# Symbolic and Neuro-symbolic AI

##### Session 3.1 (SEMANTiCS)

#### Time: Thursday, September 19, 2024 - 10:30 to 12:00

#### Chair: Linda Oosterheert

## **Talks**

### The Dimensions Knowledge Graph - Leveraging neuro-symbolic AI to accelerate business decisions [SP]

The data needed to create new opportunities and drive decisions is abundant, but it is distributed across heterogeneous sources and lacks the context needed to deliver insights. The Dimensions Knowledge Graph powered by metaphactory combines the power of symbolic and subsymbolic AI to transform data into knowledge, connect internal data with global research knowledge, and augment and scale business decisions. It is the world’s largest and most comprehensive scientific knowledge graph covering the entire R&D landscape and is designed for seamless integration with other datasets from the public domain, as well as private enterprise data sources.

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| Peter Haasemetaphacts |

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### Simplifying and Automating Product Compatibility with Rules-based AI aka “What goes with what?”

he solution lies in semantic reasoning, otherwise known as rules-based Artificial Intelligence (AI). By adding expert knowledge to the system in the form of rules, this technology contextualises and analyzes the relationships between products, akin to human reasoning. This AI-driven approach scales expert knowledge, alleviating the burden of manually configuring every potential product combination, while also introducing a method to automatically update the product catalogue—incremental reasoning. Incremental reasoning ensures the knowledge base is always consistent and up to date with the latest changes, calculating new configurations as new products are added and removing old when the relevant products are discontinued. Our presentation will demonstrate how this innovative use of knowledge graphs and rules-based AI significantly enhances customer experiences and reduces operational costs, regardless of the industry.

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| Peter Crocker | Thomas Vout | Philip Foster |

### How Semantic Technology Brings Clinical Knowledge to Decision Support in an Instant

Semantic technology use cases for medical and pharma applications involve some of the largest and most complex ontologies and knowledge graphs. In this presentation we will hear about the first intelligent assistant of its kind that relies on a hybrid AI (logical semantic reasoning and ML image recognition), fully integrated on-device in ultrasound platforms—showcasing the SUOG (Smart Ultrasound in Obstetrics and Gynecology) project1. The use of semantic technology in this project will be explored along with how performance and scalability was achieved on-device by using an in-memory knowledge graph and reasoning engine. Examples and parallels will be highlighted showing this technology’s relevance with other medical applications and the pharma industry.

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### Next-Generation Cybersecurity: Integrating Knowledge Graphs and Neuro-symbolic AI with STIX and TAXII

This presentation will delve into the practical applications of Knowledge Graphs and Neuro-symbolic AI in cybersecurity, highlighting their potential to transform threat detection and response. In particular we will be focusing on how to automatically extract structured STIX objects from unstructured incident reports. By incorporating the principles of STIX and TAXII, we demonstrate how these technologies can enhance collaborative threat analysis, automated threat exchange, and ultimately, the overall security posture of organizations.

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| Jans Aasman |