

item

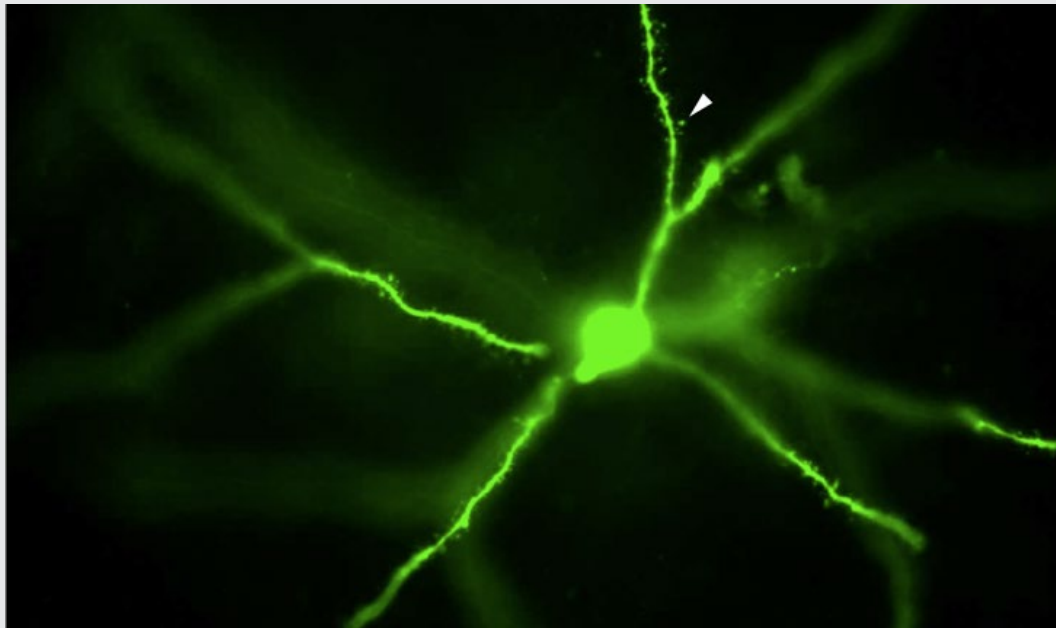
Solingen | 21 March 2013

A SUCCESS STORY

USER REPORT

**UNI
FREIBURG**

17 kg in weight and
accurate to the micrometre



Microscopic image of a nerve cell in a rat's brain, highlighted with green fluorescent colouring. The nerve centre measures approx. 40 µm in diameter.

17 kg in weight and accurate to the micrometre

A team of scientists at the University of Freiburg have succeeded in producing high-resolution pictures of animal brain cells. The equipment they are using weighs a good 17 kg, has to be moved with micrometre precision and needs to take pictures from different distances in rapid succession – all without exhibiting any camera shake. It took the team a great deal of improvisation with the item building kit system before they finally developed a camera mount that satisfied these requirements.

Dr. Clemens Boucsein works in the Department for Neurobiology and Biophysics at the Institute of Biology and is part of a team with five other postgraduates from the University of Freiburg that is studying the impact of network activity on neuronal cell physiology. Besides taking pictures of stationary microscope slides with permanent mounts, the team also has to photograph test animals that

are not always in the same place on the operating table. As a result, the combined microscope and camera, which weighs 17 kg, needs to be as flexible and easily manoeuvrable as a dentist's light. Given the cost of the camera, buying two was not an option.

Fortunately, the head of the department's workshop is a very practical problem-solver – and one who is familiar with item. Mr. Schächtele has many years of experience in building frames, supports and mounts for a whole variety of test structures. Before he came across the versatile item MB aluminium profile building kit system, cutting and welding steel tube systems was his only option. Today, having built up several years of experience with item, he is only too happy to admit that the slightly higher material costs for item products are entirely justified. The versatility of the building kit system from item saves a great deal of



Users:
Research institutes, universities

Sector:
Neurobiology, microscopy

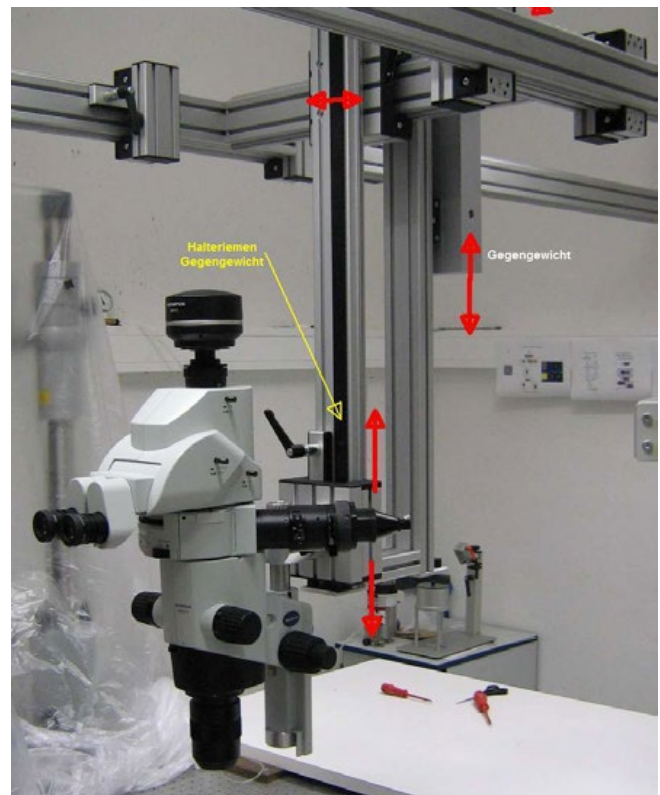
www.uni-freiburg.de

work and stress and, in many cases, offers the simplest solutions. After some years of working with item products, he knows the various product lines and the diverse range of accessories very well and his own stock of parts also enables him to build the necessary structure quickly.

