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## Poster session

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# Konstantinos E. Kampourakis

# Digital Twins for Incident Detection & Response

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Konstantinos E. Kampourakis ([konstantinos.kampourakis@ntnu.no](mailto:konstantinos.kampourakis@ntnu.no), Gjøvik)

## Motivation:

- Increasing cyber threats in CI
- Reactive and passive defenses
- Need for proactive, DT-enabled solutions

## Approach:

- SLR
- Framework design
- Validation using existing datasets
- Application in real-world scenarios

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Gizem Erceylan



# NTNU

Kunnskap for en bedre verden

# Digital Twin-Assisted Threat Modeling Framework for Industrial Control Systems Cybersecurity

**PhD Candidate:** Gizem Erceylan

**Supervisors:** Vasileios Gkioulas, Aida Akbarzadeh,  
Sokratis Katsikas, Sandeep Pirbhulal

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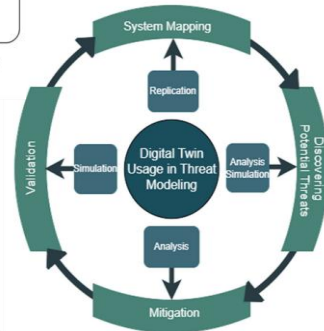
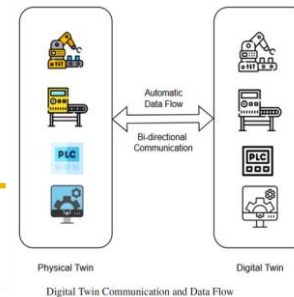
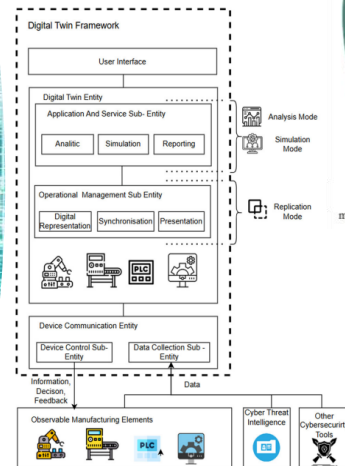
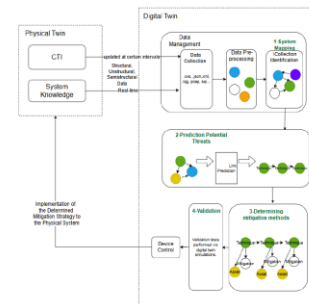


Illustration of different mode of the digital twin (inner circle) mapped to the four basic stages of threat modeling (outer circle)



Adaptation of a digital twin-assisted threat modeling framework based on ISO 23247 with distinct operational modes



Suggested digital twin-assisted threat modeling structure


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# Jessica Barbosa Heluany

The background of the slide is a reproduction of the painting 'The Scream' by Edvard Munch. It depicts a figure in the foreground with a pale, yellowish face and wide, staring eyes, holding their head with both hands in a gesture of intense emotional distress or mental anguish. The figure is on a bridge with a wooden railing, and other figures are visible in the distance. The sky and water are rendered with vibrant, swirling colors of orange, red, and blue, suggesting a turbulent, emotional atmosphere.

What makes us  
scream in VM?

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# Camille Sivelle

# Balancing Privacy and User Experience in Virtual Reality



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Camille Sivelle, PhD candidate, NTNU and Katrien De Moor, Associate professor, NTNU

## Balancing Privacy and User Experience in Virtual Reality

VR relies on an increasing number of sensors. This enables personalization and intuitive interaction, but it also raises **new privacy risks** (identifiability, profiling...)

**Motivation**


- » Approaches to enhance privacy in VR (e.g. pseudonymization of motion or gaze data) exist, but their impact on immersive experiences has not yet been evaluated with QoE-relevant measures like presence, cybersickness or trust.
- » **how can we increase privacy in VR training environments, without degrading the user experience?**

**What we do**

- » **Controlled lab experiment** in a VR training app (e.g. healthcare or emergency response), with **different anonymization levels** applied to the VR motion data **as conditions**
- » Subjective and objective data, collected **during and after tasks**

**Interested in integrating this in your own VR use case?**

Do you have a VR application which you would like to try this with? Reach out to me with the QR code on the left



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# Kaja Fjørtoft Ystgaard

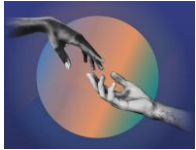
# Cybersecurity that embed ethics-by-design: holistic process

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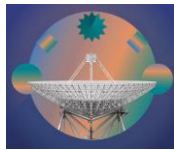
*“The best way to make an impact is to make the risks more tangible. This means clearly showing where ethical harms occur and backing it up with scientific evidence...”*

Jack Clark, Anthropic founder

## Assessing Ethical Risks and Challenges of EdTech in Norwegian K-12 Education



Ambiguous ownership,  
accountability and  
transparency



Too much  
surveillance



Lack of user awareness,  
literacy and autonomy



Tools that  
cause harm

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# Johannes Lorentzen

# Detecting Crime in the Banks

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Johannes Pippidis Lorentzen

## Problem:

How should one build Anti-Money Laundering and Anti-Terrorism Financing Systems in Banks?



