

A portrait of Prof. dr. ir. Marcel Heertjes, a man with light brown hair and a friendly smile, wearing a patterned button-down shirt. He is standing in what appears to be a laboratory or industrial setting with blurred equipment in the background.

**Prof.dr.ir. Marcel Heertjes**  
**March 6, 2020**

**INAUGURAL LECTURE**  
**Everything is**  
**under control**

**TU/e**

**EINDHOVEN**  
**UNIVERSITY OF**  
**TECHNOLOGY**

**DEPARTMENT OF MECHANICAL ENGINEERING**

## **INVITATION**

Prof.dr.ir. Marcel Heertjes was appointed part-time professor of Industrial nonlinear control for high-precision systems at the Department of Mechanical Engineering at Eindhoven University of Technology (TU/e) on February 1, 2019. He will deliver his inaugural lecture on March 6, 2020.

The Executive Board of Eindhoven University of Technology cordially invites you to attend the inaugural lecture of Prof.dr.ir. Marcel Heertjes on **Friday, March 6, 2020, at 4.00 PM**. The public lecture will be delivered in the Blauwe Zaal of the Auditorium. You do not need to register.

The lecture concerns

**'Everything is under control'**

After the lecture, drinks will be served in the Senaatszaal.

All full professors are invited to join the cortège. If you want to join the cortège, please register in advance with the P&P office which organizes all academic ceremonies, telephone +31 (0)40 247 33 02, e-mail: penp@tue.nl.



**Prof.dr.ir. F.P.T. Baaijens**

Rector Magnificus

After March 6, 2020, the text of the inaugural lecture will be available online at [www.tue.nl/lectures](http://www.tue.nl/lectures).

Marcel Heertjes received both his MSc and PhD in mechanical engineering from Eindhoven University of Technology (TU/e) in 1995 and 1999, respectively. In 2000, he joined the Philips Centre for Industrial Technology (CFT) in Eindhoven. In 2007 he joined ASML, Department of Mechatronic Systems Development, in Veldhoven, and also TU/e (part-time) as a visiting scientist. In 2011 he was appointed part-time assistant professor in the group Dynamics & Control as well as the group Control Systems Technology. In 2012 he became part-time associate professor. His primary affiliation is with ASML in the role of principal engineer (since 2007) and control competence leader (since 2012). He served as guest editor of International Journal of Robust and Nonlinear Control (2011) and IFAC Mechatronics (2014) and is currently associate editor of IFAC Mechatronics (since 2016). He is (co-)recipient of the IEEE Control Systems Technology award (2015) for variable gain control and its applications to wafer scanners. His main research interests are with industrial control for high-precision mechatronic systems with specific focus on nonlinear control, feedforward and learning control, and data-driven optimization.

### **About the lecture**

Wafer scanners, whose list prices range from several tens to hundreds of millions of euros, are key tools in the production of microchips. They consist of highly-complex mechatronic systems that together combine high throughput with high precision. Modern wafer scanners expose around 280 wafers per hour. Exposure occurs while tracking a sequence of point-to-point motion profiles during which the specifications of the scanner's motion systems lie in the (sub-)nanometer range. Based on both feedforward and feedback control, the control designs underlying these motion systems reflect proven values like simplicity, predictability and (physical) transparency. But do these designs provide the control engineer with sufficient design freedom, or do they impose unnecessary limitations on system specifications and, in that sense, limit future growth? During the lecture, Marcel Heertjes will discuss two scenarios that aim to inspire, to sustain future growth and to preserve earlier values, namely: learning in feedforward control and hybrid integrator-gain systems in feedback control. He will also share the results of his research and his vision on industrial nonlinear control in general and the control of wafer scanners in particular.

**Visiting address** Auditorium, Building 1, Groene Loper, Eindhoven

**Navigation address** De Zaaie, Eindhoven, [www.tue.nl/map](http://www.tue.nl/map)