IS2021 Schedule

Saturday at IS 2021

Start time	End time	**Start time**	**End time**	Start time	End time	Start time	End time	Start time	End time	Start time	End time	Start time	End time	Start time	End time		**Track 1**	**Track 2**	**Track 3**	**Track 4**	**Track 5**
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney							
05:00	**09:00**	**08:00**	**12:00**	**13:00**	**17:00**	**14:00**	**18:00**	**17:30**	**21:30**	**20:00**	**00:00**	**21:00**	**01:00**	**22:00**	**02:00**	**Session A**	Tutorial#26: A.1 / Artificial Intelligence for Systems Engineers: Going Deep With Machine Learning and Deep Neural Networks Barclay Brown (Raytheon Technologies); Ramakrishnan Raman (Honeywell Technology Solutions); Ali Raz (George Mason University)	Tutorial#21: A.2 / From Operational Concept Development to Systems Architecture Definition with SysML and MBSE Grid approach Aurelijus Morkevicius, Aiste Aleksandraviciene (Dassault Systemes)	Tutorial#7: A.3 / Overview of the INCOSE SE Handbook Version 4.0 John Clark (Old Dominion University); Gabriela Coe (Northrop Grumman Corporation, Space Systems)	Tutorial#20: A.4 / Handling Organizational Complexity Dean Beale (University of Bristol)	Tutorial#25: A.5 / Introduction to Model Simulation and Engineering Analysis with SysML Saulius Pavalkis, Nerijus Jankevicius (Dassault Systemes)
09:00	10:00	**12:00**	**13:00**	17:00	18:00	18:00	19:00	21:30	22:30	0:00	1:00	1:00	2:00	2:00	3:00	**Break**					
10:00	11:00	**13:00**	**14:00**	18:00	19:00	19:00	20:00	22:30	23:30	1:00	2:00	2:00	3:00	3:00	4:00	**Session C**	Tutorial#15: C.1 / Systems Security Engineering: A Loss-Driven Focus Mark Winstead (MITRE); Michael McEvilley (The MITRE Corporation); Daryl Hild (MITRE)	Tutorial#24: C.2 / Modeling and Analysis of Standard Operating Procedures Jomana Bashata, Lance Sherry (Center for Air Transportation Systems Research at George Mason University); Steven Dam (SPEC Innovations)	Tutorial#23: C.3 / Leadership Skills for Systems Engineers David Walden (Sysnovation, LLC)		
11:00	12:00	**14:00**	**15:00**	19:00	20:00	20:00	21:00	23:30	0:30	2:00	3:00	3:00	4:00	4:00	5:00						
12:00	14:00	**15:00**	**17:00**	20:00	22:00	21:00	23:00	0:30	2:30	3:00	5:00	4:00	6:00	5:00	7:00					Tutorial#19: C.4 / Applied Systems Theory to Enhance Systems Engineering Practice for Complex Systems Charles Keating (Old Dominion University); Richard Hodge (DrRichardHodge.com); Joseph Bradley (Leading Change, LLC)	
14:00	15:00	**17:00**	**18:00**	22:00	23:00	23:00	0:00	2:30	3:30	5:00	6:00	6:00	7:00	7:00	8:00						
15:00	16:00	**18:00**	**19:00**	23:00	0:00	0:00	1:00	3:30	4:30	6:00	7:00	7:00	8:00	8:00	9:00						

Sunday at IS 2021

Start time	End time	**Start time**	**End time**	Start time	End time	Start time	End time	Start time	End time	Start time	End time	Start time	End time	Start time	End time		**Track 1**	**Track 2**	**Track 3**	**Track 4**	**Track 5**
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney							
05:00	**09:00**	**08:00**	**12:00**	**13:00**	**17:00**	**14:00**	**18:00**	**17:30**	**21:30**	**20:00**	**00:00**	**21:00**	**01:00**	**22:00**	**02:00**	**Session E**	Tutorial#26: E.1 / Artificial Intelligence for Systems Engineers: Going Deep With Machine Learning and Deep Neural Networks Barclay Brown (Raytheon Technologies); Ramakrishnan Raman (Honeywell Technology Solutions); Ali Raz (George Mason University)	Tutorial#21: E.2 / From Operational Concept Development to Systems Architecture Definition with SysML and MBSE Grid approach Aurelijus Morkevicius, Aiste Aleksandraviciene (Dassault Systemes)	Tutorial#7: E.3 / Overview of the INCOSE SE Handbook Version 4.0 John Clark (Old Dominion University); Gabriela Coe (Northrop Grumman Corporation, Space Systems)	Tutorial#20: E.4 / Handling Organizational Complexity Dean Beale (University of Bristol)	Tutorial#25: E.5 / Introduction to Model Simulation and Engineering Analysis with SysML Saulius Pavalkis, Nerijus Jankevicius (Dassault Systemes)
09:00	10:00	**12:00**	**13:00**	17:00	18:00	18:00	19:00	21:30	22:30	0:00	1:00	1:00	2:00	2:00	3:00	**Break**					
10:00	11:00	**13:00**	**14:00**	18:00	19:00	19:00	20:00	22:30	23:30	1:00	2:00	2:00	3:00	3:00	4:00	**Session G**	Tutorial#15: G.1 / Systems Security Engineering: A Loss-Driven Focus Mark Winstead (MITRE); Michael McEvilley (The MITRE Corporation); Daryl Hild (MITRE)		Tutorial#23: G.3 / Leadership Skills for Systems Engineers David Walden (Sysnovation, LLC)		
11:00	12:00	**14:00**	**15:00**	19:00	20:00	20:00	21:00	23:30	0:30	2:00	3:00	3:00	4:00	4:00	5:00						
12:00	14:00	**15:00**	**17:00**	20:00	22:00	21:00	23:00	0:30	2:30	3:00	5:00	4:00	6:00	5:00	7:00					Tutorial#19: G.4 / Applied Systems Theory to Enhance Systems Engineering Practice for Complex Systems Charles Keating (Old Dominion University); Richard Hodge (DrRichardHodge.com); Joseph Bradley (Leading Change, LLC)	
14:00	15:00	**17:00**	**18:00**	22:00	23:00	23:00	0:00	2:30	3:30	5:00	6:00	6:00	7:00	7:00	8:00						
15:00	16:00	**18:00**	**19:00**	23:00	0:00	0:00	1:00	3:30	4:30	6:00	7:00	7:00	8:00	8:00	9:00						