### Detection

*What detection capabilities are truly needed?*



### System

*How should AML/CFT systems be built?*



### Governance

*How should the governance of detection systems be structured?*

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# Suneet Kumar Singh

# Smart 5G Control with AI and RIC

- Uses **AI** and **O-RAN** to make **private 5G** networks more **intelligent** and **secure**
- Supports a range of applications including mission critical communications (**MCX**) and **smart grids** to improve **QoS** and overall **performance**
- Provide a reusable **AI-driven testbed** for advance research, experimentation, and development

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## Smart 5G Control with AI and RIC

Sureet Kumar Singh, Stanislaw Lango, Thomas Zimmer  
Department of Information Security and Cybersecurity Technology, NTNU Foundation

### 1 Motivation

- Private 5G networks need adaptive control for changing traffic and latency demands
- AI-driven intelligence enables real-time optimization and boosts network performance

### 2 Research Goals

- Develop AI-based methods for adaptive 5G network control and optimization
- Improve QoS, QoE, and automation across private 5G setups

### 3 AI-Driven Private 5G Testbeds

- Combines SDR, sdrRAN and Open5GS for hands-on experimentation
- Support AI/ML-based automation and QoS/QoE optimization
- Include AI, CI and EI interfaces for AI-based policy updates and telemetry monitoring




Fig. 1. Physical Testbed for 5G Network Experiments.




Fig. 2. AI/ML-Driven RAN Resource Control.

### 4 Use Cases & Applications

- Demonstrates smart resource allocation for different traffic types
- Enables optimized performance and reliability for key use cases:
  - **Smart grids**
  - **Industrial IoT**
  - **Mission-critical Communication (MCX)**
- **Security**
  - Network intrusion detection
  - Network threat detection
  - Automated policy enforcement

Type (Example Application)	Latency Sensitivity
Real-time interactive (Cloud Gaming)	Very High
Conversational voice (VoIP)	High
Conversational multimedia (Video Conferencing)	High
Real-time control (Remote Desktop)	Medium to High
Buffered streaming (YouTube, Vimeo)	Low

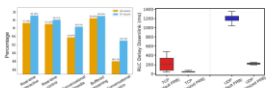



Fig. 3.4 Tab 1. Application and Runtime Classification Results. Fig. 3.

### 5 Collaboration & Next Steps

- **Reusable AI-driven testbed** available for further research and experimentation
- Open to integrate with security, ML and edge computing studies
- **Goal:** build a shared foundation for **adaptive, secure, and intelligent** 5G network



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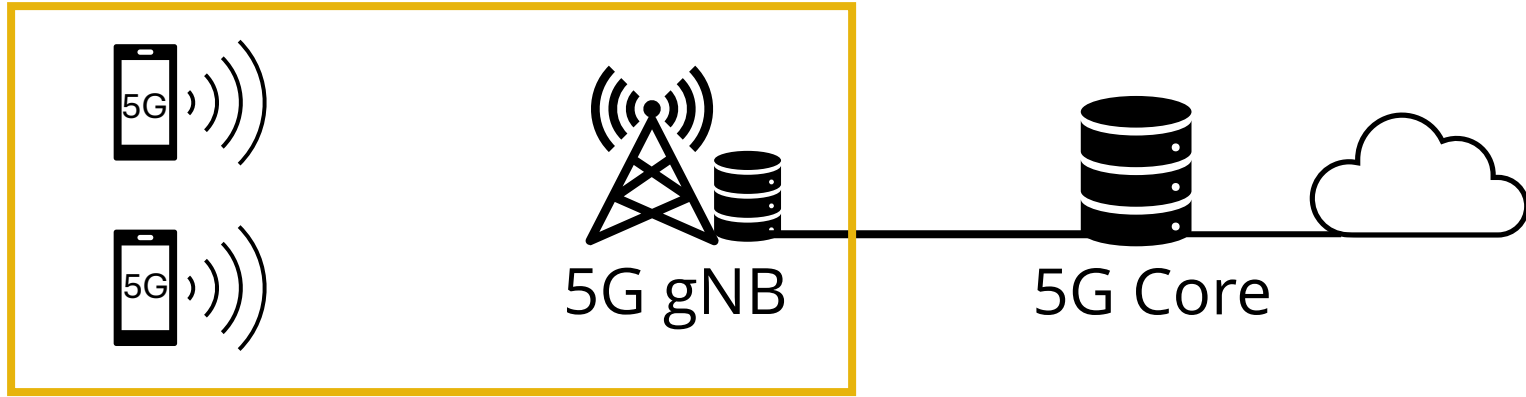
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# Sebastian Gilje Grøsvik

