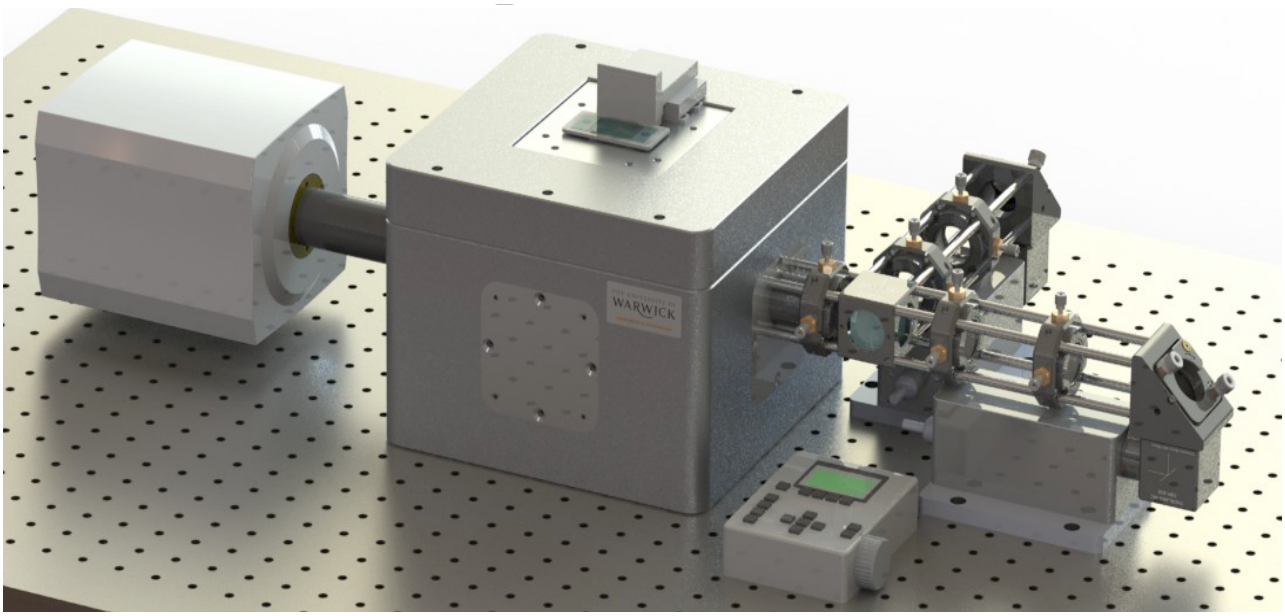
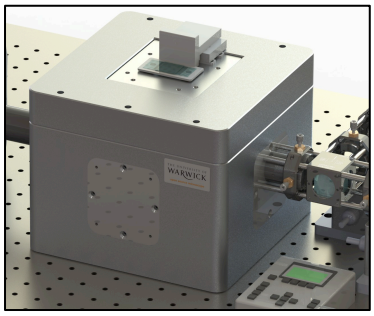
WOSM



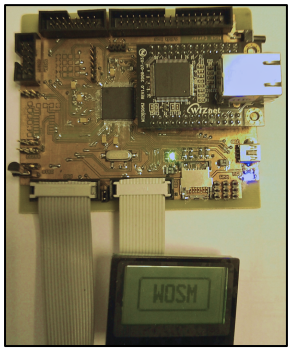
Our story: Early in 2010, we began design and development of a radically innovative, ultra-stable, ultra-bright, modular optical microscope. We quickly realized the designs could be very widely useful, and decided to make the project open source. The Warwick Open Source Microscope is the result. Our vision is of a **WOSM** user-developer community that will share expertise and collectively solve problems in advanced optical microscopy, using open source hardware and software.

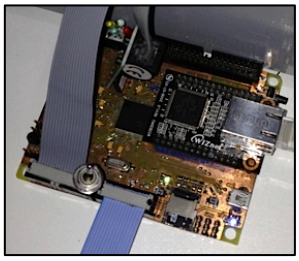
WOSM Optical Block: The core of the WOSM is its optical block, a monolithic chassis that is CNC machined from solid aluminum and weighs ~20kg. Each block is tapped to accept a single plan apo high resolution objective, which screws permanently into the block so that the block and the objective lens of the microscope become a single monolith, giving unprecedented physical stability. The WOSM block is also tapped to accept standard Thor Labs 'optical lego' so that users can customize input and output pathways by building on to an extremely stable, perfectly aligned core that houses the objective, nanostage, and dichroics.



The ***WOSM illuminator*** is based on the LED illuminator that Nick Carter designed for our single molecule optical trap (Carter & Cross, Nature 435 308-12, 2005).

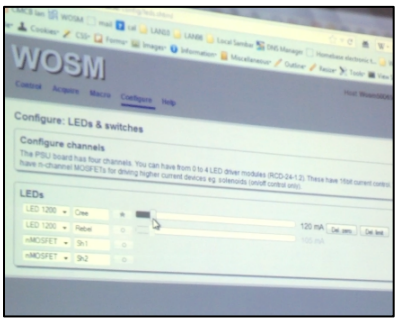
Our original microcontroller for the illuminator has been completely redeveloped to produce the ***WOSM microcontroller***, a remarkable piece of work that resembles the Arduino open source microcontroller (http://www.arduino.cc/). Our microcontroller is faster, but its most revolutionary feature is its control scheme. On startup, the microcontroller logs on to the internet, and thereafter can be commanded remotely from a web browser anywhere on the internet. This allows remote control of nanostage motion and a variety of WOSM-specific filter wheels, shutters, dichroic sliders and other actuators at an arbitrary distance from the microscope. It also allows the firmware of the microcontroller to be remotely updated without user intervention.





The ***WOSM powerboard*** is a powerful and flexible controller for an ATX power supply that can drive programmable laser and LED illumination,

The WOSM ***web browser interface*** communicates with the microcontroller via a plain text macro language that Nick has also written. This language allows users to write programmes for the microscope, switching illumination schemes, detection schemes and X,Y and Z position. Users can share these programmes via the WOSM website (http://WOSMic.org). The microcontroller harnesses and integrates with existing open source libraries (ImageJ, FIJI, Micromanager, OME)



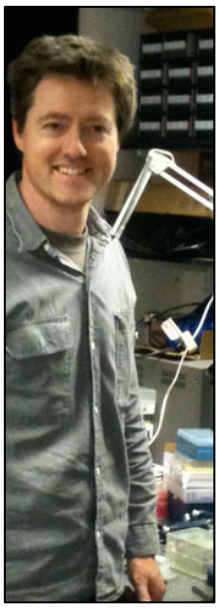

```
ConfigCCD(emCCD1, 20ms, g500, triggered);
TimerSetup(0, 7500);      //timer repeat 7.5s

Do {
  TimerWait;
  CurrentOut(LED1, 700mA);
  TriggerOut(CCD1, high, 1ms);
  WaitTriggerIn(CCD1exp, low);
  CurrentOut(LED1, 0mA);
  loop_count++;
} while (loop_count < 240);
```

The ***WOSM macro language*** allows the microcontroller to communicate with switches, shutter, sliders, filter wheels, stages, cameras, light sources and so on. Users can readily write and share programmes for the microscope and share them via the WOSM website.

Nick has designed the **WOSM parts library** using CAD, and we routinely print these parts using a 3D printer attached to a PC.

All designs will be published, as will all other data on the **WOSM website**, hosted at Warwick and acting as a global hub for our user community.



CONTACT

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More detail is at **http://WOSMic.org**