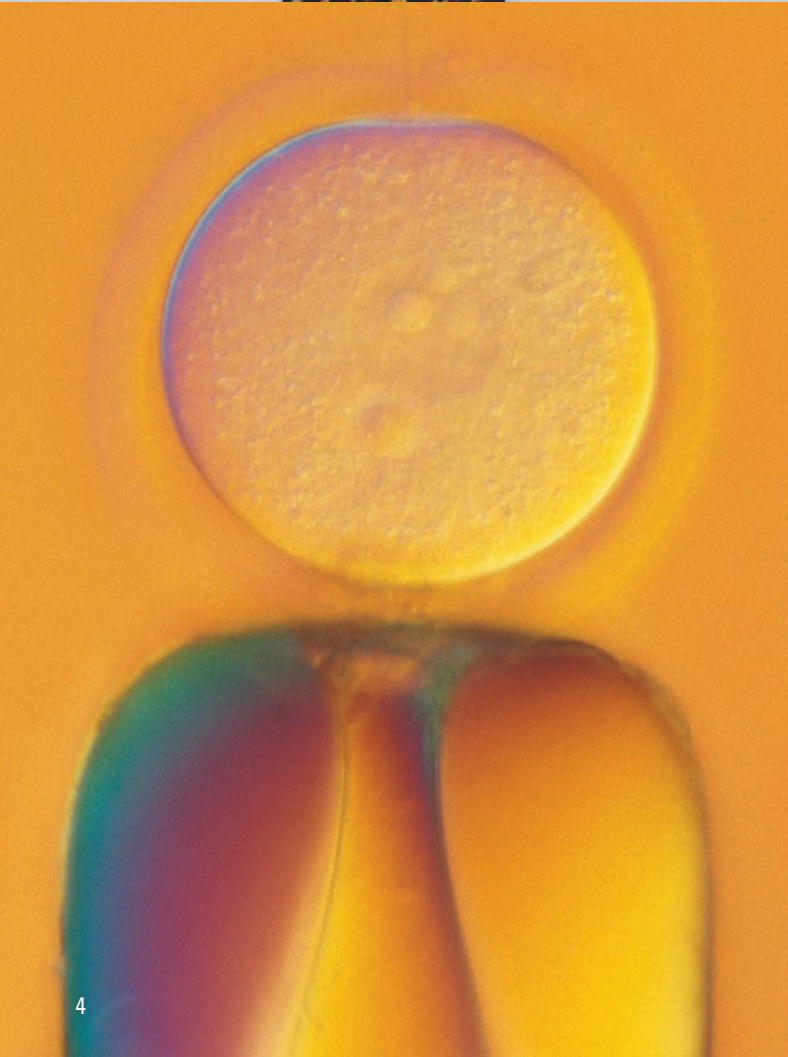
A lot has been written about ergonomics. Discover the convenience of ergonomics with the Leica AM6000. Leica and Eppendorf developers designed an easy-to-use system that not only exceeds the latest technical standards, but more than fulfills all ergonomic requirements.

## A team is more powerful than the sum of its players

Leica products are team players that are carefully in tune with one another and build on each other's strengths. The AM6000 was developed in cooperation with Eppendorf engineers. The consistent integration of microscope and micromanipulators in the new manipulation system provides a wide range of new options that you will soon consider essential.







“We asked many users worldwide for suggestions on how to optimize their typical microscope-micromanipulation workflow. The main message was: ‘I would like to leave my hands on a single control unit to operate both the microscope functions and micromanipulators’. I am very pleased to announce that we have succeeded in converting these suggestions into reality. We now have a unique and really integrated system – Leica AM6000. See for yourself – you’ll be glad you did.”

