



FABtimes

MiniFAB (AUST) Pty Ltd Newsletter
Edition 2, December 2009



We would like to take this opportunity to wish you and your family a joyful festive season and continued success throughout the coming year.

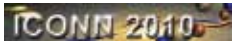
- From the MiniFAB team

Upcoming Events:

Visit MiniFAB's booth at LabAutomation in Palm Springs
Jan 23 - 27, 2010



Hear MiniFAB CEO Erol Harvey speak at the ICONN conference in Sydney
Feb 22 - 26, 2010



MiniFAB's business is the design, development and manufacture of real world solutions and products using polymer, micro and nano manufacturing technologies. Our unique design for manufacture approach enables the simplified fabrication of products. Working from our ISO 6 and ISO 7 clean rooms, our rapid turnaround development tools and diverse range of expertise and knowledge enable us to demonstrate and prove design concepts faster than anybody else in the industry.

CEO Update



"Every one of your design engineers should talk directly with a client!" That was the advice given by Finn Helmer, Danish serial entrepreneur, at the other important conference held in Copenhagen

this year. I refer, of course, to the Commercialisation of Micro and Nano Systems Conference. The other key message in Finn's talk was that you can motivate your staff to do amazing things by inspiring them to be the best in the world. These two messages easily resonate with MiniFAB where you talk directly to our engineers and they work directly with you. And about being the best in the world? Well, we constantly test ourselves on this one and are pleased with the outcome. My talk at that conference was about "Frogs and Princesses - working in the no man's

land between Universities and Industry". The talk was so well received that I have been asked to give a repeat at the ICONN meeting in February in Sydney. The talk is about what we do; working with researchers in industry and academia to fast-track innovation and develop amazing products. Ideas for solutions to design problems come from many different sources and from many different industry sectors and one of the fun things about what we do is to be able to translate learnings from one field into solutions for another. For example our work in food packaging helps us solve problems for biosensors. It is fun to work with other bright people to solve big problems. One such project that has been recently announced is our work starting with Monash University to develop an implantable array for the visual cortex to restore vision to blind people. What bigger goal could the team have set themselves and how amazing will be the outcome? Talk to us about your challenges and let our engineers work with you to do amazing things.

- Erol Harvey

Bionic Eye in sight

Senator Kim Carr, Minister for Innovation, Industry, Science and Research announced this week that Monash V1sion was successful in their bid for the ARC grant to develop the Bionic Eye.

Monash V1sion's group of experts (see picture) comprising of commercial partners MiniFAB and Grey Innovation, Monash University and the Alfred Hospital will work together to deliver a cortical implant that will stimulate the visual cortex, and restore lost vision.

"The Australian Government's investment will help us to give and restore sight to thousands of people around the world," Senator Carr said on Tuesday.

"MiniFAB is very excited to be a part of this team, working towards achieving the amazing goal of restoring sight," said MiniFAB CEO Erol Harvey. Monash V1sion's proposal will provide a treatment for 90% of cases of lost sight. By implanting a device into the visual cortex of the eye,

any remaining sight will be enhanced rather than replaced.

An external camera will capture images, which will then be processed and transmitted to the implant. The implant will then decode the signal and stimulate specific electrodes in the brain, which will effectively create vision.

"We are delighted to have been given the financial backing to develop this concept with our partners," said Monash University Senior Deputy Vice-Chancellor & Deputy Vice-Chancellor, Research Professor Edwina Cornish.

MiniFAB's microtechnology expertise will be used to design and manufacture key implantable components such as the high-density electrode array, high-density ceramic feed-through and connectors.

The Monash V1sion proposal will receive \$8m from the Australian Research Council's Research in Bionic Vision Science and Technology Initiative, a program that came out of the Australia 2020 Summit

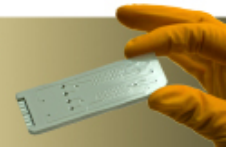


in 2008.

Senator Carr went on to say that the development of the bionic eye will ensure that Australia maintains its position as a world leader in bionics.

This is another recognition of MiniFAB's team and its expertise in applying microtechnology solutions to medical implants.

- Kate Wilkinson



Connecting your product

Whilst most of the effort in microelectronics, or MEMS, often goes into the development of highly intelligent silicon based devices, some of the biggest challenges arise when these IC's are ready to be integrated into devices. Particularly during prototyping of devices the challenges include placing a die in an environment compatible with the intended application or testing, and making electrical connections to the die and to the instrumentation that it must communicate with.

