From Eye to Insight

Leica
MICROSYSTEMS

Leica EM ACE

Coater Family



EM ACE COATERS

A Coater Family to cover all your needs.

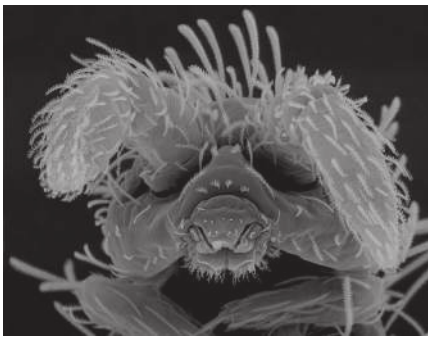
Developed in cooperation with leading scientists, the EM ACE coaters cover all the requirements for your sample preparation needs, from coating to freeze fracture. Open the door to explore new coating capabilities. Our philosophy is simple: "Produce a coating layer easily, fast and reliably, to achieve the best image of your sample in the electron microscope."



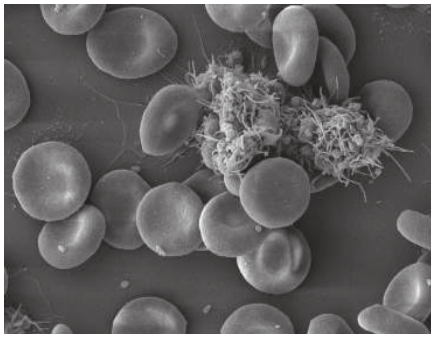


Image is everything - let`s get it covered

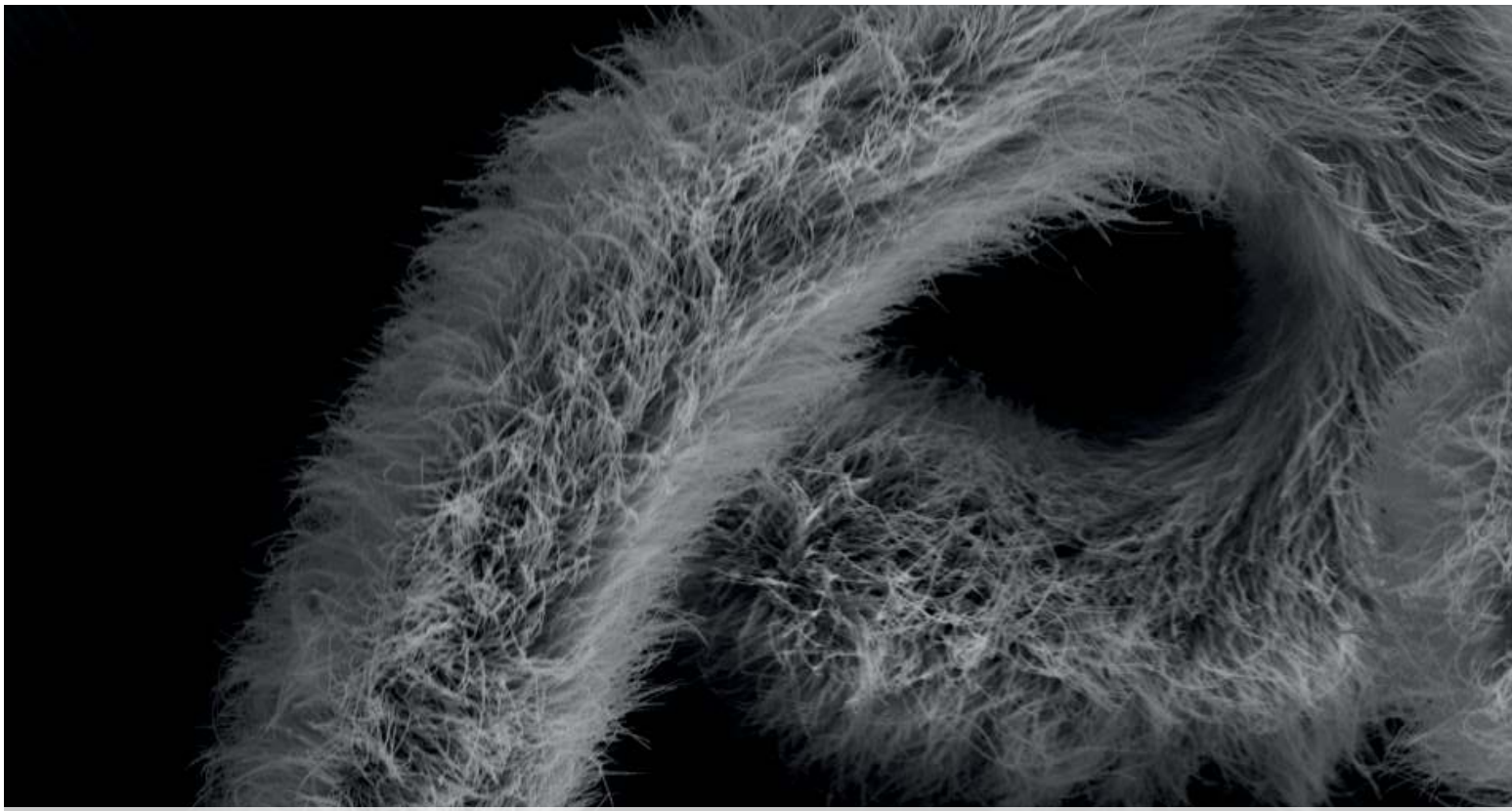
The EM ACE one-touch coating systems are available in two versions: The EM ACE200 Low Vacuum coater for general SEM and TEM analysis and the EM ACE600 High Vacuum coater for the highest resolution TEM and FE-SEM analysis. The EM ACE600 instrument is easily upgraded to a cryo-coater including vacuum cryo transfer. The instruments are fully automated for the easiest operation. Their compact design and small footprint save lab space whilst delivering operational ergonomy. Protocols can be shared as the touch screen interface supports a multi-user environment. The flexibility of the EM ACE coaters allows individual systems to be configured to your laboratories exact needs.