**Dr. Werner Wittke,**  
**Product Manager, Micromanipulation and Microscopy, Leica Microsystems**

# Intelligent Imaging – Simply Press a Button

## The intelligent base – Leica DMI 6000 B

The inverted DMI 6000 B digital microscope leaves nothing to be desired. The entire instrument is fully automated so that the user can concentrate on the experiment, and not on the microscope functions. The contrast and illumination manager take over all of the work when changing contrast – at the touch of a button – in transmitted light as well as in fluorescence. For detailed information, please request the Leica DMI 4000–6000 B Series product brochure.

## The ideal partner – Eppendorf micromanipulators

Eppendorf's electrical micromanipulators are integrated to the complete system. In addition to proven functions such as "Home", "Clean", "Y-off", and "Limit", other functions are available that are unique to the AM6000. The joystick, for example, can control the manipulators and the motorized microscope stage. Both components feature coarse and fine modes for fast travel and working with micron precision.

## The key to enhanced efficiency – the multifunction panels

The entire system is controlled from multifunction panels that manage the most important microscope functions in addition to the full range of micromanipulation functions. This integrated system is your key to accelerated work processes and higher efficiency. In addition to all NK2-generation Eppendorf manipulator functions, the control panels feature focus hand wheels and function buttons to control brightness, the objective turret, and the magnification changer.

Customize the AM6000 to suit your work with three freely programmable function buttons. The objective, subsequent magnification, and contrast method can be stored and recalled with the touch of a button. You can switch instantly between contrasts and magnifications – ideal for repetitive processes and perfectly reproducible experimental conditions!



## Clearly designed controls

All microscope settings at a glance: The current contrast method, selected magnification, illumination parameters, and camera ports, as well as information about the focal plane, are all available. The most important fluorescence functions at a glance: Each filter cube can be selected directly. The shutter opens or closes at the touch of a button. Immediate feedback is displayed.

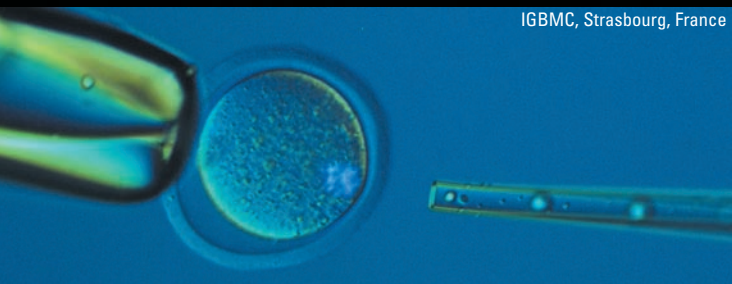


## Focus on the action

The microscope stage, objective turret, condenser, and manipulators form the heart of the Leica AM6000. They are perfectly attuned to one another for optimal software-supported interaction.

# Sample Application: Transgenics

Transgenics places high demands on the complete system, and the Leica AM6000 is ideal for the application. The AM6000 integrated solution consists of a Leica AM6000, equipped with an Eppendorf FemtoJet®, a cooling insert, and an anti-vibration stage.



