

Most innovative – you decide

This competition, aimed at providing a platform for budding inventors to showcase their original idea to help move eye care forward, was unknown

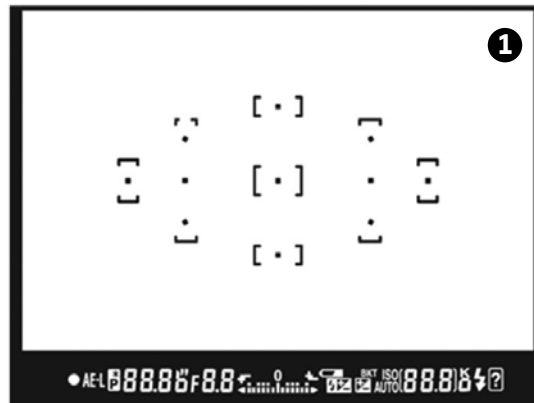
territory and, when the idea was developed between *Optician* and Keeler, there was some concern that we would not have many entries at all. Thankfully, there was quite the opposite result and many entries flooded in over the last few months. Many of these had to be discounted – usually because they were based on an existing instrument or appliance. These ranged from a ptosis prop and an adapted macular pigment screener, to variations on electronic chart displays and digital enhancements of optical instruments. In fact, digital ophthalmoscopes, either via a digital camera enhancement of an existing instrument or by adapting smartphone technology to existing instruments, were perhaps the most popular entries.

When the judges came together last month at Aston University, it soon became apparent that several entries met the winning criteria, in that they were original, would prove useful to the benefit of the patient and/or practitioner, and they would be realisable if it was required for them to be put into production. A final shortlist of five resulted, each with merit and different enough from each other for it to be difficult to say any one was better than the others. We have decided, therefore, to put the final vote to you. Here is a summary of each of the five entries. We invite you to go online and cast your vote for the one which you think should be the overall winner.

● **Finalist 1**
Digital Screen/Viewfinder for Eyepieces
Vadim Pecheriy
Dnipropetrovsk, Ukraine

This is one of a number of excellent ideas from Ukrainian ophthalmologist Vadim Pecheriy. The idea the judges liked best was a digital screen that could be viewed within the eyepiece view of a slit lamp or indirect headset that offered simultaneous information to aid the examination. In his own words: 'As a photographer I know how important it is to keep everything under control, not tearing your eye off the camera viewfinder'. The Nikon

Optician presents the best entries in the Keeler Innovations competition and needs your help to decide on the overall winner. Go to www.opticianonline.net and register your vote for the one you feel should be the overall winner



SLR viewfinder in Figure 1 is an example. 'So it annoys me somehow to get my eyes off the eyepieces to clarify what the slit height or illuminator angle is. I propose to incorporate a digital screen into the optical system of slit lamps (and probably headset BIOs). It would be great to have real-time information just in your field of view.' The sort of information might include level of light brightness, number of bulb working hours, estimated bulb lifetime, slit height, slit width, slit angle, magnification level, eyepiece dioptic correction level, PD and many others. More advanced modifications might include 'focusing and alignment marks, measurement marks (pupil diameter, length/height, angle), topographic marks, and cup-to-disc ratio marks.'

The judges noted that this technology already existed for surgical microscopes so why not optometric instruments?

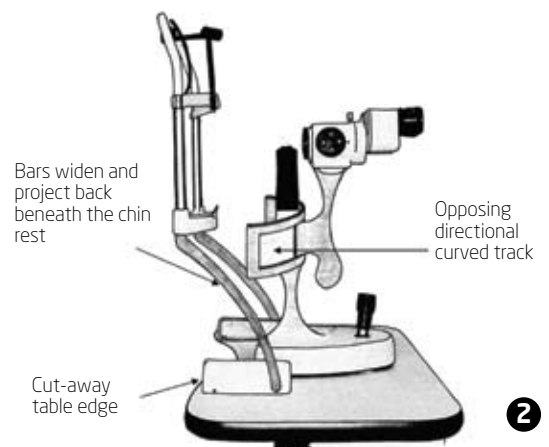
● **Finalist 2**
Opposing Bidirectional Curved Track (OBCT) Slit Lamp
Edwin Shield
Lytham St Annes, Lancashire

Optometrist Edwin Shield has come up with one of those ideas that addresses a real world problem and is simple enough to prompt the question as to why no one else has come up with such an adaptation before.

In a very detailed outline of his innovation, Shield suggests there

are two major design problems with current slit lamps that make examination of the obese, some elderly and disabled patients and some women difficult. Firstly, both the microscope eyepieces and the illumination system pivot in a circular arc around the same focal point, located directly beneath the focal point of the eyepieces and illumination system. This protrusion presses into the patient's chest, and stops them from approaching close enough to correctly position themselves on the chin rest and head rest. Secondly, the bars below the chin rest project straight down and connect to the table at the front edges, between the table top and the patient. These bars make it difficult for a patient whose chest protrudes forward to get their head close enough to correctly position themselves on the chin rest and head rest.