Collembola; Courtesy of Mag. Daniela Gruber, Core Facility of Cell Imaging and Ultrastructure Research, University of Vienna, Austria



Human Erythrocytes and Lymphocytes; Courtesy of Dr. W. Müller, University of Utrecht, Netherlands



BIGGER AREA BETTER LAYER BEST RESULTS

LESS...

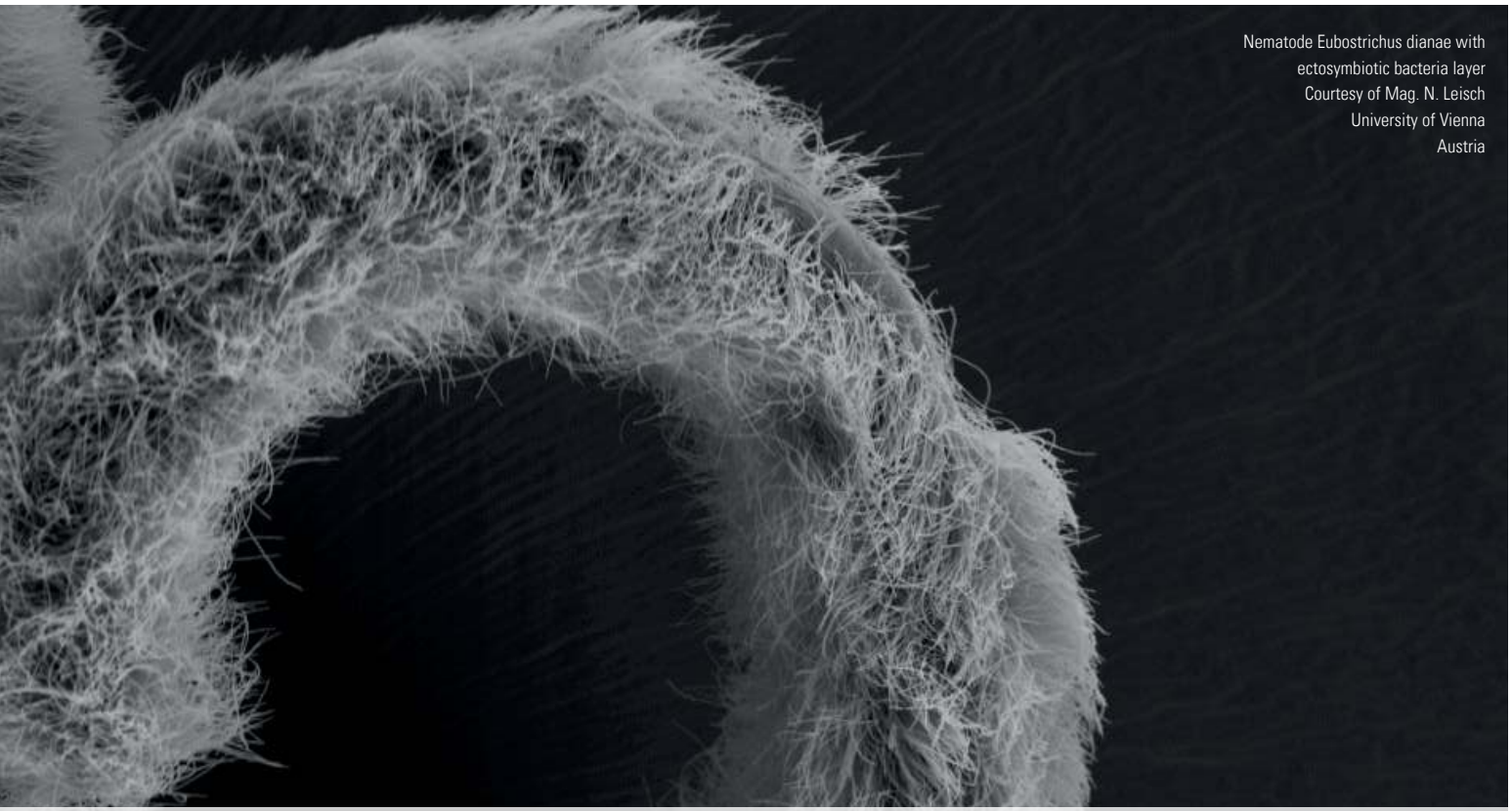
- Human interaction time and expert knowledge
- Footprint
- Complexity - intuitive touch-screen and automated process run
- Sealing surface - one door only
- Operator effort - easy push-fit connectors - no tools required



...IS MORE

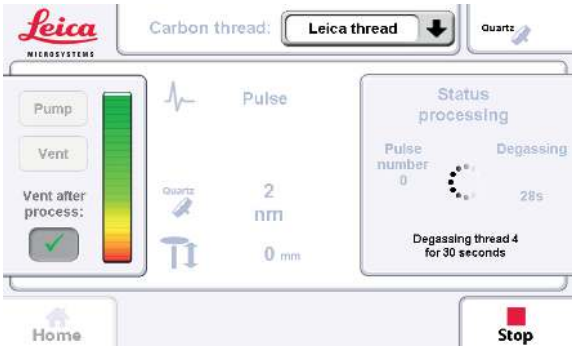
- Customized configuration with hardware and software upgrades
- Lab space
- Effective coating to free your working time
- Homogenous coating, accurate layers and reproducible results
- Flexibility - removeable door, chamber shielding and shutter