## Leica AM6000

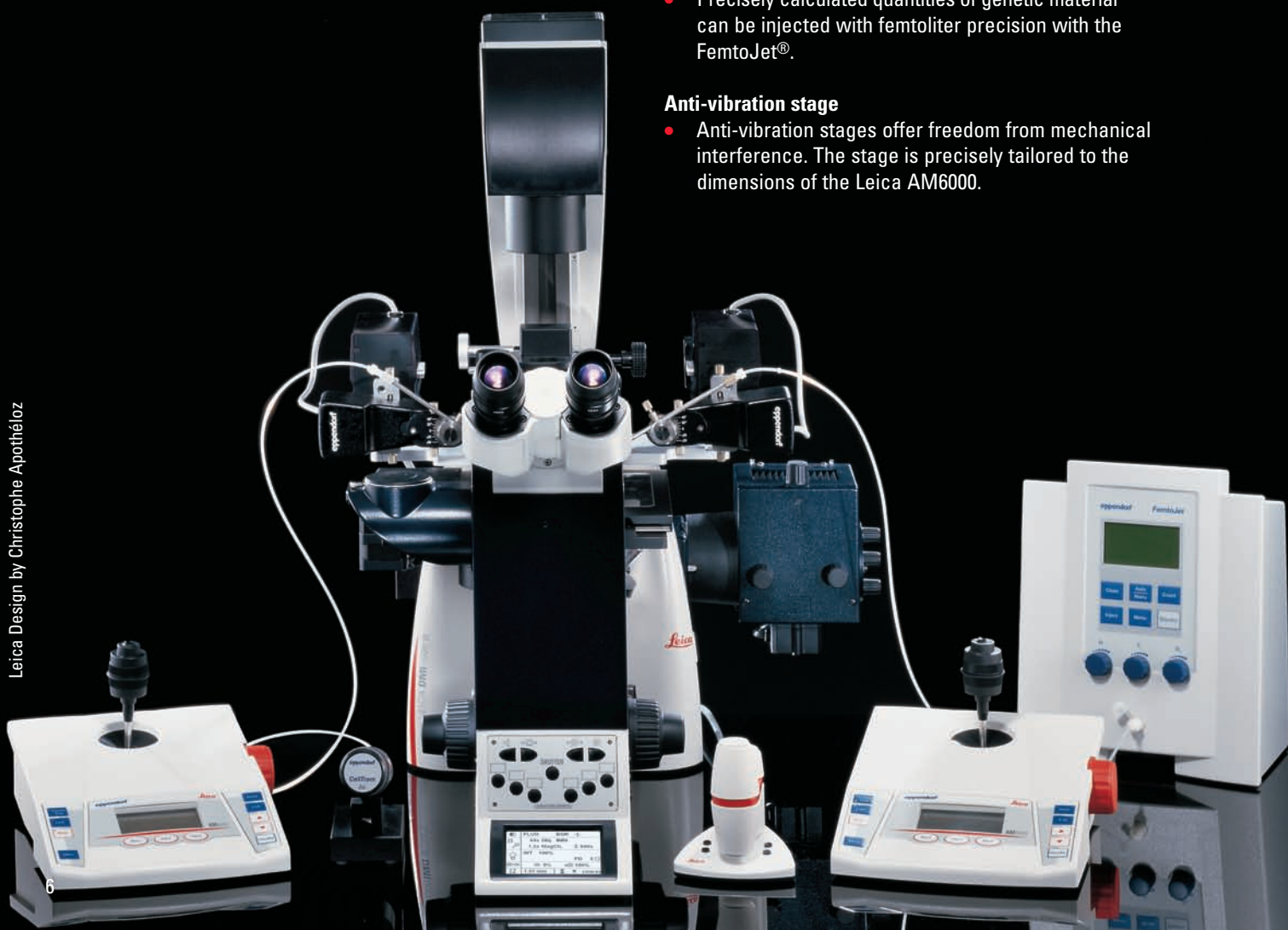
- Combination contrast – the simultaneous use of DIC and fluorescence – is activated at the touch of a button and ensures rapid monitoring of fluorescence probes.
- The Parfocality Manager ensures a sharp image at all times – even after changing the magnification.
- The micromanipulation stage with its slim design allows easy adaptation of manipulators.
- The cooling insert provides an optimal injection environment for the cells.
- The “Y-off” function of the electrical micromanipulators moves the instruments only in the X direction, which facilitates injection.
- The “Limit” function of the manipulators sets a lower Z limit to effectively prevent broken needles.
- The multifunction panel acts as the control unit for the entire system, reducing the number of required remote control units.

## Eppendorf FemtoJet®

- Precisely calculated quantities of genetic material can be injected with femtoliter precision with the FemtoJet®.

## Anti-vibration stage

- Anti-vibration stages offer freedom from mechanical interference. The stage is precisely tailored to the dimensions of the Leica AM6000.



# Experience and Innovation – The Art of Creating Brilliant Images

## Always the right contrast

The basis of the Leica AM6000 is a research microscope, so you can use any contrast method, as detailed below.

