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Chair of Integrated Product Design (IPD)

Call for Master Thesis at the Chair of Integrated Product Design (IPD)

AGENTIC PRODUCT DESIGN

Can an AI Agent Design a Physical Product from Idea to Prototype?

Summary

What would AI agents create if they were asked to design a product? Could they balance user needs, aesthetics and functionality the way human designers do? Generative AI has been adopted across many stages of design practice and is beginning to reshape both the design process and the results (Verganti et al., 2020). Recent design research has extended the use of AI beyond single-prompt interaction towards agentic workflows, in which multiple specialized agents collaborate across different stages of the design process. Such workflows have been shown to support problem definition, information gathering, concept generation and evaluation (Liu et al., 2026), and to design domain-specific products such as sustainability-oriented biomimetic furniture (Alevizos et al., 2026).

In this Master thesis, you will conduct a research-through-design study in which you build an AI design agent and let it design and fabricate a physical product of low complexity with your guidance. The design brief will be taken from the IPD course *Foundations of Product Design*, so that both the process and the results can be compared with human-designed outcomes of the same brief. The product has to meet three requirements: aesthetic quality, functionality, and ease of manufacture, so that it can be produced in a small series of more than ten pieces. You will build the agent on Claude AI by selecting appropriate skills and MCP tools and integrating them into the product design process, from user research and concept development to 3D modelling and prototyping.

Throughout the project, you will explore how the product design process unfolds with agentic AI and how the agent performs in the different stages of design. As a result, you will deliver a working AI design agent and a full-size product, and gain a first-hand understanding of the potential and limits of agentic AI in product design. If the outcome of your thesis allows, we will jointly publish the results in an academic design journal or conference proceedings.

Keywords: Agentic AI, Generative AI, Product Design, Human–AI Collaboration

Prerequisites

In order to conduct this thesis at our chair, you need to bring an interest in AI-supported design and relevant skills in product design, such as sketching, engineering drawing and prototyping. Ideally, you have completed the IPD course *Foundations of Product Design* or bring comparable manufacturing skills. In addition, we expect some first experience with Claude, in particular Claude Code and Claude skills, or the willingness to acquire it quickly at the beginning of the thesis. Having your own subscription to Claude or ChatGPT is beneficial. We consider students from design- and engineering-related programs (students from other programs upon request).

Provided Resources

We will support you in gaining access to workshop facilities for prototyping and manufacturing the product. At the start of the thesis, we will provide a brief introduction to building AI agents with Claude AI. The actual thesis will be rather self-directed. We offer 3 personal meetings throughout the thesis progress in a joint colloquium with other thesis candidates, plus on-demand consultations when needed.

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How to Apply

If you are interested in conducting this thesis at our chair, please send an email **to thesis.ipd@ed.tum.de** with reference line **"Master Thesis: Agentic Product Design".** Please state in your email your preferred starting date, your motivation for the topic, and attach your resume and some portfolio samples. Based on the provided materials we will invite you for a first meeting to discuss further.

Key References

Alevizos, V., Gerolimos, N., Georgantzelis, D., & Papakostas, G. A. (2026). A large language model-based multi-agent framework for sustainable industrial design. *Engineering Applications of Artificial Intelligence, 176*, Article 114818. https://doi.org/10.1016/j.engappai.2026.114818

Liu, S., Shen, Y., Zhang, Y., Hou, Z., Wang, X., Luo, J., & Zhang, Z. (2026). iDesignGPT enhances conceptual design via large language model agentic workflows. *Nature Communications, 17*, Article 1997. https://doi.org/10.1038/s41467-026-68672-1

Verganti, R., Vendraminelli, L., & Iansiti, M. (2020). Innovation and design in the age of artificial intelligence. *Journal of Product Innovation Management, 37*(3), 212–227. https://doi.org/10.1111/jpim.12523