Versatility that enables improvisation

The scientists and workshop team sat down together to sketch out a design for the microscope camera mount and, after paying a visit to get to grips with the task at hand, a member of the item sales team took up the challenge. The relevant components were ordered and quickly delivered in kit form. The ceiling mount made of MB profiles was installed in next to no time and the mobile camera was almost ready for use.

Measuring three metres long and 90 cm wide, the mount reaches far into the lab from one side of the room. Moved by hand, the device's mount glides smoothly along lateral profiles and is locked in place using clamp lever screws. Adjustments that are accurate down to the micrometre range are taken care of by precision drives supplied by another German manufacturer. The biggest challenge



The ceiling construction reaches from one side of the room to above the operating table.

was getting the heavy microscope and camera to move a few micrometres and stop, without shaking. The guides had to be both easy-running and stable. What's more, because the high-precision motors were unable to carry

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The 17 kg microscope camera is mounted on item profiles.

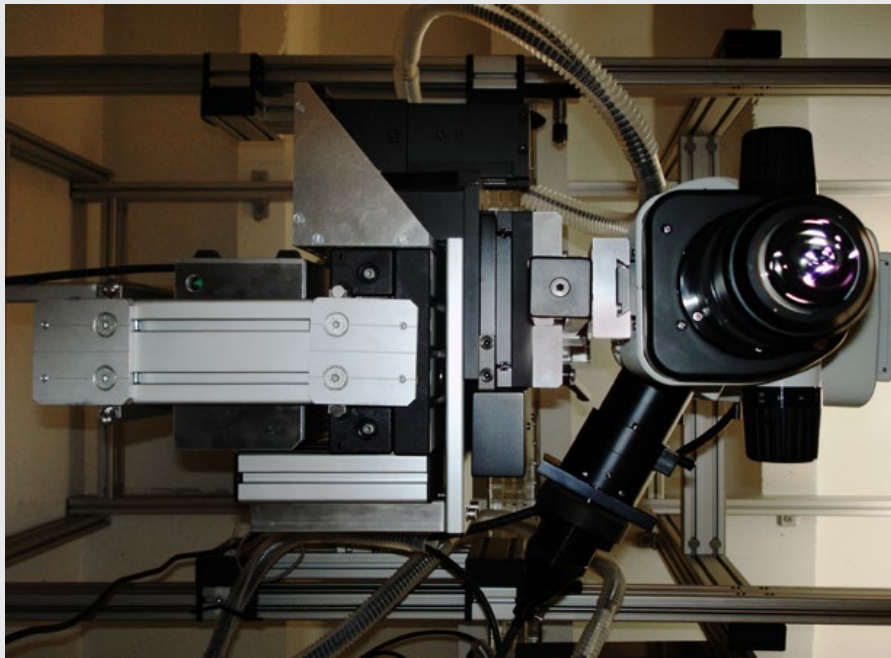
the full weight of the camera on their own, Mr Boucsein and Mr Schächtele had to build a counterweight to balance out and stabilise the camera. "First, we had the

weight running via a timing belt," recalls Boucsein. "Later on, we started using climbing ropes, which have enough elasticity to absorb juddering movements. item components enabled us to do all of that." However, there were still problems with recoil vibration when the mount was brought to a halt. Initially, an improvised guide was used to keep the microscope on track and thus sufficiently stable: "The parts were easy to attach to the item building kit elements and we were able to fit them precisely where we needed them, without having to plan everything out first."

The monitor used to provide visual stimulation for the test animals also had to be suspended from the ceiling. It was important that it could be secured at the right angle to the animal, but would not be in the way when out of use. Clamp Profiles from item were used to design and implement a solution in next to no time.

Making research possible

Although magnetic resonance tomography systems such as MRI scanners offer a non-invasive means of producing images of organs, the photographs from a microscope camera have a much higher resolution. Instead of depicting brain structures with 1 mm pixels, a combination of



A view from below, looking into the lens of the microscope. The ceiling mount can be seen in the background, running from left to right into the room.

a CCD camera and microscope lenses can yield richly detailed images of individual nerve cells in resolutions down to the micrometre range. As a result, the lab in Freiburg is producing images that are leading to groundbreaking discoveries in brain research. The microscope camera was financed as part of the Bernstein Center Freiburg's funding package with funds from the German Federal Ministry of Education and Research.

Although he is a scientist, Boucsein is anything but a dry theoretician. Reporting on the design of the mount and the search for the perfect solution, he speaks with great passion for customised technical solutions that deliver precisely the desired result. The versatility that the item MB Building Kit System offers is exactly what is needed when trying to meet the type of highly specific requirements that are typical of research work. He is also very pleased that, no matter how much improvisation was involved, the constructions built with item profiles always looked professional.

item und the University of Freiburg – partners for creative solutions

LINKS

Further information about the University of Freiburg:

www.uni-freiburg.de

Product information about the MB Building Kit System:

www.item24.de



item Industrietechnik GmbH
Friedenstrasse 107-109
42699 Solingen
Germany

Tel.: +49 212 65 80 0
Fax: +49 212 65 80 310
info@item24.de
www.item24.de

Press contact:
Maik Rico y Gomez

item Industrietechnik GmbH from Solingen, Germany, develops and supplies the MB Building Kit System, a system which enables customised solutions for all aspects of industrial factory equipment engineering. The Building Kit System is based on aluminium profiles, carefully coordinated fasteners and versatile functional elements.