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Press release

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Leif-Thore Deck receives EFCE Excellence Award in Crystallization 2026 for studies on liquid–solid phase transitions

Dr. Leif-Thore Deck has been selected as the winner of the EFCE Excellence Award in Crystallization 2026. His doctoral thesis, *Characterizing liquid–solid phase transitions for mechanistic model-based process design*, completed at ETH Zürich, Switzerland, under the supervision of Prof. Marco Mazzotti, was recognised by the award jury for its exceptional breadth and depth, scientific and industrial impact, innovation and dissemination.

Dr. Leif-Thore Deck completed his MSc in Chemical and Biochemical Engineering and his PhD in Mechanical and Process Engineering at ETH Zürich, Switzerland. He currently hold the position of Postdoctoral Fellow in the Department of Chemistry at the University of Cambridge, United Kingdom. He is also affiliated with Queens' College Cambridge as a Rokos Postdoctoral Research Associate.

Dr. Deck's doctoral research addressed three closely connected areas of crystallization and phase-transition science: the stochastic nucleation of ice, the freezing and freeze-drying of pharmaceuticals, and the behaviour of complex crystallization systems.
In his work on ice nucleation, he developed detailed experimental and modelling approaches to quantify the inherently stochastic formation of ice in pharmaceutical solutions. His studies showed that seemingly identical sample containers can produce different nucleation rates and he established methods for accounting for this variability. He also investigated how particulate impurities influence nucleation.
In collaboration with Janssen Pharmaceutical Companies, he studied the freezing behaviour of biopharmaceuticals, including the company's COVID-19 vaccine. His models and infrared thermography measurements revealed how thermal interactions among densely packed vials contribute to batch heterogeneity and can affect the performance of industrial freeze-drying processes. The resulting freezing models were made openly available through the Python package *SNOW — Stochastic Nucleation of Water.*
A further highlight of Dr. Deck's thesis was his work on solid-state deracemization. Through a combination of analytical theory, numerical simulations and experiments, he identified the conditions for deracemization. His work demonstrated that small periodic or random temperature fluctuations can drive the process when crystal dissolution is faster than crystal growth.

The breakthrough promises to facilitate the application of solid-state deracemization in industrial processes and to enable the interpretation of solid-state deracemization as one of the possible natural pathways to homochirality in the pre-biotic Earth.

The award jury described Dr. Deck's thesis as "a truly outstanding and exceptional piece of research" and recognized his work as "both scientifically original and highly influential for crystallization science and pharmaceutical process engineering". The committee highlighted the combination of strong experimental, theoretical and modelling skills with his ability to translate fundamental insights into practical process-design tools. The jury also noted that his work on deracemization challenged widely held assumptions in the field and resolved a long-standing scientific controversy.

Prof. Mazzotti said: "Leif-Thore Deck is exceptional in his scientific talents, teaching effectiveness, interpersonal skills, as well as in his leadership within his research group and in his scholarship within the research community at large.

Supporting his nomination, Prof. Michael F. Doherty of the University of California, USA, wrote: "Leif-Thore's doctoral dissertation is a tour-de-force and ranks among the top handful of dissertations I have read in my long career."

The award was presented during the 23rd International Symposium on Industrial Crystallization (ISIC 2026), held in Budapest, Hungary, from 6 to 9 September 2026. The award lecture was held on 9 September 2026.

Photo: Presentation of the award certificate to Dr. Leif-Thore Deck (middle) by the Chair of the EFCE Working Party on Crystallization, Prof. Daniele Marchisio (right) and the jury member Prof. Kerstin Wohlgemuth (left)

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Related links

EFCE media centre (https://www.efce.info/News)

EFCE Working Party on Crystallization (https://efce.info/WP_Crystallization.html)

23rd International Symposium on Industrial Crystallization — ISIC 2026 (https://akcongress.com/isic2026/)

Notes to media

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