## Contrast and resolution for every specimen – the new DIC

It's a familiar phenomenon when using DIC: Improved contrast results in lower resolution and vice versa. This effect increases when observing particularly thick or thin specimens. Leica offers special prism combinations for these cases: prism C for regular specimen thicknesses, C1 for especially thick, and C2 for especially thin specimens.

## Take the optics into your own hands – the new IMC

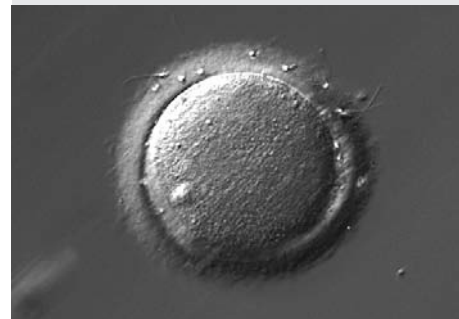
Leica's optics experts have created an intermediate interpupillary interface. Now users have an effective, yet affordable modulation contrast solution with brightfield objectives.

## Seeing with different eyes – the new fluorescence axis

Also, Leica has completely overhauled the fluorescence axis, optimizing it with regard to transmission, image flattening, and light flux qualities. The result is a fluorescence axis of peerless optical quality.

The unique functions of the fully automated AM6000 fluorescence axis will facilitate your workflow. Imaging specimens with multiple fluorescence probes becomes easy with the ultra-fast IFW filter wheel and motorized excitation manager.

For detailed information, please see the  
Leica DMI 4000–6000 B Series product brochure.



Hard, contrast-pronounced modulation contrast



Soft modulation contrast

Photos: C. Mehnert, Center for In-Vitro Fertilization,  
Giessen, Germany



## A disk like no other

This universal genius is located in the heart of the fluorescence axis. Leica engineers have installed the FIM (fluorescence intensity manager), two fast shutters, a motorized excitation manager, and the IFW (internal fast filter wheel) on a 49.5 mm diameter disk.

# Sample Application: ICSI

## Leica AM6000

- IMC – integrated modulation contrast – provides a relief-like image and works perfectly with plastic Petri dishes – an absolute must in human reproductive medicine.
- A polarizer allows a brightfield share to be mixed into the IMC image to vary the impression.
- The Parfocality Manager ensures a sharp image at all times – even after changing the magnification.
- The micromanipulation stage with its slim design allows easy adaptation of manipulators.
- Heating inserts guarantee optimal experimental conditions for the cells.
- The Y-off function of the electrical micromanipulators moves the instruments only in the X direction, which facilitates injection.
- The Limit function of the manipulators sets a lower Z Limit to effectively prevent broken needles.
- The multifunction panel acts as the control unit for the entire system, reducing the number of required remote control units.

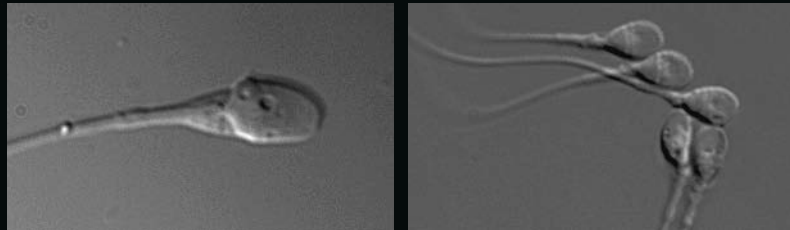
## Leica DFC320

- The high-resolution DFC320 Digital Camera features a FireWire interface for rapid image transfers for a fast live image.

## Accurate Sperm Viewing

- A continuous zoom applied to the camera allows sperm to be magnified to over 10,000x. This opens new possibilities for judging the quality of sperm.

An ICSI system combines ease of use with the option of projecting images onto a monitor for educational purposes. The system shown below meets these requirements.



