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# Seminar

## BAYESIAN STATISTICAL ANALYSIS OF LARGE IMAGES

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**Room Benvenuti | Campus S. Caterina**

# Bayesian Statistical Analysis of Large Images

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Images pervade almost all areas of science and society. As the generators of such images, such as cameras, satellites, medical scanning devices and digital text, become more sophisticated and accessible, the resultant images grow in size and complexity. The analysis of large images is now a research field in its own right and is characterised by a wide range of computational mathematical, statistical and machine learning solutions. Randomised numerical linear algebra plays an important role in this field, as do Bayesian approaches. In this presentation, I will discuss some of our forays into Bayesian computational methods for the analysis of large images. These methods include scalable spatial models (led by Dr Insha Ullah at QUT and Dr Clair Alston via AutoStat) and hybrid Bayesian machine learning models (led by Jacinta Holloway at QUT), as well as scalable approximate algorithms and pre-processing (led by Dr Matthew Moores, now at University of Wollongong) and sparse matrix factorisation and nonlocal singular value thresholding (led by Dr Hongbo Xie at QUT). Discussion will also touch on the real-world problems that have motivated this research, including using satellite data to achieve UN Sustainable Development Goals (SDGs), improving medical imaging for radiation therapy and enhancing computer vision and pattern recognition.

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