University of Amsterdam
Informatics Institute

Computational Science Lab

Computational Science Lab:

Making Complexity Tractable

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Our Mission

In the Computational Science Lab we use ***computation*** to understand how the world works and how we can act on it to improve it for all. We study Dynamic **Complex Adaptive Systems** by developing fundamental theory and validated mechanistic domain specific models. We perform data driven simulations to inform novel ***interventions***.

Theory

Information processing

Complex networks

Uncertainty quantification

Models

Multiscale models

Network-based, agent-based and dynamic system models

Data-driven modeling and simulation

Computation

High performance and distributed simulation

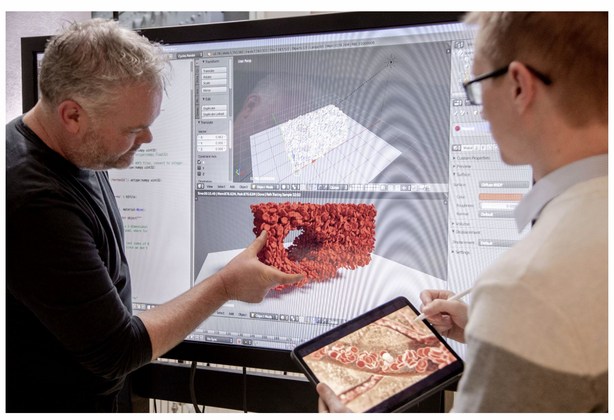
Multiscale computing

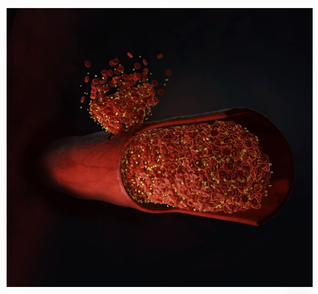
Coarse graining

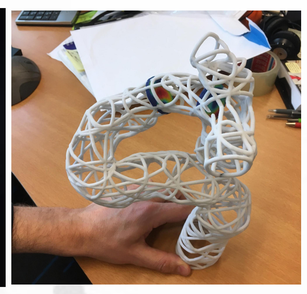
Challenges - predicting the future

Digital twins

Human body

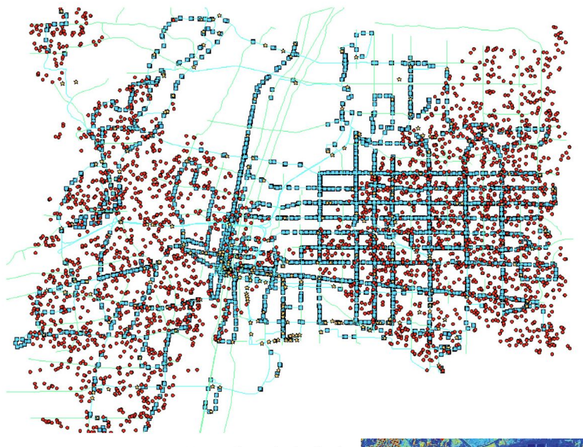


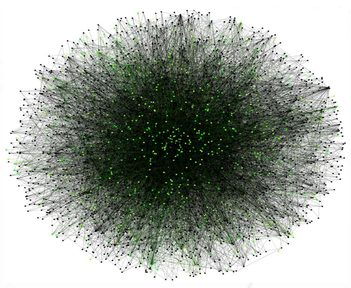


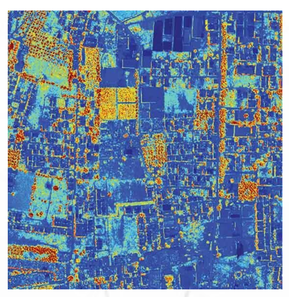


Simulating aneurysm, strokes

Society







Simulating city-level airborne infectious diseases, criminal networks, slums

Earth



Simulating ecosystems

We need…

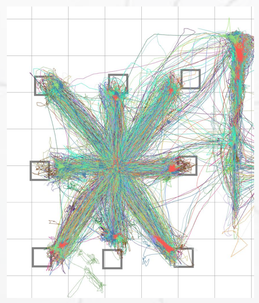
Collaborations & Data synthesis

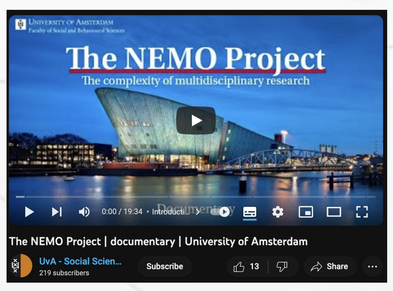
- Complexity science
- Computational science and engineering
- AI and data science
- Hybrid methods
- High-resolution spatiotemporal data
- High-performance computing

Outreach

Nemo Project







ICCS 2025

https://www.iccs-meeting.org/

