The Inkjet Conference, under the title TheIJC, organised jointly by ESMA (European Specialist Printers Manufacturers Association) and Steve Knight from Direct Digital Technologies, was held in Dusseldorf on 24-25 October. The event brought together 525 delegates from 23 countries, in what is now the largest conference devoted solely to inkjet printing technologies. TheIJC covers the complete range of applications in all industries and brings in speakers from all sides of the inkjet printing industry – digital print machines, print heads, software and chemistry of both inks and media surfaces and provides an ideal and exciting venue for cross-fertilisation of ideas.

This year, there were 62 lectures broken up into two plenary sessions on both days (concentrating on print head technology and new developments) and three parallel technical tracks over the two days of the conference. Presentations specifically on digital textile printing were only six in total, however, there were considerable developments in print head technology and ink and media chemistry, which could well have direct impact on digital textiles, particularly new print head technology. An excellent feature of the conference was the table top exhibitions, which this year numbered 87 companies and research organisations, which gave invaluable opportunity for networking and further follow-up discussion with many of the presenters.

Peter Buttiens, CEO of ESMA, said: “TheIJC has been an enormous success. In four years, we have almost doubled the number of presentations and more than doubled the number of table tops, with 36 new table tops..."
this year. In addition, 74 new companies sent delegates this year, with 195 new attendees. "The number of exhibitors and delegates bring together so many possibilities. The level of presentations was exceptional. We have been re-inventing TheIJC every year. We have 40% new exhibitors, and they bring new subjects and we have 60% more delegates. This is the platform for inkjet."

As there was so many technical presentations, it is impossible to cover them all in this brief review, I would just like to highlight two areas; print head developments and pigment ink and pre-treatment developments, which are particularly relevant to digital textile printing.

The conference plenary sessions, over the two days, focused on print head technology and developments from many of the major print-head manufacturers, including the major piezo print head manufacturers Kyocera, Seiko Printek, Fuji Dimatix and Xaar, and together with presentations from Kodak with its Stream and UltraStream continuous print head technology and Hewlett Packard (HP), with thermal print head developments and, gave an up to date picture of the current state of developments.

**Print heads**

As discussed many times in *Digital Textile*, the key driving force in the market expansion of digital textiles has been print head developments, enabling production levels, quality and operability performance to constantly improve. The main print heads used in digital textile printing are based on piezo drop-on-demand (DOD) technology and is now used in all new digital textile print machines introductions. The introduction of the Kyocera KJ4B series print heads in 2009 and its installation in single pass (fixed print head array) print machines by MS and high production scanning machines by both EFI Reggiani and MS, has given the Kyocera KJ4B print head a dominant position in production volumes in the digital textile printing industry.

Figure 1 gives an overview of the global print head market share in digital textile production volume terms, based on the analysis by WTIN Intelligence: Digital Textiles in 2016. Figure 2 gives an update on the specific print heads used in a range of typical digital textile printing machines.

With the current volume of digital textiles (~1.57 billion in 2016 according to WTIN Intelligence: Digital Textiles), the market looks ever more attractive, in terms of both print head sales, machine sales and ink volumes.

For the digital textile print industry to continue its expansion, the key is the on-going developments in print heads. It will be interesting to watch the major piezo print head manufacturers, who are successful in other digital printing industries, such as the signage, graphic, ceramic and corrugated printing industries, whether they can increase their market share with new head developments, or will Kyocera keep its number one market position, with on-going developments in ceramic print head technology?

Shin Ishikura of Kyocera, presented a very comprehensive overview of bulk piezo ceramic technology, going into great detail of the manufacturing processes, particularly the current Kyocera ceramic sheet approach and comparing this with Silicon MEMS production methods. Shin Ishikura, illustrated this with the evolution of the company’s technology, which has led to second-generation print heads and further future developments (see Figure 3).

Shane O'Neill of Fuji Dimatix gave an equally impressive technical presentation of the advances in the other major print head technology approach, Silicon MEMS technology, and how it could lead to the next generation of print heads. Fuji Dimatix provide Silicon MEMS print heads to the digital textile industry, with its StarFire1024 print head and the Samba G3L print head,
established in SPG’s Archer technology found in the Pike single pass machine and Javelin high production scanning machine. The next development described by Shane O’Neil is a new version of the Samba print head termed the Samba GSM print head, a very recent introduction announced in June 2017. This print head has been developed specifically for scanning type applications and will complement the Samba G3L head. It will be interesting to see whether the digital textile printing industry will be a priority target market for the Samba GSM head.

Angus Condie of Xaar gave a presentation on Xaar’s high laydown (HL) technology, which has been developed for the printing industries and used for braille and 3D Printing. The HL technology operates in multi-drop binary mode, which enables three times the amount of ink to be deposited using the Xaar 1003, Xaar 2001 and Xaar 501/2 print heads. However, there was no mention of any textile application, although it could be interesting for certain textile printing applications, where high ink volumes are required.

Subsequent to the conference, Xaar announced that its 1201 print head, introduced at Drupa 2016, and based on thin film Silicon MEMS print head has been used for the first time in a digital textile application. The new d.gen printer, the Papyrus 740K, uses the 1201 head and was shown printing disperse dye sub inks at the KOSign show in Korea in November 2017.

Chemistry

On the chemistry side and specific to textiles, there were a number of interesting presentations examining the textile pigment area and pre-treatment technologies.

Dr Hamid Shiraz of Fuji Imaging Colours, presenting a range of textile inks, but in particular a range of digital textile pigments based on RxD pigments, manufactured at its UK plant, which uses interesting reactive dispersant technology, where a polymer network surrounds the pigment giving dispersion stability. The formulated textile pigments termed Pro-Jet TX.
421, claim to have high fastness levels and proven design for high-speed single pass jetting.

Other presentations highlighted encapsulated pigment approaches for digital printing, for example from Matsui of Japan. J Martinez and Daisuke Hamada of Kao Chemicals, described another approach to encapsulating pigments, although not specific to textiles. The technology was initially developed for digitally printing polyester films although it would be interesting to examine the Kao Chemical encapsulated pigment ink approach on textiles.

Additionally, there were two presentations on textile pre-treatments from Brad Riley of Lubrizol and Helmuth Haas of CHT Germany. The presentation by Dr Haas was extremely interesting as it was the first presentation which has examined in detail, the two stages in the preparation of textiles for digital printing, ie PFP (prepared for printing) and PFDP (prepared for digital printing), first defined in Digital Textile. Dr Haas, used both Lab colorimetric values and ISO fastness standards to quantitatively assess the results of his evaluations of pre-treatment chemicals, used in the both the initial PFP stage and the second PFDP stage. His results clearly showed that both stages must be evaluated and carried out efficiently for optimum final digital printing performance.

As discussed previously in a recent article in Digital Textile, digital textile pigment printing volumes are still small in the roll-to-roll area, at most only in the region of 3% of the global digital textile printing market. However, with considerable research efforts currently focused on this area, in both pigment dispersion and pre-treatment technologies, there could well be new technology introductions in the near future.

The complete set of presentations will be available from the organisers. TheIJC is taking its conference concept to the USA on 12-13 April 2018 at the Westin O’Hare Chicago, with over 50% of the table tops already booked. TheIJC will return to the Swissotel, Düsseldorf on 15-17 October 2018 and a call for papers and table top booking is now open. For more details, please contact info@theijc.com or contact ESMA.

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