Photos: Pr. Stéphane Viville, Service de Biologie de la Reproduction, Schiltigheim, France





# The Experts Call It Ergonomics – We Call It Convenience

## Convenient insights

The ergonomic tube is a standard feature of the AM6000. It is included in the total system price, and costs no more than a fixed tube. The viewing angle of the tube can be adjusted continuously to ensure the best possible user posture.

## Convenient overviews

There is no substitute for an unobstructed clear view of the specimen. That's why Leica invented the "viewing channel" – a notch between the eyepieces that provides a clear view of the specimen regardless of the position of the ergonomic tube.

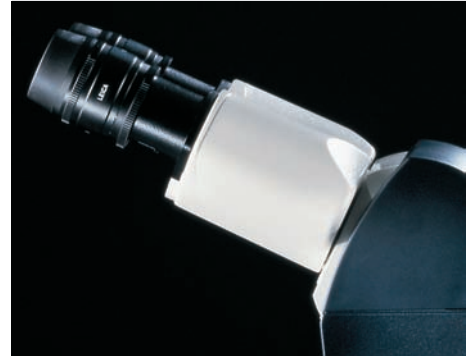
## Convenient operation

The complete system can be controlled from the multifunction panel, designed by Leica in cooperation with Eppendorf engineers. It not only controls the manipulators, but also the microscope. The entire system can be controlled remotely – with a single hand.



## Unobstructed view of the specimen

The "viewing channel" integrated in the tube provides a clear view of your specimen, and lets you switch from microscopic to visual observation of your specimens at any time without changing the tube setting.



## Integrated ergonomic tube

Every Leica DMI 6000 B is equipped with an ergonomic tube. The continuous adjustment of the eyepieces ensures optimal viewing angles for all users. The "viewing channel" provides an unobstructed view of the specimen at all times.



## Multifunction panel

The multifunction panel controls manipulator and microscope functions such as focus, objective selection, and light intensity. As another special convenience, the magnification and contrast can be simultaneously stored and recalled on three freely programmable buttons.



Dr. M. Hurtado, Swiss Federation for Artificial Insemination, Müligen, Switzerland

“I have always been fascinated by the unknown and the best way to satisfy my curiosity is research.”

**Pr. Stéphane Viville, Institut de Génétique et de Biologie, Moléculaire et Cellulaire, Illkirch, France and Service de Biologie de la Reproduction SIHCUS-CMCO, Unité fonctionnelle de Diagnostic Préimplantatoire, Schiltigheim, France**

# Specifications

## Power supply for manipulator

Supply voltage:

Input: 120–240 V AC

Output: 15–18 V DC

Frequency:

Input: 50–60 Hz

Power consumption:

