A letter from the Editor

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Dear Readers,

With this closing issue of Volume 13, we round off a year that has powerfully demonstrated how print and media technology continues branching into new functional domains while refining its classical strengths. The three peer-reviewed articles collected in this issue reflect that dual dynamic of process insight and function integration.

The first article in this issue, titled "Development of a 3D-Formed and Thin-Film Back-Lit HMI," by Gunter Hübner, Katrin Mayer, Wolfgang Kaefer, and Klaus Schmidt (Hochschule der Medien – IAD; Marquardt; Motherson) charts a decade-long, tri-project journey. It begins with screen-printed capacitive and piezo sensors on transparent polycarbonate, moves through thermoforming and overmoulding, and culminates in the integration of electroluminescent layers and innovative varnish-suspended micro-LEDs. The review offers both a state-of-the-art map and a technology roadmap for seamless, lightweight user-interface surfaces in automotive and consumer devices.

The second paper, "Optimization and forecasting models of the sublimation printing process on textile materials" by Vyacheslav Repeta, Yurii Petriv, and Yurii Kukura (Lviv Polytechnic National University), applies Taguchi design and fuzzy-logic modelling to transfer printing. Their analysis reveals temperature and substrate absorbency as the dominant factors for optical density. The authors' fuzzy knowledge base then forecasts CMYK density with remarkable accuracy, laying a data-driven foundation for tighter control of colour in high-throughput textile lines.

The final paper of this issue, by Cecilia Rydefalk, Sofia Thorman, Anton Hagman, and Artem Kulachenko (KTH Royal Institute of Technology / RISE Research Institutes of Sweden), is titled "Separating the Effects of Maximum Pressure and Printing-Nip Length on Flexographic Print Quality." The authors devised the use of a lab printing press to decouple peak pressure from nip length, performing controlled load cases to study their independent effects. Printing was done in solid tone and halftone, with results evaluated for mottle, density, and dot gain. They found that increasing the maximum pressure boosts color density. Conversely, increasing the nip length at a fixed maximum pressure slightly decreases colour density, a change attributed to an alteration in the ink split point. This nuanced finding offers direct implications for packaging printers aiming to optimize both coverage and mottle control.

Together, these studies remind us that scientific rigour – whether carried out with precision sensors, extended matrices based on Design of Experiments, or rule sets derived from artificial intelligence – remains the clearest path to reliable industrial application.

Our Topicalities pages, expertly compiled by Markéta Držková, survey the latest standards, as well as progress briefs from Fogra's Print 4.0 research programme.

The Bookshelf highlights, alongside monographs on printed electronics, textile functionalisation, and immersive-media workflows, three AI-centred volumes – Artificial Intelligence in Manufacturing: Enabling Intelligent, Flexible and Cost-Effective Production Through AI; Artificial Intelligence in Manufacturing: Applications and Case Studies; and Intelligent Fractal-Based Image Analysis: Applications in Pattern Recognition and Machine Vision. Three freshly defended doctoral theses then round out the panorama of emerging scholarship.

We also mark the passing of Dr. J. Anthony Bristow, honorary member of iarigai and former Technical Editor of Advances in Printing Science and Technology, who died on 7 June 2025 at the age of 93. Less than two years ago, in Vol. 12 No. 3 (2023) in this Journal, Tony contributed the position paper "What about the surphase?"– a concise but insightful plea for distinguishing a material's surphase from its mathematically defined surface layer, which powerfully illustrates his unceasing dedication to precision in paper science and scientific terminology. Tony's insistence on meticulous peer review and clear scientific English laid much of the groundwork on which iarigai publications, including this Journal, still rely. We dedicate the present issue to his memory.

Looking ahead, I encourage you to join the iarigai annual conference in Pardubice, Czech Republic, from 2 to 5 September 2025.

My heartfelt thanks go to our authors, reviewers, and editors – and to you, our readers – or another year of rigorous exchange. Your curiosity and critical eye keep the field vibrant.

Wuppertal, June 2025

Daniel Bohn