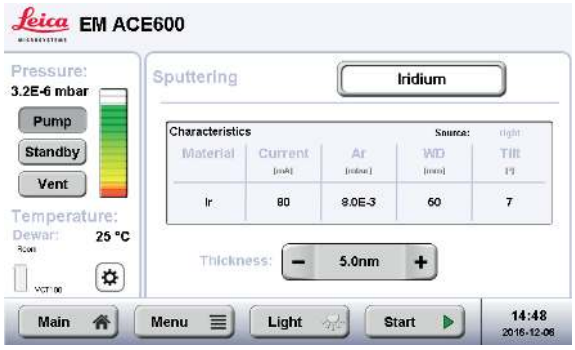


Nematode Eubostrichus dianae with
ectosymbiotic bacteria layer
Courtesy of Mag. N. Leisch
University of Vienna
Austria

SIMPLE ADAPTATION SMALLEST FOOTPRINT



EM ACE200
Carbon thread evaporation work in process. The fourth section is degassed and 2 nm will be deposited. The Table is on the defined zero position and the instrument automatically vented after finishing the process.



EM ACE600
A protocol for sputtering iridium is chosen. The stage will automatically move to 50 mm working distance and 5° tilt. With 80 mA 5 nm of iridium are sputter coated at a pressure of $8x10^{-3}$ mbar.

Coating Technology

Coating of samples is required in the field of electron microscopy to enable or improve the imaging of samples. Creating a conductive layer of metal on the sample inhibits charging, reduces thermal damage and improves the secondary electron signal required for topographic examination in the SEM. Fine carbon layers, being transparent to the electron beam but conductive, are needed for x-ray microanalysis, to support films on grids and back up replicas to be imaged in the TEM. The coating technique used depends on the resolution and application. The EM ACE coater family provides the perfect solution for every application.

EM ACE200

Sputter and Carbon Thread Coating for perfectly reproducible results



The EM ACE200 is a high quality desk-top coater designed to produce homogeneous coatings of conductive metal or carbon as required for electron microscopy.
The fully automated instrument can be configured either as a sputter coater (II) or a carbon thread evaporation coater (I). Or, if preferred, the EM ACE200 can combine both methods with interchangeable heads on the one instrument.
Additional options include:

- Quartz crystal measurement – for reproducible layers
- Planetary rotation – for even distribution of coating material on fissured samples
- Glow discharge – to make TEM grids hydrophilic

Small Coaters - Big Features

- One touch coating
- Small footprint
- Cryo upgrade
- Customized configurations
- Intuitive operation
- Fully automated

EM ACE600

High Vacuum Coating - configure your system - we build the coater you need



The EM ACE600 is a versatile high vacuum film deposition system, designed to produce very thin, fine-grained and conductive metal and carbon coatings for the highest resolution analysis, as required for FE-SEM and TEM applications.
This fully automated table-top coater includes an integrated oil-free pumping system, quartz crystal film thickness measurement and three axis motorized stage (rotation, optional tilt and height).

The EM ACE600 can be configured for the following up to two methods:

- Carbon thread evaporation (I)
- Sputtering (II)
- Carbon rod evaporation (III)
- e-beam evaporation (IV)
- Glow discharge
- EM VCT adaptation for cryo-coating, freeze-fracture, double-replica, freeze-etching and environmental transfer with the VCT Shuttle

(I)



(II)



(III)



(IV)



Accessories for coating methods

(I) Carbon thread evaporation,
(II) Sputtering,
(III) Carbon rod evaporation,
(IV) e-beam evaporation



A NEW ERA OF CARBON EVAPORATION

- Highly reproducible and smooth carbon layers
- Larger and more evenly coated surfaces due to angled sources and integrated rotation
- Accurately definition and deposition of carbon layers up to 40 nm thick
- Unique sofware-controlled, adaptive, pulsed evaporation procedure
- Continous thickness monitoring (quartz measurement)
- 3-axis motorized stage control - stage adjustment without breaking vacuum
- For low angle rotary shadowing and large samples quartz mounted at the side



Grid stage for secure mounting of TEM grids.