Input: < 50 W

Output: 25 W

## Control panel

Dimensions: 270 x 205 x 160 mm

Supply voltage: 15–18V DC

Power consumption: 25 W

Ambient temperature: max. 40 °C

Relative humidity: max. 80 % up to 30 °C

Overvoltage category: II

Degree of contamination: 2

## Manipulator module

Dimensions of Y/Z module: 120 x 100 x 68 mm

Dimensions of X module: 120 x 60 x 50 mm

Maximum travel per axis: > 22 mm

Microstep resolution: approx. 40 nm

Maximum speed of tool: 7,500 µm/s

## Weights

Microscope: 53 kg

Motorized cross-stage: 2.8 kg

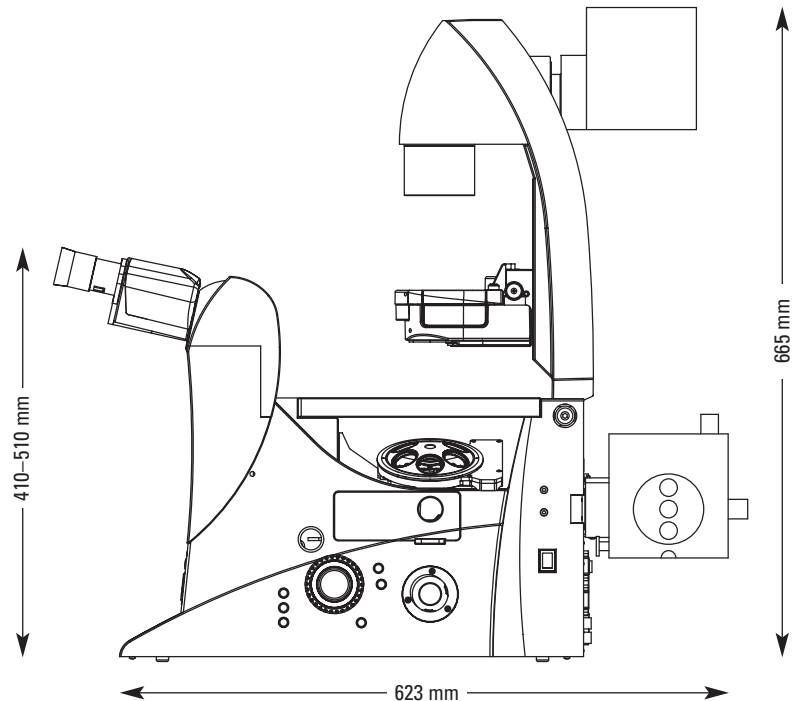
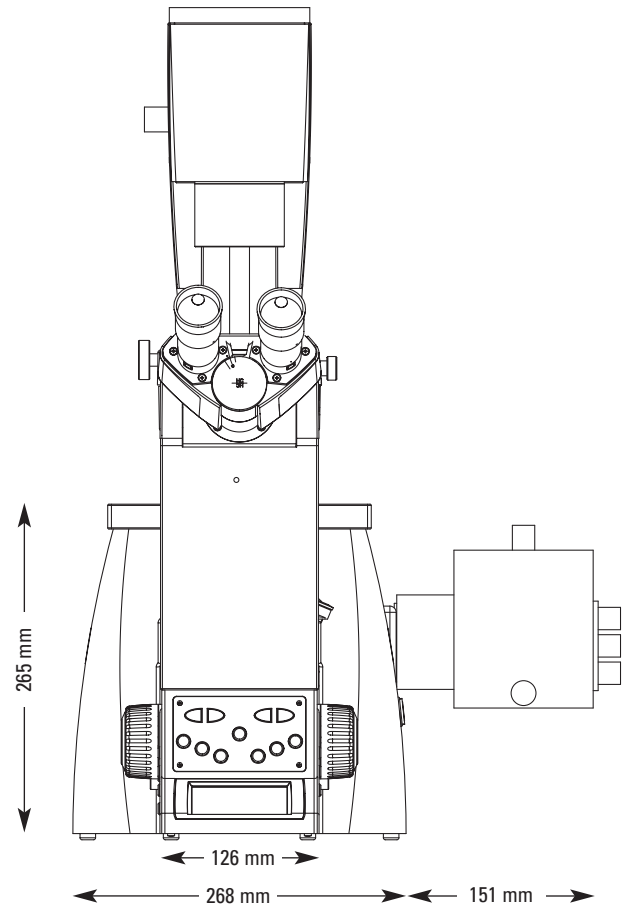
Control panel with power supply: 2.7 kg

Module unit, including guide: 1.4 kg

Complete system: 62 kg

The system bears the **CE** mark.

Technical specifications subject to change.