MiniFAB offers a range of electronic pack-



aging services to allow connection between a carrier substrate and your sensor, MEMS device or Integrated Circuit. Starting with the carrier itself we can advise, design and source suitable platforms to interface to your components. Over the last few years we have been routinely placing 200µm square dies onto flex circuits with 5µm positional accuracy using die attach equipment. Not bad for semi-manual process. The bond can then be made using an epoxy or solder. Electrical connections are made between the die and the carrier by wire bonding, where wires (gold or aluminium) as small as 18µm in diameter are used to create wedge or ball type connections. As few as 1 wire per die may be needed or, like some of the more challenging projects we are undertaking at minute, several hundred bonds per device. And if the number of bonds itself isn't challenging enough, these connects are made onto pads no larger than 100µm x 100µm.

The composition of the metal bonding pads on both the device and carrier is crucial to wire bonding success and contact-

ing us for advice as early in the development process as possible is recommended.

Once a device has its electrical connections to the outside world the final part of the packaging solution is to ensure that the relevant components are either protected from or exposed to the necessary environmental factors. The dies and wire bonds can be partly or fully encapsulated, and the whole device can be housed in a package compatible with applications such as microwave, optical, vacuum, structural monitoring, medical, and other sensing devices. We are also able to offer a suite of supporting processes including stenciled epoxy attachment, epoxy encapsulation, bond pull testing and QA metrology. Protection of components by parylene coating is also available on-site.

We specialise in prototypes, small production runs and one-off manufacturing of devices with unusual or challenging design constraints. With MiniFAB as your service provider you gain access to highly trained staff with a strong, international background in the electronics-packaging field.

- Matthew Solomon

Metal tooling by Electroforming

Robust electroformed nickel tools preserve delicate microfeatures and facilitate easy transfer to common manufacturing techniques, avoiding the inherent time, cost and material problems of other micro-fabrication processes such as laser micro-machining and photolithography. Electroforming has become a key capability for MiniFAB in the development and manufacture of precision micro-devices.

Electroforming is the process where metal parts are "formed" electrochemically from a patterned master. The "formed" tool maintains all the geometries of the original master and is used for subsequent replication processes. Typically, electroformed features are shallow (aspect ratio < 1) with features typically down to a few micrometres in size. MiniFAB has developed a process for the routine fabrication of nickel shims with micro-features >5 µm up to 200 µm in depth with an aspect ratio < 5. These metallic replicas are created using a state-of-the-art, large format electroforming system with the capability

of fabricating nickel shims up to 1m x 1m in size. These shims are typically fabricated in thickness between 0.10 mm and 0.50 mm with a typical total thickness variation (TTV) of <10%. Once a mould has been created, this tool can then be used to generate families of tooling where generations of tools can be copied from the master, or even from subsequent metal copies.

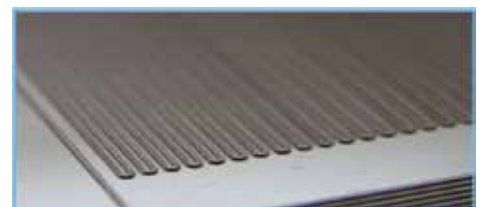
MiniFAB uses this large format system to supply precision tools for perforating plastic film for food packaging applications. Arrays of micro-pins (50-100 µm wide) precisely perforate printed film for a range of product improvements including breathability and easy tear. The fabrication of the initial polymer master (containing the micro-features) and the conversion to a metal master are critical to the performance of this specialised tool.

Other applications such as flat panel displays, printing, solar cells, OVD applications, etc. would be ideally suited to MiniFAB's electroforming service for the

production of nickel shims where the full service from fabrication of the polymer master to delivery of the nickel tooling can be provided.

MiniFAB also offers electroforming services in other metals such as copper, where copper electroplating is typically used to coat surfaces for electrical contact or as a pre-cursor to other processes such as wire bonding. Customised electroforming solutions, such as NiCo or NiFe, have also been developed to meet client specific requirements. More information can be found by talking directly to one of our project engineers.

- Rick Barber



For more information on how our micro and nano fabrication services can be of benefit to you, please take time to view our website or call us on +61 3 9764 2241