	Description	Application	Features
Grid stage	The grid stage allows the secure mounting of TEM grids onto the coating stage. Small springs, clamp the grids in place. The stage can be tilted to very low coating angles without any movement of the grids.	Low angle rotary shadowing directly on EM grids of: > Proteins > DNA	> Clamping up to 15 grids > Special eccentric quartz holder for accurate thickness measurement > Low angle (down to 1°, in 1° increments) coating of grids > Exchangeable with standard stage
LARS stage	The LARS (low angle rotary shadowing) stage securely mounts SEM stubs. Alternatively a mica sheet can be attached with sticky tape directly onto the stage. It allows tilting to very low caoting angles without any shadow effect by the quartz holder.	Low angle rotary shadowing of: > General e-beam coating	> Mounting up to 10 SEM stubs, 60 mm diameter



LARS (low angle rotary shadowing) stage for secure mounting of SEM stubs.

Both stages are recommended for e-beam configured EM ACE600 coaters. They can be retrofitted and do not require a service technician.



EM ACE600 WITH EM VCT500

Not only a coater - cryo options and VCT connection for the EM ACE600

Contamination-free cryo-SEM sample preparation

The EM ACE600 outfitted with an EM VCT500 (vacuum cryo transfer system) is the ideal solution for contamination-free cryo-SEM sample preparation with complete environmental control. Cryo stage and room temperature stages are interchangeable once the coater is cryo-configured. With the VCT500 configuration, the EM ACE600 connects to other VCT-outfitted instruments such as glove boxes, SEMs and the EM FC7.

- Transfer under controlled environment (vacuum and temperature)
- Cryo pump for higher vacuum
- Temperature-controlled stage for freeze fracture, sublimation and freeze etching
- Fracturing knife with motor-driven height adjustment
- Scalpel for basic fracturing
- Double replica release
- LED light illuminates the wohle coating chamber
- Assisted parameter setting and automated run of the whole coating cycle

Freeze Fracture, Freeze Etching and Freeze Drying

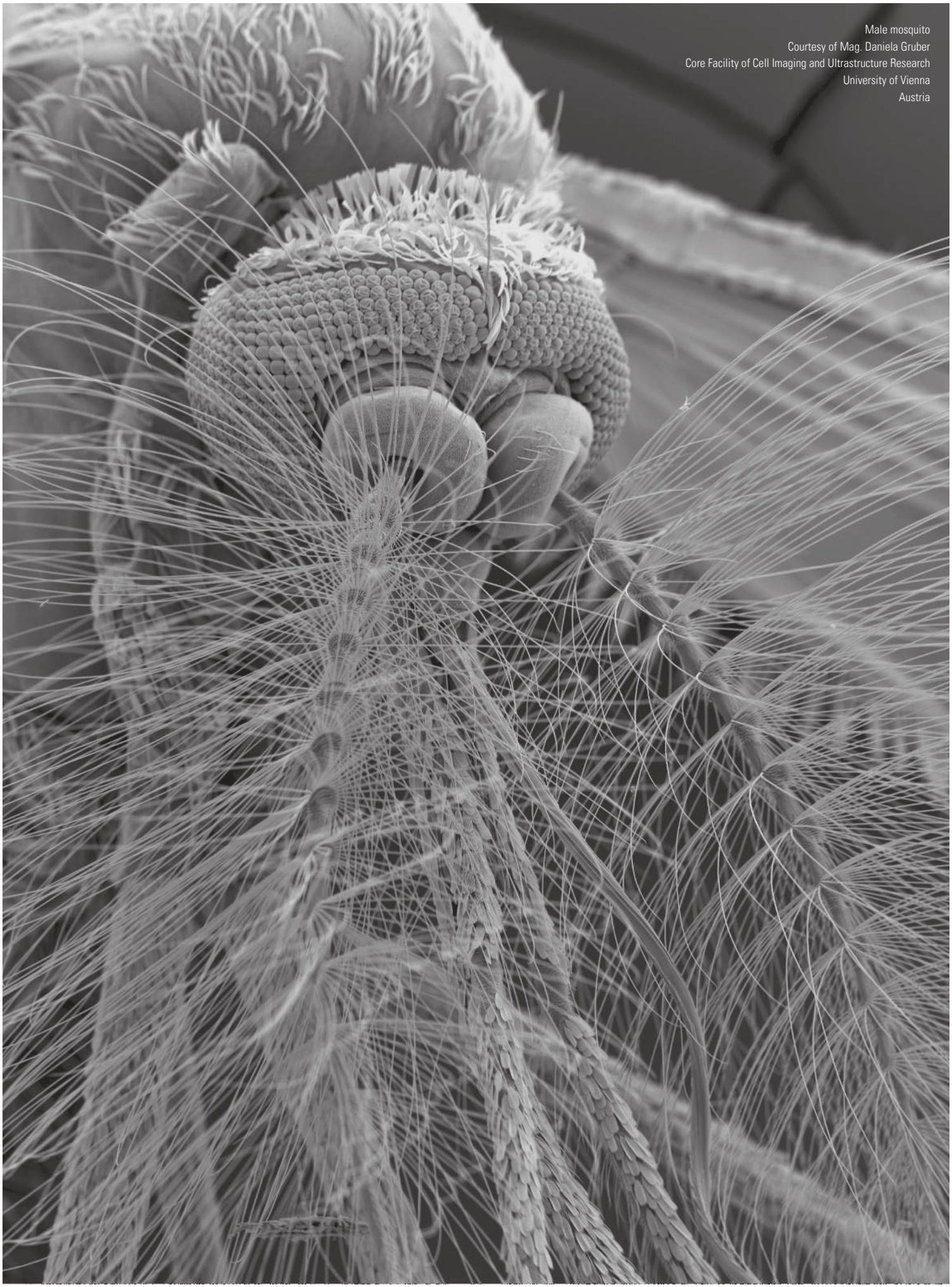
Freeze fracture includes a series of techniques that reveal and replicate internal components of organelles and other membrane structures for examination in the electron microscope. Freeze etching removes layers of ice by sublimation and exposes membrane surfaces that were originally hidden.