		<b>Leica DMI 6000 B</b>
<b>Stand</b>	<b>Power supply</b> <b>Display</b> <b>Interfaces</b>	<ul style="list-style-type: none"> <li>• in CTR6000 electronics box</li> <li>• information display 77 x 49 cm (W/H)</li> <li>• RS232</li> <li>• ready for USB</li> </ul>
<b>Focus</b>	<b>General</b>	<ul style="list-style-type: none"> <li>• motorized</li> <li>• 5 electronic transmissions</li> <li>• switching between coarse and fine mode</li> </ul>
<b>Objective turret</b>		<ul style="list-style-type: none"> <li>• 6x M25</li> <li>• motorized, absolutely coded</li> </ul>
<b>Controls</b>	<b>Stand</b>  <b>SmartMove (remote control)</b>	<ul style="list-style-type: none"> <li>• 7 freely programmable buttons</li> <li>• buttons with fixed functions for <ul style="list-style-type: none"> <li>– illumination manager, focus functions, camera ports, subsequent magnification, fluorescence functions</li> </ul> </li> <li>• control element for focus (z) and stage movement (x, y)</li> <li>• 4 freely programmable buttons</li> </ul>
<b>Stages</b>	<b>Mechanical stages</b>  <b>Motorized stages</b>	<ul style="list-style-type: none"> <li>• fixed stages <ul style="list-style-type: none"> <li>– ceramic-coated</li> <li>– over 20 different inserts available</li> <li>– can be equipped with heating and cooling inserts</li> </ul> </li> <li>• 3-plate cross-stages (also slim form for micromanipulator)</li> </ul>
<b>Transmitted-light axes</b>	<b>Illumination arm</b>	<ul style="list-style-type: none"> <li>• 12 V/100 W halogen lamp</li> <li>• motorized field diaphragm (mechanical optional)</li> <li>• filter magazine for 2 filters, motorized (mechanical optional)</li> <li>• motorized shutter (mechanical optional)</li> </ul>
<b>Condensers</b>	<b>General</b>  <b>S1–28</b>  <b>S70</b>	<ul style="list-style-type: none"> <li>• condenser disk for optical elements with <ul style="list-style-type: none"> <li>– 4 large openings for prisms, DF stop, BF, PH rings</li> <li>– 3 small openings for BF, PH rings</li> </ul> </li> <li>• integrated motorized aperture diaphragm (mechanical optional)</li> <li>• suitable for magnifications from 1.25x to 100x</li> <li>• separate polarizer (optional; mechanical or motorized)</li> <li>• motorized condenser disk (coded optional)</li> <li>• motorized condenser head (mechanical optional)</li> <li>• motorized condenser disk (coded optional)</li> <li>• fixed condenser head</li> <li>• mechanical lens for low magnifications</li> </ul>
<b>Fluorescence axis</b>	<b>Filter disk</b>  <b>Illumination</b>	<ul style="list-style-type: none"> <li>• motorized</li> <li>• for up to 6 filter cubes</li> <li>• 100 W hg lamp</li> </ul>
<b>Automation</b>	<b>Focus</b>  <b>Illumination Manager, transmitted light</b>  <b>CCIC</b> <b>Contrast Manager</b>  <b>Illumination Manager, fluorescence</b>	<ul style="list-style-type: none"> <li>• including parfocality function</li> <li>• positioning memory slots for fast traversal to 2 z-positions</li> <li>• adjustment of brightness, aperture and field diaphragms to the objective and contrast technique currently in use</li> <li>• Constant Color Intensity Control – maintains color temperature of 3200 K</li> <li>• adaptation of optical elements such as prisms or light rings to the objective and contrast technique currently in use</li> <li>• FIM (Fluorescence Intensity Manager) – adaptation of brightness in 5 fixed levels</li> <li>• adjustment of field diaphragm to the eyepieces or camera chips (round or rectangular diaphragms)</li> <li>• IFW (Integrated Fast Filter Wheel) – very fast switching of excitation with changeover times of less than 0.05 second</li> <li>• Leica Excitation Manager – red-green attenuation in 8 levels</li> </ul>

# Well-Adjusted – and Yet Individual

## The best stage

The Leica AM6000 supports a large selection of specimen stages, and you can choose among fixed and 3-plate cross-stages. Motorized stages may also be used. A special new development for the AM6000: an extra-slim motorized 3-plate stage for micromanipulation.

## Contrast for every application

A broad selection of condensers is available for the AM6000. From 1 to 70 mm, any working distance is possible. Leica's S1 to S28 condensers (1–28 mm working distance) are universal condensers for magnifications from 1.25x to 100x.

