SIRIUS GA: From Research to Value (May 11-12, 2022, Oslo)			
Day 1			
	09:00 – 09:15 (Intro)	Welcome and Agenda	K. S. Tungland (Equinor), E. Kharlamov (Bosch, UiO), A. Waaler (UiO)
	09:15 – 09:45	Keynote talk: Value of Data and Digitalization via Semantic Technologies	P. Haase (metaphacts)
Session 1: Research Program Presentations --2h 00'--	09:45 – 10:15 (Analysis of Complex Systems)	Talk 1.1: Highlights from Program Leader	S. L. Tapia Tarifa (UiO)
		Talk 1.2: Research talk: SMT and Logistics	C. M. Nguyen (UiO)
	Coffee Break: 10:15 – 10:30		
	10:30 – 11:00 (Ontology Engineering)	Talk 1.3: Highlights from Program Leader	M. G. Skjæveland (UiO)
		Talk 1.4: Asset Information Modelling Framework (IMF)	A. Waaler (UiO)
	11:00 – 11:15 (Industrial Digital Transformation)	Talk 1.5: Highlights from Program Leader	T. Østerlie (NTNU)
Session 2: Parallel Workshops --2h 45'—	11:15-15:00 Lunch Break: 12:00 – 13:00	WS1: READI, Industry 4.0, OPC, AAS, Digital Twins and the Industrial Digital Twin Association: Joining the Dots – Part 1	D. Cameron (UiO)
		WS2: Challenges w/ enabling work process renewal w/ new tech. – Part 1	T. Østerlie (NTNU), A. Waaler (UiO)
		WS3: Reasonable Ontology Templates – user forum – Part 1	M. G. Skjæveland (UiO)
		WS4: Digital Geosciences	A. Latif (UiO)
	15:00-15:15	Workshops feedback	M. Giese (UiO)
Cofee Break: 15:15 – 15:30			
Session 3: Panel Discussion --1h 30'--	15:30 – 17:00	Value of research @ SIRIUS: research and industrial perspectives • Academic Panelist 1: Ian Horrocks, Uni Oxford • Academic Panelist 2: Ahmet Soylu, OsloMet • Academic Panelist 3: Laura Ann Slaughter, UiO • Industry Panelist 1: Peter Haase, metaphacts • Industry Panelist 2: Ellen Karlsen, Aibel • Industry Panelist 3: Kirsten Helle, TechnipFMC	I. Chieh Yu (UiO), K. Lewis (UiO)
Poster&Social Session with snacks and champagne: 17:00 – 19:00			
Dinner: 19:00 – midnight ☺			

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Day 2			
	08:30 – 09:30	Business meeting	A. Latif (UiO)
Session 4: Panel Discussion --1h 00' --	09:30 – 10:30	The voice of the "youth": vision of SIRIUS, feedback, career perspectives, questions to and from the audience / SIRIUS partners • Bifan Zhou: post-doct, Uni Olso • Mina Haghshenas, PhD student, NTNU • Foivos Psarommatis: post-doc, Uni Oslo • Marta Rozanska: PhD student, Uni Oslo • Peyman Rasouli: PhD student, Uni Oslo • Chi Mai Nguyen, post-doc Uni Oslo • Rustam Mehmandarov: PhD candidate, Computas	E. Kharlamov (Bosch, UiO), K. Lewis (UiO)
Session 5: Research Program Presentations --2h 00'--	Coffee Break: 10:30 – 10:45		
	10:45 – 11:15 (Semantic Integration)	Talk 5.1: Highlights from Program Leader	I. Horrocks (OXF)
		Talk 5.2: Research talk: Semantic Integration through Ontologies and KGs	X. Guohui (UiB, UiO)
	11:15 – 11:45 (Scalable Computing)	Talk 5.3: Highlights from Program Leader	G. Horn (UiO)
		Talk 5.5: industry talk: Shared memory high performance computing	A. Vesterkjær, (Numascale)
	11:45 – 12:15 (Data Science)	Talk 6.1: Highlights from Program Leader	B. Ell (Uni Bielefeld, UiO)
		Talk 6.2: Re Research talk: Scaling ML with Semantics	B. Zhou (UiO)
	Lunch Break: 12:15 – 13:15		
Session 6: Parallel Workshops --2h 15'--	13:15 – 15:45	WS1: Challenges with digitalization of LCI and related standards	B. Berli (NORSOK/Standards Norway), T. Østerlie (NTNU)
		WS2: Reference Architecture Asset Information Modelling Framework (IMF)	C. M. Hansen (Aibel), M. G. Skjæveland (UiO)
		WS3: Polymorphic and proactive automatic Cloud application management	G. Horn (UiO), M. Rózanska (UiO)
		WS4: Key challenges in domain-adapted data science	B. Ell (Uni Bielefeld, UiO)
	15:45-16:00	Workshops feedback	D. Cameron (UiO)
	16:00-16:15	Wrapping up and Closing	E. Kharlamov (Bosch, UiO), A. Latif (UiO), A. Waaler (UiO)