Freeze drying, removes water from a frozen sample under high vacuum conditions (sublimation). The result is a dry and stable sample which can be imaged in the electron microscope.









Male mosquito
Courtesy of Mag. Daniela Gruber
Core Facility of Cell Imaging and Ultrastructure Research
University of Vienna
Austria



SEM AND CRYO SEM WORKFLOWS

Leica Microsystems offers a complete range of solutions for EM sample preparation. The EM ACE coaters perfectly enhance these workflows. Only if each step of sample preparation is of the highest quality, can optimum results be obtained from a high resolution electron microscope.

WORKFLOW

Tissue Processing – EM TP ❯ Critical Point Drying – EM CPD300 ❯ Coating – EM ACE200 and EM ACE600 ❯ Imaging and analysis



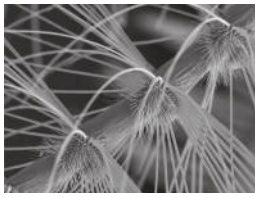
Automated tissue processing for fixation and dehydration.



Automated critical point drying for extremely well perserved sample structures.



Automated coating for reproducible, thin and conductive layers.



Antenna of male mosquito (Gold sputter coating), SEM

WORKFLOW

High Pressure Freezing – EM ICE ❯ Cryo Ultramicrotomy – EM UC7 with EM FC7 ❯ Coating – EM ACE600 cryo outfit ❯ Imaging and analysis



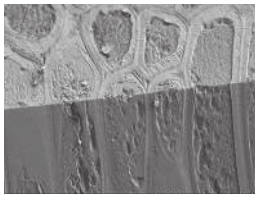
Superior cryo fixation to observe aqueous biological and industrial samples near to native state.



High quality ultrathin sectioning/planing for light, electron, and atomic force microscopy examination.



High vacuum coating in conjunction with EM VCT500 (vacuum cryo transfer) system for the finest metal and carbon layers.



Poplar cambium and xylem

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