



## Photonics and Opto-Electronic Packaging Conference (PoP2) – 23<sup>rd</sup> October 2018

The growth in demand for compound semiconductors driven by the exponential expansion in data centre traffic, wireless technologies, sensors and autonomous vehicles is posing challenges for opto-electronic packaging techniques in order to increase transmission rates and reduce manufacturing costs. The burgeoning opto-electronics industry is responding to these challenges through development of global manufacturing strategies and setting up local clusters of expertise, as demonstrated through the Compound Semiconductor activities centred in South Wales, according to Dr Iwan Davies of IQE, the keynote speaker at the IMAPS-UK organised 2<sup>nd</sup> International Conference “Photonics and Opto Packaging (PoP2)” supported by Torbay Hi-Tech Forum, EPIC and IEEE-EPS and hosted at South Devon College, Paignton on 23 October 2018.

This summit was attended by leading players from industry and research in photonics and opto-electronic packaging. PoP2 covered a diverse range of topics, including: packaging directions, technology developments, developing applications and advanced manufacturing technologies. The Torbay area is the focus of opto-electronic industry within the UK and ambitious plans were described to elevate the area to attract new and established companies.



### Packaging Directions:

Andy Longford of Panda Europe described the status of optical and electronic packages covering QFN, CSP, SiP, WLP, TSV, Flip chip and embedded device packaging. The profusion of different packaging options is challenging the established routes for manufacture; for example, wafer level packaging is generally carried out at the semiconductor foundry and embedded device packaging takes place at the circuit board level.

Bob Musk of Entroptix Ltd plotted the history of opto-electronic packaging and the growth of the monolithic photonic integrated circuit (PIC). He highlighted that the current assembly, test and packaging costs accounted for up 80% of the overall unit costs. The need to reduce overall costs has led to research into the development and adoption of common building blocks, with the added complications of integrating micro-optics, electronic components and thermal management. The packaging challenges are being tackled through a variety of approaches including improving the performance and efficiency of silicon photonic modules and creating generic packaging platforms to standardise designs.



### Technology Developments

Chris Bailey of the University of Greenwich described a programme of work undertaken to model flip chip assembly of focal plane arrays in order to predict the accuracy needed for flip chip assembly alignment for compression and reflow bonding of micro indium bumps down to pitches of 12 $\mu$ m. Simulations also were carried out to predict the performance of the micro-assemblies in thermal cycling.

Dr Yang Liu and Claire Pearce of the Plymouth Electron Microscopy Centre, University of Plymouth presented an overview of their recently established electron microscopy capability (particularly 3D imaging and analysis), which can be used for failure analysis and quality control of micro-electronic and optical devices.

### Developing Applications

Dr Philip Mitchell of Effect Photonics traced the evolution of Photonic Integrated Circuits for application in data transmission and the requirements for 5G networks. Transceiver products have been developed for commercial telecommunication networks and system architectures.

Glenn George of Bay Photonics outlined the packaging and assembly capabilities available for optical and electronic components and highlighted a forthcoming initiative to reduce the cost of packaging (LoCoPack) through standard building blocks to enable low cost proof of concept and prototyping.



Thomas Danger of FiconTEC saw the key to solving the packaging cost issue through automated equipment, adapted specifically for photonics assembly requirements, including 6 DOF motion equipment with sub-micron accuracies and machine vision.

### Advanced Manufacturing Technologies

Ana Gonzalez of EPIC gave an overview the PIXAPP programme, where a distributed pilot packaging line for the design, manufacture and test of photonic circuits has been created in order to bridge the gap between photonics design and achieving volume manufacturing.

Nicolas Boyer of IBM Bromont Canada presented details of several packaging developments to improve the performance of fibre connections and reducing manufacturing costs in silicon photonics applications.

Joe Gannicliffe, Head of Photonics at the Compound Semiconductor Applications Catapult Centre described the current activities to tackle industry challenges for high energy densities and precision assembly in photonics, sensing, RF/microwave and power electronics as an open access facility.



The attendees also had the chance to meet leading industry supply chain members who provided a very worthwhile exhibition of equipment, materials and solutions, to enable delegates to network during the refreshment breaks and find new sources of supply. This conference was very well received and it is hoped that many of the developments discussed will be made available for a repeat event in the near future.

For further information, please visit IMAPS-UK ([www.imaps.org.uk](http://www.imaps.org.uk))

This event was supported by:



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