

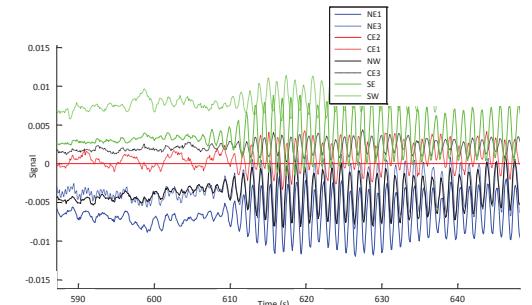
Machine Learning & Dynamical Systems, AI Ethics, and Economic & Financial Data Analysis

R.S.MacKay

Mathematics and Centre for Complexity Science
University of Warwick
& ATI faculty fellow

ML & DS

- New special interest group (SIG) at the ATI
- Aim: Show how ML can be useful for DS and how DS can be useful for ML
- Based on two conferences: IC Feb 2019, Fields (Toronto, but online) Sep 2020, organised by Boumediene Hamzi (IC)
- E.g. why neural networks work, reservoir computing, controlled ODEs, model reduction
- Plan monthly seminar, host 3rd conference at ATI, and stimulate research in the area
- My work:
 - Linear stochastic processes to detect oscillations arxiv: [1909.10247](https://arxiv.org/abs/1909.10247)
 - Inferring value from price series (PhD Kutlwano Bashe)



AI Ethics

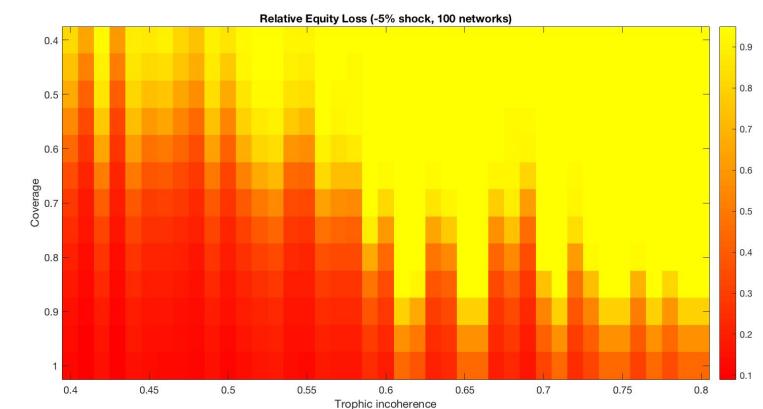
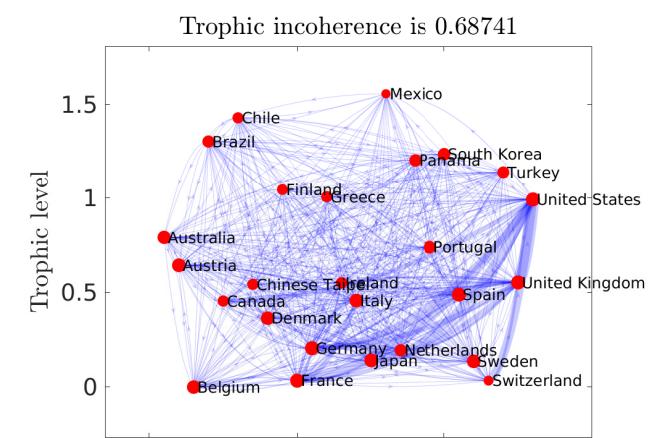
- Artificial Intelligence algorithms are highly likely to choose strategies that are regarded as unethical
<https://doi.org/10.1098/rsos.200462> (Beale, Battey, Davison): extreme value statistics
- ATI has a Public Policy programme dealing with ethical foundations and a Data Ethics Group

PRICE OF INSURANCE			
	Mo Smith	John Smith	Extra cost
 Admiral (Leicester)	£2,252	£1,333	£919
 Bell (London)	£1,572	£1,029	£543
 M&S (Cardiff)	£3,182	£2,949	£233
 Elephant (Manchester)	£2,173	1,956	£217
 Diamond (Bradford)	£2,048	£1,843	£205

Economic & Financial Data Analysis

- ATI has a programme on Economics & Finance, supported by HSBC and with some input from FCA.
- My work is focussed on
 - financial regulation to reduce systemic risk (Beale, Mousavi, Tucker)
 - inferring value from price (KB)
 - trophic analysis <https://doi.org/10.1098/rsos.201138> (Sansom, Johnson, Zhou) + see Shuaib

Coverage=Equity/Assets; Equity=Assets-Liabilities



My pitch to the ATI

- Directions in Data Science, New Turing fellow talk,
<https://youtu.be/uvsdpMSabLU>