Figure 2 shows Shield's sketch for a prototype slit-lamp that addresses these drawbacks. A cut-away table and widening of the chin rest support bars are simple but effective. The innovation that most impressed was the removal of the pivot that impacts on so many chests. 'Having the microscope eyepieces and the illumination system run along a curved track whose centre of curvature is at the focal point of the microscope eyepieces and the illumination means the protruding pivot point can be removed without affecting the abilities of the slit lamp.'



The curved track would locate the illumination system on its inner surface and the microscope eyepieces on its outer surface, allowing both to move and pass each other just as they do with current traditional designs.'

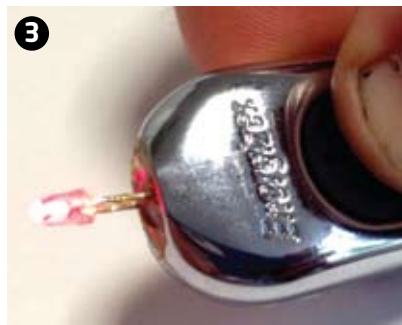
Judges were impressed by both the simplicity of the idea as well as the real-life benefits of the design. A very detailed application concerning a very useful product.

● **Finalist 3**
The Pocket Meiboscope
Stephen Meynell
Liss, Hampshire

The significance of the meibomian glands in secreting the surface lipid layer of the tears to reduce loss through evaporation is something all eye care practitioners are aware of and assessing the patency of the tears and the structures that affect them is an important part of practice. There are currently a number of instruments being introduced by various instrument manufacturers that allow the glands to be assessed by way of an infra-red image which can then be analysed by the appropriate software manipulation of the image. As these are adaptations to existing imaging systems, they are expensive.

After reading the TFOS Meibomian Gland Report (IOVS, March 2011), optometrist Stephen Meynell was left in no doubt as to the importance of the contribution of the meibomian glands to dry eye. He continues: 'However, there are no simple meiboscopes on the market to use and gain experience. Yet, over the next few years the report predicts that meiboscopy will become mainstream and important. Gland disorganisation and drop-out is still being understood, and is known to relate closely to dry eye symptoms and auto-immune disease. Many ideas were trialled. Then I hit on the simple keyring torch meiboscope. Used to invert and illuminate the lower eyelid, this is a great way to see the meibomian glands as dark masses within the eyelid. Slit-lamp magnification can be varied as desired.'

His Pocket Meiboscope (Figures 3 and 4) was created by simply combining an 80p LED with a key ring torch (£3.90 from Amazon). The judges liked the simplicity of the gadget, the potential usefulness, but felt there might be little commercial viability and, furthermore, it may be, as a medical device, somewhat stifled by regulatory requirements getting it onto the market. Still a good idea.



● **Finalist 4**
The Angle Cam
Rob Jones
West Parley, Dorset

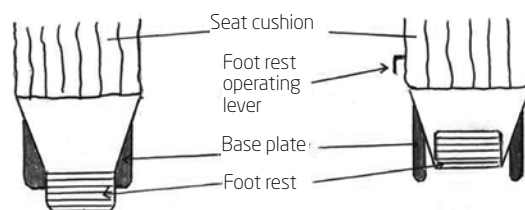
This finalist idea may appeal to all those out there brushing up on their gonioscopy. The AngleCam, suggested by optometrist Rob Jones, 'enables 360 degree panoramic photographic documentation of the anterior chamber angle. The package consists of a modified gonio lens and software package, and could be used with existing slit lamp imaging systems. It utilises a conical mirrored gonio lens, an ordinary imaging slit lamp or bespoke imaging set up, and a software package that unravels the conical image to produce a repeatable visual documentation of the anterior chamber angle in a linear block, with the quadrants indicated in the familiar TSNIT way.'

Included with the submission were the original sketches from the 'brainstorm' session when Jones first thought up the idea. Figure 5 shows the adapted 'gonio' lens with the mirror in place, Figure 6 the slit-lamp view through the AngleCam. The judges felt this was a novel idea and probably doable at not too much cost – 'He has sketched out his idea well and even developed some trial units using funnels and foil.'

● **Finalist 5**
Adapted Chair
Simon Webster
Sherborne, Dorset

Simple is often best, and our last finalist has suggested another adaptation of an existing design which should benefit many patients. Simon Webster is aware that most examination chairs have footrests which hinder those with walking difficulties. 'Elderly people, of whom we see many in practice, often shuffle and can find considerable difficulty when approaching the examination chair. Having reached the chair, there is a footstep attached to the chair to surmount, which even when moved out of the way, the small step formed by the base plate of the chair will present problems.' Webster's simple idea (Figure 7 shows a prototype sketch) is to have a footplate that may be easily flipped out of the way by the practitioner while, underneath, the base plate is re-profiled to remove any protruding step which might cause discomfort to the patient. ●

Plan view of patient examination chair



Present design: Requires 'foot rest to be lifted by lifting the foot rest itself. Chair base plate obstructs patient's feet when approaching the chair and turning around to sit

New design: Foot rest up/down position operated by lever. Base plate re-profiled to allow patient's feet not to be obstructed when positioning to sit on the chair