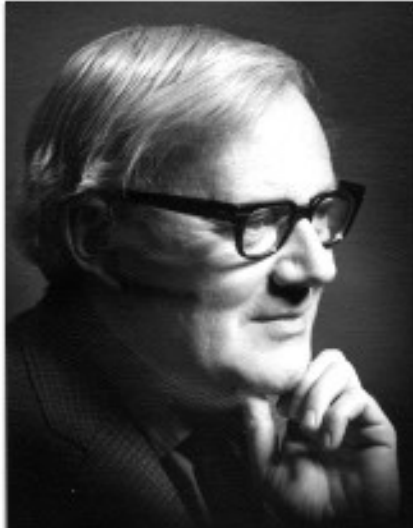


Tutte Institute for Mathematics and Computing

August 2019

- Canadian government research institute
- Established in 2011
- Supported and funded by Communications Security Establishment



To **deliver research results** having an impact on the most important scientific challenges facing the Canadian and 5-eyes **security and intelligence** communities.

Enable and conduct strategic research –
both classified and unclassified – that
CSE needs in order to provide and
protect information of national interest

Attract and **engage leading Canadian researchers** to work in support of the Canadian and 5-eyes security and intelligence communities

Obtain the highest possible return on
CSE's strategic **research partnerships**

Provide strong knowledge and requirements transfer mechanisms between a variety of research and **operational domains**

Research areas

■ Cryptology

- Classical cryptography
- Post-quantum public-key cryptography
- “Advanced Cryptography”

■ Data Science

- Theoretical and practical machine learning
- Graph mining techniques
- Applications to cyber defense and security

■ Vulnerability Research

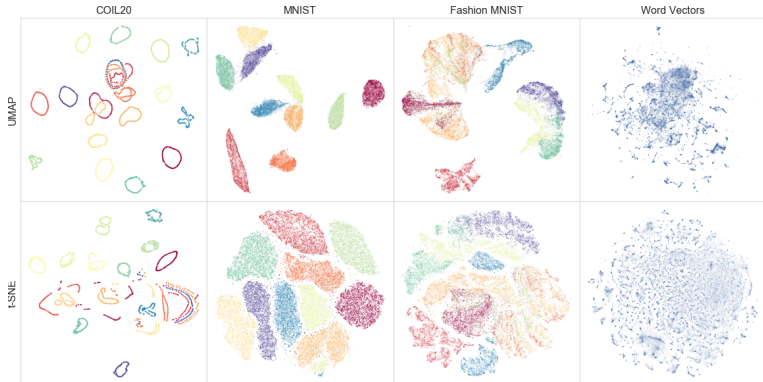
- Cyber security for GC systems
- AssemblyLine

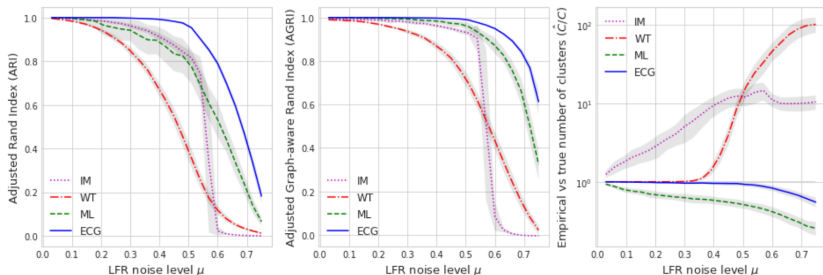
Some data science research topics involving TIMC we will cover in the next few days:

- UMAP
- Graph clustering: comparison and a new algorithm
- Graph embedding
- Semi-supervised learning on graphs
- Hypergraph modularity and clustering

UMAP:

- Dimension reduction technique
- Utilizes category theory and algebraic topology
- Practical implementation, widely used





Academic engagement

- Experts in fields relevant to TIMC research program
- From short (2 weeks) to long (1 year) term
- Participation in classified workshops
- Requires TOP SECRET clearance

- Funding provided to select conferences & workshops
- TIMC researchers as adjuncts at local universities
- Unclassified joint research activities

- Call of Interest (September 2019)
- Submissions due (December 2019)
- Announcement of decision (March 2020)
- Funds distributed (April 2020)

Contact Us

www.cse-cst.gc.ca/en/tutte-institute

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