KONINKLIJKE NEDERLANDSE
AKADEMIE VAN WETENSCHAPPEN

# KNAW-minisymposium 10 september 2013

# Big Data Science

## More information and abstracts

**David Hand, Imperial College London: Big data: hope or hype?**

**Patrick Wolfe, University College London**
*"Big Data" and Statistical Network Analysis: Challenges and Opportunities at the Forefront of Modern Statistics*

We are surrounded by networks and other forms of "big data" that challenge the assumptions of traditional statistical data analysis.  From Facebook's graph search to large-scale recommender systems like Amazon's, how do we model mathematical objects that describe relationships and interactions rather than points in space?  How do we turn unbounded data rates to our advantage?  And what does it all mean for modern methods of detection and estimation?  In this talk I will share research perspectives on these questions, drawing on my work with partners across a variety of professional sectors and academic disciplines.  The combination of challenges and opportunities presented by this area make it unique and exciting at the forefront of modern mathematics, statistics, and computing.

About Patrick Wolfe
Patrick J. Wolfe holds chairs in Statistics and Computer Science at University College London, where his research is focused on statistical theory and methods for network data analysis.  He received the PhD degree from Cambridge University in 2003, after which he held assistant and associate professorships at Harvard University, receiving the Presidential Early Career Award from the White House in 2008 for contributions to signal and image processing.  Among several ongoing efforts in network modeling and inference, he currently leads a large US Multidisciplinary University Research Initiative on the statistical analysis of graphs and social networks, and is a UK Royal Society Research Fellow and UK EPSRC Mathematical Sciences Research Fellow.

**Aad van der Vaart, Universiteit Leiden**

**Bert Kappen, Radboud Universiteit Nijmegen**
*DNA matching as an example of Bayesian inference*
In this talk, I show how Bayesian networks can be used for missing person identification in forensics. In large scale disasters, it is tremendously important that victims of tragedies are quickly and accurately identified. But when there may be limited information available, and only partial DNA data, the task of identification can become very difficult and time consuming.

For this purpose, we developed the Bonaparte Disaster Victim Identification system together with the Netherlands Forensic Institute. Bonaparte uses Bayesian networks to model statistical relationships of genetic material of relatives and calculates statistical likelihoods of the missing people being a member of each family. In this way data from many members of the same family can be used in combination to identify victims. Bonaparte DVI was first used by the Netherland Forensic Institute to match 129 body parts from a plane crash in Libya in 2010. More recently Bonaparte was used in the identification of the perpetrator in a 13-year-old murder case.)