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Introduction
Dr. Kimmo Soramäki is the Founder and CEO of Financial Network Analytics (FNA) and the founding Editor-in-Chief of the Journal of Network Theory in Finance.

Kimmo started his career as an economist at the Bank of Finland where in 1997, he developed the first simulation model for interbank payment systems. In 2004, while at the Federal Reserve Bank of New York, he was among the first to apply methods from network theory to improve our understanding of financial systems. During the financial crisis of 2007–2008, Kimmo advised several central banks in modeling interconnections and systemic risk. His research on these topics have been cited in over 1500 publications.

Kimmo founded FNA in 2013 to develop software for solving important issues around financial risk and for exploring the complex financial networks that play a continually larger role in the world around us.
About FNA

Our mission
To make the financial system safer and more efficient

FNA is a deep technology company and award-winning leader in Regulatory Technology (Regtech) and Supervisory Technology (Suptech). FNA combines industry leading data science capabilities with deep business domain expertise.

Supervisors, banks and FMIs have recognized the interconnected nature of financial systems and now have access to large amounts of granular data.

FNA’s software solutions allow central banks and financial institutions and authorities to map and monitor complex financial networks and to simulate operational and financial risks.
Representative Clients

Our clients

FNA’s clients include the world’s largest central banks, supervisors and financial market infrastructures.

- Bank of England
- Central Bank of Colombia
- Hong Kong Monetary Authority
- US Department of the Treasury
- US Department of Defense
- CME Group
- Payments Canada
- CLS Group
- SWIFT
- Fnality
Network Theory in Suptech and Regtech
Evolution of Terminology

**FinTech**
Technology that helps facilitate retail financial services in a new way

**RegTech**
Technology that helps banks & FMIs to comply with regulatory requirements

**SupTech**
Technology that helps authorities in their mission to monitor, oversee and supervise financial markets

**TechFin**
Technology giants entering the financial services markets (Google, Amazon, Apple, Alibaba, Tencent,...)
Network Theory is about

New Way of Looking at Data

- How is data connected with other data?
- How do these connections matter?
- How do complex systems move in time?

For the first time we are able to measure and model this!
Three Main Modes of Analysis

- Bottom up analysis
- Top down analysis
- Features of Data
Bottom Up

Typical use cases:

- Criminal investigation
- Terrorist networks
- Money laundering
- KYC & KYCC
- Fundamental investment analysis
- Supply chain analysis
Top Down

Typical use cases:

- Systemic risk analysis
- System monitoring
- System design
- System stress testing
- Clustering/Classification
- Early warning
- Anomaly detection
Network Features of Data

Typical use cases:

- AI/ML
- Fraud algorithms
- Recommendation engines
- Algorithmic investment

FNA Research: Comparison of Graph Computing Platform Performance
FNA’s Technology
Our Technology

FNA's technology enables decision makers and business analysts to easily uncover hidden connections, access and understand complex datasets and create network dashboards & simulations.

**Discover**
Uncover hidden connections in large, complex datasets and visualize them via interactive dashboards

**Simulate**
Build AI simulations to predict the impact of anomalies and stress events within systems and networks

**Optimize**
Enhance and configure for optimal performance using proven machine learning algorithms
Our Solutions

Client sectors

- Central Banks
- FMIs & Exchanges
- Banks & Treasuries
- National Security

Solutions

- Suptech
- CBDC Simulation
- System Simulation
- Intraday Liquidity Optimization
- Augmented Targeting

Network analytics for large datasets and training
Simulating the impact of introducing a digital currency
Simulating the impact of changes or stresses to large payment and settlement systems
Optimizing payment flows and intraday to reduce liquidity costs
Advanced targeting and anomaly detection within complex networks
Flow from Data to Insights

- **FNA Retrieve**: Connect and Combine data from online APIs and data collectors
- **FNA Resolve**: Clean, Transform and Resolve entities in data
- **FNA Analyze & Visualize**: Apply latest data science techniques, network analysis and AI/ML methods. Create flexible interactive dashboards.
- **FNA Simulate**: Carry out simulations on granular transaction data

The FNA Platform
Use Cases and Demos
**Case Study:** Insights from global payments data

**Background**

SWIFT messaging services are used by over 11,000 financial institutions in more than 200 countries. SWIFT was interested in what insights could be drawn from the "Big Data" that it collects when transmitting messages between financial institutions.

