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Automatic  
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The Department of Automatic Control & Systems Engineering  
is pleased to announce the following seminar:

## **On controlling ensembles of memoryless robots**

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**Wednesday, 10 February 2021 at 14:00**

Via Google Meet

*Host Academic: Dr Shuhei Miyashita, ACSE*

### **Abstract**

We consider the problem of controlling relatively large ensembles of memoryless robots that have few, discrete sensory inputs. First, we show how ensembles of loosely coupled robots with 1-bit inputs and continuous outputs can be controlled to gather in a common place, or disperse to cover an area. Then, we study ensembles of robots that can assemble with each other. The robots are of cubic shape with 2-bit inputs per face, and have discrete outputs. We present theoretical and empirical findings for two systems, a moment-driven terrestrial robot (M-Blocks from MIT) and an aquatic robot (MHP from Sheffield). We conclude by discussing current limitations and possible extensions

### **Biography**

Roderich Gross is a senior lecturer in the Department of Automatic Control and Systems Engineering at the University of Sheffield. He received a PhD degree in engineering science in 2007 from Université libre de Bruxelles in 2007. He was a JSPS fellow at Tokyo Institute of Technology, a Marie Curie fellow at both EPFL and Unilever, and a visiting scientist at MIT. He has made contributions to the coordination of distributed autonomous robotic systems, and invented a method for behavioural inference called Turing Learning. In 2016, he served as the general chair of the International Symposium on Distributed Autonomous Robotic Systems. Currently, he serves as associate editor of Swarm Intelligence, IEEE Robotics and Automation Letters, and ICRA 2021, as area chair for RSS 2021 and MRS 2021, and as senior programme committee member of IJCAI 2021.