Transactions on Additive Manufacturing Meets Medicine
Trans. AMMM, 2026, Vol. 8, No 1, Suppl. 1, Article ID 3077, 1 Page

Infinite Science Publishing

Industrial Keynote

From individualization to industrialization – via 3D printed implants

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Additive Manufacturing is transforming the medical implant industry from highly individualized, labor-intensive production toward scalable, industrialized manufacturing. This presentation explores how recent advances in metal 3D printing technology, workflow automation, and process reliability are enabling both patient-specific implants and serial implant manufacturing to reach new levels of efficiency, quality, and economic viability.

For patient-specific implants, the focus shifts from artisanal production to scalable customization. Automated scan-to-print workflows, combined with first-time-right printing strategies, significantly reduce engineering effort, shorten lead times, and improve reproducibility. At the point of care, simplified manufacturing approaches – Including support-free printing and robust process automation – reduce operational complexity and make personalized implant production more accessible and reliable within clinical environments.

Beyond customization, AM is increasingly becoming a competitive solution for serial manufacturing of implants. The technology enables simplified supply chains, lower inventory requirements, and greater responsiveness to fluctuating market demand through digital production and reduced lead times. At the same time, advances in printer productivity, process stability, and lower-cost platforms and materials, such as EOS Onyx and next-generation titanium processes and powder, are driving down cost per part. These developments position additive manufacturing as a price-competitive alternative to conventional manufacturing methods such as casting, while maintaining the design freedom and agility unique to AM.

The presentation highlights how the convergence of automation, process maturity, and economic scalability is moving the implant industry from individualization toward true industrialization through additive manufacturing.

AUTHOR'S STATEMENT
Conflict of interest: Davy Oyre is an employee of EOS GmbH. Informed consent: Informed consent has been obtained from all individuals included in this study. Research funding: The author state no funding involved.

DOI: 10.18416/AMMM.2026.26063077