**Objective**

To analyse the payment networks created by flows of SWIFT MT103 messages to draw insights about macroeconomic, geo-political and compliance topics.

**Outcome**

Analysis of the SWIFT payment networks revealed a number of insights, including the phenomena of de-risking, payment country blocks relevant for sanctions analysis and how geopolitics shape them, and estimated the cost of the financial crisis at $5tr. The outcome/research was presented at Sibos 2014 by SWIFT CEO Gottfried Leibbrandt.

SWIFT Institute Research Paper: [The global network of payment flows](#)
Research Paper: [The Impact of Anti-Money Laundering Regulation on Payment Flows](#)
**Case Study:** Understanding systemic risk

**Bank of England** maps Interbank Exposures in the United Kingdom

**Background**

During the 2008 financial crisis, many banks ran into difficulties at the same time as shocks spread rapidly across the financial system. One of the main reasons for this was that the global financial system had become highly interconnected.

**Objective**

To measure bank interconnectedness and associated systemic risk in the UK.

**Outcome**

Direct interconnectedness such as interbank credit exposures, have decreased materially since the financial crisis. On the other hand indirect interconnectedness such as correlations in banks’ CDS premia remain elevated. The analysis helps to define the case for policy interventions to reduce the associated risks.

Bank of England: [Banking sector interconnectedness: what is it, how can we measure it and why does it matter?](https://www.bankofengland.co.uk/publications/Documents/researchbankingsectorinterconnectednesswhatishowcanwemeasureitandwhydoesitmatter.pdf)

Research paper: [Interbank Exposure Networks](https://www.bankofengland.co.uk/publications/Documents/researchbankingsectorinterconnectednesswhatishowcanwemeasureitandwhydoesitmatter.pdf)
Case Study: Simulating and Modelling New Settlement Systems

Fnality designs, simulates and models optimal system design

Background
Fnality is a consortium of global banks that is developing a novel asset-backed digital cash instrument for use within global institutional financial markets using Distributed Ledger Technology.

Objective
Fnality is using FNA’s technology to model and simulate the proposed FnPS ecosystem using realistic individual transaction data from member banks. This allows FNALITY, member banks and regulators to evaluate the impact that system design will have on liquidity requirements and consequently balance sheets supporting the settlement of interbank payments.

Outcome
Fnality has used the economic models created with FNA to provide valuable insights to member banks on the overall economic, balance sheet, liquidity and operational benefits of its proposed new service.
**Case Study:** Anomaly Detection in Maritime Shipping

**US Department of Defence**

**Background**

Through a US Department of Defense entity, several agencies from the five eyes countries, including the UK border force, required clearer intelligence in order to focus resources for multinational drug trafficking and sanctioned entity shipment interdiction.

**Objective**

Provide an end to end solution from data query through anomaly detection and visualization that can support decision making based on 1 month’s data set containing millions of containers, tens of thousands of ships and 2,730 global shipments between 369 international ports.

**Outcome**

In one month of data, 91,207 IP address inquiries on the status of nearly 100,000 containers in a 2 week period is reduced to a maximum of 12 IP address communities of interest that inquired on ~294 containers. This process has been implemented as a repeatable function for the US DOD and this program’s stakeholders.

FNA Augmented Targeting Cycle applied to International Maritime Shipping: 12 identified communities of IP addresses anomalously pinging 294 containers; based on real data used by the US DOD.
Publicly Available Demos: G20 Monitor

10 monitors with 30+ interactive dashboards

100M+ data points from public sources, data vendors

Sign up and explore for yourselves

www.g20monitor.com
Internship Opportunities
FNA's Internship Program

Since 2015, the internship program has been attended by 20+ students from all around the world - over a half of these continue to work with FNA.

Examples of current projects:

- G20 Monitor
- FMI & CBDC Simulator
- Related Parties Analysis for National Security
- Anomaly Detection for FinCrime and Cyber threats

We are also happy to support dissertation projects with a relevant thematic focus

If interested, please reach out to Will Towning on will@fna.fi
Discussion
Thank you

Follow us on LinkedIn to keep up with FNA news, events, jobs and research

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