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INVITATION to the Public defence of

Kristof DE SMET

To obtain the academic degree of

‘DOCTOR OF MEDICAL SCIENCES’

**Beyond diagnosis: integrating AI-driven imaging,
laboratory markers, and clinical insights for future
pandemic preparedness**

The public defence will take place on

Wednesday, 6 May 2026 at 5 p.m.

In Auditorium Piet Brouwer

VUB Health Campus

Faculty of Medicine and Pharmacy, Laarbeeklaan 103, 1090 Brussels

and can be followed online, accessible through the following link:

https://gf.vub.ac.be/redirects/PhD_defense_Kristof_De_Smet.php

Summary of the dissertation

The COVID-19 pandemic placed unprecedented pressure on healthcare systems, highlighting the need for rapid and reliable risk stratification tools. This dissertation investigates how chest CT imaging, laboratory data, and artificial intelligence (AI) can be integrated to improve diagnostic and prognostic decision-making in COVID-19.

The first study evaluates the diagnostic performance of the CO-RADS classification system, demonstrating high accuracy in symptomatic patients and a meaningful role in clinical triage. The second study establishes the CT severity score as an independent predictor of mortality, with additional insights into its relationship with vitamin D status.

The third study presents the M3-score, a parsimonious and interpretable model combining age, white blood cell count, and AI-derived CT lung involvement to predict in-hospital mortality, with robust performance across independent cohorts.

Together, these findings illustrate how combining imaging, laboratory markers, and AI enables clinically actionable risk stratification. This work also reflects the evolving role of the radiologist as a clinical integrator and innovation driver in data-driven healthcare.

Curriculum Vitae

Kristof De Smet obtained his MD degree summa cum laude at the Vrije Universiteit Brussel (VUB) in 2006 and completed his radiology training across several institutions, including CHU Brugmann, ZNA Middelheim, UZ Brussel, and UMC Groningen, where he further subspecialized in cardiac imaging. He subsequently obtained a Master's degree in Healthcare Management at KU Leuven.

He is currently Head of the Department of Radiology at AZ Delta General Hospital in Roeselare (since 2019) and Chairman of the Medical Board (since 2024). In addition, he remains clinically active as a consultant in cardiac CT and MRI at UZ Brussel and is involved in the training of medical students and residents as a clinical tutor at VUB.

His professional activities extend beyond clinical practice into governance and innovation. He serves as board member of the Belgian Society of Radiology, the Vlaams Artsensyndicaat, and the RADar Innovation Center at AZ Delta. Within RADar, he actively promotes the "Engineer Meets Physician" (EMP) concept, fostering interdisciplinary collaboration between clinicians and engineers to accelerate the implementation of technological innovation in healthcare.

His academic work focuses on thoracic imaging and the integration of artificial intelligence into clinical decision-making. During the COVID-19 pandemic, he contributed to the validation of structured CT reporting systems such as CO-RADS and co-developed the M3-score, an interpretable machine learning model combining imaging biomarkers, laboratory data, and clinical parameters to predict patient outcomes. His work emphasizes clinically applicable, transparent, and robust AI solutions that bridge the gap between technological innovation and real-world medical practice.