Workshops			
Day 1			
WS1: (2h 45')	11:15-15:00 (with lunch break)	**Title: READI, Industry 4.0, OPC, AAS, Digital Twins and the Industrial Digital Twin Association: Joining the Dots** **Abstract:** The SIRIUS digital twins and digital field development beacons have been working on developing practical semantic information models for engineering and operation of facilities. SIRIUS workers and partners have been engaged in the READI project and have developed a digital format for requirements, the first version of the ISO/IEC81346 RDS-O&G, and ISO15916-14. These ideas have been tried out in the Digital Design Basis project and are now being applied to the NOAKA field developments. The University of Oslo has joined the Industrial Digital Twin Association, with a view to build competence in Industry 4.0 and influence the direction of standards development in the industry. This work brings together a diverse set complementary initiatives and standards, including: • OPC UA, with Equinor and DEXPI submodels. • Asset Administration Shell. • DEXPI for P&IDs, now to the extended to PFDs. • CFIHOS. • ISO15926 Part 14 and new Part 4 reference data. • IMF and Mimir **Target Audience:** The purpose of this workshop is to bring together SIRIUS partners and others who have an interest in this work so that we can "join the dots" between these initiatives and identify areas for additional research, standardization and application. The target group is practitioners from partner companies and researchers who are involved in this work or want to learn more about it.	D. Cameron (UiO)
WS2: (2h 45')	11:15-15:00 (with lunch break)	**Title: Challenges with enabling work process renewal with new technologies** **Abstract:** Developing new technologies is one thing. Applying them to renew work processes in an organizational setting is something entirely different. The purpose of this workshop is to identify industrial challenges related to renewing work processes with novel digital technologies throughout the value chain of energy installations; from design, operations, to maintenance and modification. **Target Audience:**	T. Østerlie (NTNU), A.Waaler (UiO),

		Work process owners engineering and operations, and digitalization managers.	
WS3: (2h 45’)	11:15-15:00 (with lunch break)	**Title: Reasonable Ontology Templates** **Abstract:** The purpose of the event is to let (potential) users of the OTTR framework share experiences and to meet the developers behind OTTR to discuss future directions. The workshop will contain a presentation of the current status and plans of the OTTR project, talks by users of the OTTR framework and discussions. **Target Audience:** We invite in particular users that have hands-on experience with the. OTTR framework, as we are interested in discussing how we best can support your wishes for future developments and if and how we can. Collaborate on these tasks. This means that we do not plan to give any introduction to the OTTR framework and will assume that participants understand the basics. However, we welcome everyone that want to listen. In. Introductory material about the OTTR framework and more details about the workshop can be found at http://ottr.xyz.	M. G. Skjæveland (UiS, UiO)
WS4: (2h 45’)	11:15-15:00 (with lunch break)	**Title: Digital Geosciences** **Abstract:** Geoscience digital transformation is about overcoming the bottlenecks of G&G data access and increasing the quality of interpretations by means of the better use of data. The data access bottleneck means that up to 70% of exploration experts’ time is spent finding, accessing, integrating and cleaning data before analysis can even start (Putting the FOCUS on Data, W3C Workshop on Semantic Web in Oil & Gas Industry, Jim Crompton). Further, Faster access to relevant data is of interest only if the data can be efficiently used to generate insights and guide decisions. Emerging sciences like Data Science, Formal Methods, Semantic technologies and HPC etc., can enable end-users to generate valuable insights for the subsurface much faster and with significantly reduced uncertainty. Along with improving the existing subsurface evaluation work processes, these technologies provide opportunities to develop completely new methods and workflows for the subsurface evaluation. Since the centre’s start, researchers in SIRIUS have been actively developing Digital methods and tools for Digital Geosciences. We have come a long way, but this work still covers an extremely small part of the problem spectrum. In this workshop, we will take the related SIRIUS work as a starting point to discuss what we have achieved so far and identify areas where we (Academia and Industrial partners) see potential in working together in the space of Geoscience Digitalization. SIRIUS partners will also be invited to present their vision of a digital subsurface.	A. Latif (UiO)