# Cross-Vendor 5G gNB Comparison



- Comparing RAN performance across 4 different gNB vendors.
  - 2 Open-Source: srsRAN & OAI
  - 2 Commercial: Nokia & Askey



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# Trond Vatten

# Operators *Sharing* Network Infrastructure?

*Investigating network sharing using cloud-based architectures*



Nasjonal kommunikasjonsmyndighet

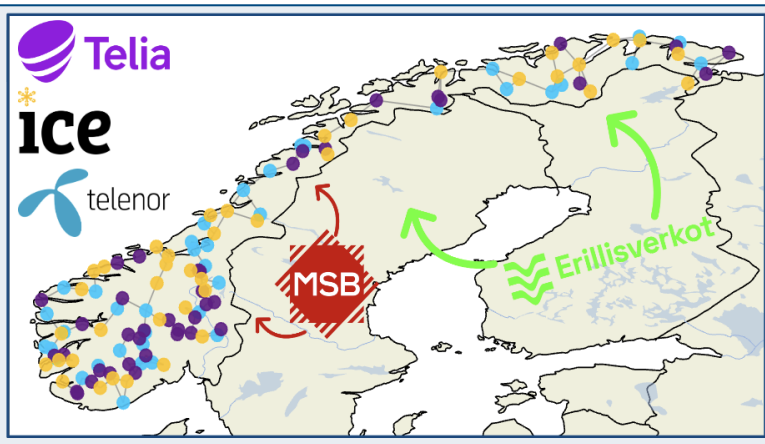
## New emergency network

The government has decided to move responsibility for the new emergency network from the Ministry of Justice and Emergency Response to the Ministry of Digitization and Administration.

The new emergency network will build on the nationwide coverage of the commercial mobile networks (5G and later generations). At the same time, the state will own and manage its own service platform that allows mission-critical emergency network services to be provided with high priority. This means that these services will be able to take precedence, even in situations where mobile networks are overloaded.

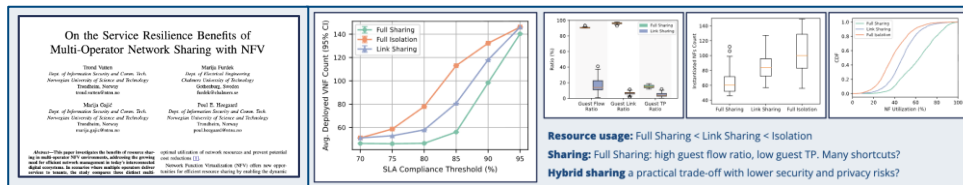


Ice



The future “Nødnett” (emergency networks) will be built on **commercial telecom networks**

**How should the operators cooperate?**



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## Karina Norfolk Tuva Westad

# Supply Chain Vulnerabilities in the Norwegian Power Grid

## Uncovered serious safety risk – Chinese electric buses can be stopped and turned off from China

A security test Ruter has conducted revealed that Chinese electric buses in Norway can be controlled from China.



*What are the consequences if the Norwegian  
power grid has similar security flaws?*

**IT/OT Integration** opens new vulnerabilities

**We seek interviewees** that are stakeholders in the Norwegian power grid

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# Vahiny Gnanasekaran

# A model-driven approach to define a security-safety incident response plan

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CSIRT member



Control room operator



**How can we represent the interaction between security and safety roles to ensure a swift response to a cyber attack with physical consequences?**

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## Linda Aandalen

# “Cybersecurity training does not work!”

Do you agree or disagree  
with this claim?



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# Ming-Chang Lee

# Real-Time Online Time Series Anomaly Detection

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## Ming-Chang Lee (Leo)

- Anomaly detection approaches for multivariate and univariate time series
- Our approaches are highly valuable that can
  - Detect anomalies in real time with high accuracy
  - Provide immediate response
  - Operate in a lightweight manner
  - Work without labelled data or offline model training
  - Require no domain knowledge or human intervention
  - Provide interpretable results