## From refrigerator to sauna

Stage inserts for any type of container and temperature control units provide the correct temperature for your experiments. From below freezing to +60°C, any temperature is possible – the choice is yours.



## The narrow stage for micromanipulation

This stage, which was developed in cooperation with a leading manufacturer of microscope stages, is designed to leave as much room on either side of the microscope as possible – space that is available to micromanipulation systems, and which eliminates the risk of collisions with the motor.

## Flexibility



## The new condenser generation

A new generation of manual/coded and motorized condensers is available for the DMI Series. This range of condensers is the first ever to support magnifications of 1.25x to 100x in inverted microscopes. Another new feature is the plug connection between the condenser and illumination arm, which eliminates cables and makes condenser replacement easy. And thanks to the Koehler locking lever, users can store their optimal Koehler settings.

The aperture diaphragm, integrated in all condensers, is available in manual and motorized versions for optimal support of the Illumination Manager. All condensers feature septuple condenser disks, making them suitable for all contrast methods.



## Leica EL6000

New external light source for fluorescence excitation. The adjustment-free metal-halogenide lamp with its long bulb life saves time, money and energy.

The statement by Ernst Leitz in 1907, “*With the User, For the User,*” describes the fruitful collaboration with end users and driving force of innovation at Leica Microsystems. We have developed five brand values to live up to this tradition: Pioneering, High-end Quality, Team Spirit, Dedication to Science, and Continuous Improvement. For us, living up to these values means: **Living up to Life.**

Leica Microsystems operates globally in four divisions, where we rank with the market leaders.

#### LIFE SCIENCE DIVISION

The Leica Microsystems Life Science Division supports the imaging needs of the scientific community with advanced innovation and technical expertise for the visualization, measurement, and analysis of microstructures. Our strong focus on understanding scientific applications puts Leica Microsystems’ customers at the leading edge of science.

#### INDUSTRY DIVISION

The Leica Microsystems Industry Division’s focus is to support customers’ pursuit of the highest quality end result. Leica Microsystems provide the best and most innovative imaging systems to see, measure, and analyze the microstructures in routine and research industrial applications, materials science, quality control, forensic science investigation, and educational applications.

#### BIOSYSTEMS DIVISION

The Leica Microsystems Biosystems Division brings histopathology labs and researchers the highest-quality, most comprehensive product range. From patient to pathologist, the range includes the ideal product for each histology step and high-productivity workflow solutions for the entire lab. With complete histology systems featuring innovative automation and Novocastra™ reagents, Leica Microsystems creates better patient care through rapid turnaround, diagnostic confidence, and close customer collaboration.

#### MEDICAL DIVISION

The Leica Microsystems Medical Division’s focus is to partner with and support surgeons and their care of patients with the highest-quality, most innovative surgical microscope technology today and into the

Leica Microsystems – an international company with a strong network of worldwide customer services:

Active worldwide		Tel.	Fax
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Belgium · Diegem	+32	2 790 98 50	2 790 98 68
Canada · Concord/Ontario	+1	800 248 0123	847 405 0164
Denmark · Ballerup	+45	4454 0101	4454 0111
France · Nanterre Cedex	+33	811 000 664	1 56 05 23 23
Germany · Wetzlar	+49	64 41 29 40 00	64 41 29 41 55
Italy · Milan	+39	02 574 861	02 574 03392
Japan · Tokyo	+81	3 5421 2800	3 5421 2896
Korea · Seoul	+82	2 514 65 43	2 514 65 48
Netherlands · Rijswijk	+31	70 4132 100	70 4132 109
People’s Rep. of China · Hong Kong	+852	2564 6699	2564 4163
· Shanghai	+86	21 6387 6606	21 6387 6698
Portugal · Lisbon	+351	21 388 9112	21 385 4668
Singapore	+65	6779 7823	6773 0628
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Switzerland · Heerbrugg	+41	71 726 34 34	71 726 34 44
United Kingdom · Milton Keynes	+44	800 298 2344	1908 246312