		Some of the aspects of Digital Geosciences that SIRIUS is working on:
		• **SIRIUS GeoAssistant** project with the goal to develop a tool-supported method for exploration geologists to better assess and evaluate exploration prospects by applying established techniques from knowledge representation and formal methods from software verification. (Subsurface Evaluation Through Multi-Scenario Reasoning)- Received a best paper award.
		• **SIRIUS GeoAnnotator** project focuses on developing a tool-supported method for transforming the Geoscience images into knowledge graphs using semantic technology/geoscience ontologies. This method makes it possible to search geoscience images based on the geoscientific content of the images.
		• **SIRIUS OBDA Subsurface** project, which is a continuation of the EU project Optique. This project is focused on extending the capabilities of OBDA (Ontology-based data access) technology developed in the Optique for the Subsurface data. OBDA can enable end-users to run complex and domain-specific queries without knowing anything about underlying DB architecture, without writing SQL queries and queries are formulated in end-user language. Further, it enables end-users to formulate different geoscience concepts in a query based on the domain (G&G) concepts and vocabulary.
		• **SIRIUS GeoDataPrep** project, which is focused on developing method for improving the preparation pipline of geological data, specifically logs and related knowledge sources: This includes better prediction of the time needed to prepare, reusability of preparation work between projects, and less time needed to prepare G&G data for subsurface evaluation.
		• **Knowledge representation of the geology domain**, e.g.,
		  ○ Developing a method for expressing geological processes. This method will facilitate the translation of knowledge from one domain into another and act as an intermediate representation, allowing geoscientists to express domain knowledge in a natural way and lessen the complexity of the domain.
		  ○ Geological Information Capture with Sketches and Ontologies. This Ph.D. project will lead to a system that will allow geologists to use sketches as an information entry method to input and store qualitative geological information in RDF format (knowledge graphs), which will make the qualitative geological information findable, accessible, interoperable, and reusable (FAIR), and enable machine-readable qualitative geological data query and reasoning in the future. This work aims to bring geology digitization one step forward and meet the needs of the digitized industry.
		• Data Science applications in Geoscience, e.g.,
		  ○ How Hybrid ML models can be used to find reservoir analogues, to support prospect evaluation
		  ○ How transfer learning can be used to train NLP models from a resource-rich domain to a resource-deficient domain like Geoscience.
		  ○ How hybrid ML can be used to predict the curve information block of header in well log files (this preojct is part of the SIRIUS GeoDataPrep project)
		• HPC support for the Reservoir simulation project, which is focused on Improving HPC support for reservoir simulators and developing application-specific parallelization techniques	

		Target Audience: • This workshop aims to induce interest in novices of digital geoscience (Geoscientists, Data Managers & Researchers). At the same time, it aims at the experienced digitalization professionals already working in subsurface digitalization. • Prerequisites: Basic understating of the Geoscience domain and subsurface evaluation workflows	

Workshops			
Day 2			
WS1: (2h 30’)	13:15-15:45	**Title: Challenges with digitalization of LCI and related standards** **Abstract:** While there is shared understanding of the need for structured and machine-readable LCI standards throughout the oil and gas industry, there is little to no coherence across companies to jointly solve central challenges associated with this. The result is that digitalization of LCI exchange is driven through disparate activities within individual enterprises, through larger capital expense projects or across various joint industry initiatives. The purpose of this workshop is to identify challenges related to digitalization of LCI at multiple levels, and to discuss how to succeed with coordinating standardization activities across initiatives while at the same time ensuring that the output of these activities are consistent and combinable. **Target Audience:** Technical authorities disciplines, information, and LCI. Members of NORSOK expert group Z-TI.	B. Berli (NORSOK/ Standards Norway), T. Østerlie (NTNU)
WS2: (2h 30’)	13:15-15:45	**Title: IMF Reference Architecture** **Abstract:** In order to facilitate practical use of IMF models in the industry, a Reference Architecture for integrating an IMF-based semantic infrastructure in a working IT environment is needed. Several applications serving complex work processes will need to be interfaced with IMF support systems, and there will be a need for systems supporting exchange of IMF models across the value chain. Further, there will be a need for hosting and sharing RDF-based models with a scope beyond that of “pure” IMF. In this workshop we welcome input and contributions, both from partners involved in currently ongoing IMF-related work, and from others who find the topic interesting. We hope to see relevant discussions, advancing the ongoing IMF Reference Architecture efforts. **Target Audience:** IT/Information/System Architects, Technical IT Managers/Leaders, Semantic technology practitioners, Academic professionals with relevant expertise	C. M. Hansen (Aibel), M. G. Skjæveland (UiO)
WS3: (2h 30’)	13:15-15:45	**Title: Polymorphic and proactive automatic Cloud application management**	G. Horn (UiO)

		Abstract: The workshop will start with an interactive demonstration of the MORPHEMIC platform showing how Cloud applications can benefit from automatic resource deployment and configuration. This allows to save on deployment cost using only the rented Cloud resources when they are needed, and avoids the need of a dedicated DevOps to constantly monitor and reconfigure the application when demand changes over time. The demonstration will be followed by a discussion session where opinions, views and requirements, from the industry will be investigated and guide the future development of MORPHEMIC. **Target Audience:** It is therefore important that the participants have some background on scalable computing applications used within their organisations and how these are manged today.	
WS4: (2h 30')	13:15-15:45	**Title: Key challenges in domain-adapted data science** **Abstract:** We will present a few of the challenges in the context of (domain-adapted) data science that we identified where we believe that they deserve attention (research-wise), about which we are enthusiastic, and where we believe that we can contribute. Together with members from the SIRIUS partner companies, in a co-creation process, we will identify challenges we were not aware of and we will assess their relevancy for our partners, so we can together shape our research agenda, start new collaborations and intensify existing collaborations	B. Ell (Uni Bielefeld, UiO)