

Juryrapport

KHMW Langerhuizen Oeuvreprijs 2026 – Informatica en wiskunde

Prof. dr. ir. dr.h.c. J.-P. (Joost-Pieter) Katoen

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Professor Joost-Pieter Katoen stands among the most influential computer scientists of his generation and is an outstandingly deserving recipient of the KHMW Langerhuizen Oeuvreprijs 2026. For over twenty-five years, he has shaped the international research agenda in formal methods, with a visionary focus on uniting correctness and performance in the verification of complex systems.

His scientific contributions are both foundational and transformative. Joost-Pieter Katoen is the driving force behind the development of probabilistic model checking, having created automated verification techniques that make it possible to establish (rigorously and at scale) whether hardware and software systems are free of errors, while simultaneously quantifying their reliability and performance. His algorithmic breakthroughs for continuous-time Markov chains and decision processes have become indispensable to modern verification tools. At the same time, he has resolved deep and long-standing theoretical challenges, from open problems in stochastic Petri nets to fundamental questions about termination and runtime complexity in probabilistic programming.

What distinguishes his oeuvre is its rare and powerful synthesis of theory and practice. Joost-Pieter Katoen has not only advanced the mathematical foundations of verification but has also ensured their real-world impact. Together with his collaborators, he has developed a suite of software tools that are used worldwide. Most prominently, the Storm probabilistic model checker has established itself as a field-leading platform, consistently outperforming competitors in international competitions. Through his work, Joost-Pieter Katoen has made a direct and lasting contribution to the engineering of safer cyber-physical systems, more reliable distributed systems, and higher standards in software development.

His influence on education and knowledge dissemination is equally profound. His textbook *Principles of Model Checking* is recognized as the authoritative reference in the field and is used at hundreds of universities across the globe. With thousands of citations, it has educated generations of researchers and students and has been instrumental in defining model checking as a central pillar of computer science.

Joost-Pieter Katoen's service to the scientific community is exceptional in both scope and impact. He has played a pivotal role in shaping the field through sustained leadership in venues such as ETAPS, TACAS, QEST, CONCUR, FM, and LICS, serving as chair, steering committee member, editor, organizer, and invited speaker. Few researchers have contributed so extensively to the intellectual infrastructure of software science.

The many honors he has received (including an ERC Advanced Grant, ACM Fellowship, memberships in the Academia Europaea and the German Academy of Sciences Leopoldina and an honorary doctorate from Aalborg University) are a testament to the international recognition he commands.

Joost-Pieter Katoen is a researcher of exceptional depth, breadth, and vision. His body of work has not only advanced formal verification; it has redefined it. His influence will continue to shape the field, and its societal impact, for decades to come.

Prof. dr. ir. W.M.P. (Wil) van der Aalst, hoogleraar Process and Data Science RWTH Aachen University en het Fraunhofer-Institut für Angewandte Informationstechnik, Chief Scientist Celonis, oud-hoogleraar informatiesystemen Technische Universiteit Eindhoven

Prof. dr. R.J. (Robert Jan) van Glabbeek, hoogleraar informatica i.h.b. formele methoden University of Edinburgh en University of New South Wales

Prof. dr. J.N. (Joost) Kok, vicedecaan Faculteit Mathematics & Computer Science Technische Universiteit Eindhoven, oud-decaan Faculteit Elektrotechniek, Wiskunde en Informatica Universiteit Twente

De jury vergaderde online op 16 maart 2026 onder leiding van KHMW-maatschappelijk lid dr. W. (Willem) Bijleveld. Tevens was ter vergadering aanwezig prof. dr. A.P. (Ad) IJzerman, secretaris natuur- en medische wetenschappen KHMW.