IS2021 Schedule

Monday at IS 2021

Start time	End time	**Start time**	**End time**	Start time	End time	Start time	End time	Start time	End time	Start time	End time	Start time	End time	Start time	End time		**Track 1**	**Track 2**	**Track 3**	**Track 4**	**Track 5**
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney							
05:00	**06:30**	**08:00**	**09:30**	**13:00**	**14:30**	**14:00**	**15:30**	**17:30**	**19:00**	**20:00**	**21:30**	**21:00**	**22:30**	**22:00**	**23:30**	**Keynote**	**Keynote - Plenary#K1: K1 / Countering Digital Authoritarianism Victoria Coleman (USAF Chief Scientist - Senior Advisor to the Director at CITRIS & the Banatao Institute, University of California Former Director of DARPA)**				
06:30	7:00	**09:30**	**10:00**	14:30	15:00	15:30	16:00	19:00	19:30	21:30	22:00	22:30	23:00	23:30	0:00	**Break**					
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney				MBSE, System Architecture/Design Definition	Energy (renewable, nuclear, etc.)	System Security, Defense, System Architecture/ Design Definition	TechOps Invited Content
7:00	7:40	**10:00**	**10:40**	15:00	15:40	16:00	16:40	19:30	20:10	22:00	22:40	23:00	23:40	0:00	0:40	**Session 1**	Panel#2: 1.1 / Systems Engineering at the Hello – Frameworks for Applying Systems Engineering in Early Stage R&D Moderator:Heidi Ann Hahn (New Mexico Tech); Panelists: Nick Lombardo (Pacific Northwest National Laboratory); Michael DiMario (Astrum Systems); Ann Hodges (Sandia National Laboratories); Frédéric Autran (Airbus Defence & Space);	Paper#116: 1.2.1 / Model-Based Systems Product Line Engineering of Physical Protection Systems Bedir Tekinerdogan (Wageningen University); Murat Kaan Özcan, İskender Yakin, Sevil Yağız (Aselsan)	Paper#40: 1.3.1 / Conceptual modeling of energy storage systems Therese Vrenne, Elisabet Syverud, Gerrit Muller (University of South-Eastern Norway)	Paper#112: 1.4.1 / Integrated Security Views in UAF Matthew Hause (Systems Solutions Inc (SSI)); Lars-Olof Kihlström (Syntell AB)	Invited Content#TechOps#1: 1.5 / Panel: To Vee or not to Vee Jon Wade
7:45	8:25	**10:45**	**11:25**	15:45	16:25	16:45	17:25	20:15	20:55	22:45	23:25	23:45	0:25	0:45	1:25			Paper#52: 1.2.2 / Applying Systems Engineering framework for architecting a Smart Parking System within a Smart City Nikhil Joshi (HCL Technologies); Mudit Mittal (BlueKei Solutions Pvt. Ltd.); Yatin Jayawant (John Deere India Pvt Ltd.); Pradip Salunkhe, Meena Hattarge (Eaton)	Paper#58: 1.3.2 / Conceptual Modelling of Seasonal Energy Storage Technologies for Residential Heating in a Dutch town Best Erik Drilen, Elisabet Syverud (University of South-Eastern Norway)	Paper#18: 1.4.2 / Experience in Designing for Cyber Resiliency in Embedded DoD Systems Jennifer Barzeele (Raytheon Intelligence and Space); Kit Siu (General Electric Research); Mike Robinson, Liana Suantak, John Merems (Raytheon Missiles and Defense); Michael Durling, Abha Moitra, Baoluo Meng (General Electric Research); Patrice Williams (Raytheon Intelligence and Space); Daniel J. Prince (GE Aviation)	
12:10	12:30	**11:30**	**12:30**	16:30	17:30	17:30	18:30	21:00	22:00	23:30	0:30	0:30	1:30	1:30	2:30	**Break**					
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney				President Invited Content	MBSE, Processes	FuSE	Aeropace, Defense, System Architecture/ Modeling	TechOps Invited Content
9:30	10:10	**12:30**	**13:10**	17:30	18:10	18:30	19:10	22:00	22:40	0:30	1:10	1:30	2:10	2:30	3:10	**Session 2**	Invited Content#Inv#1: 2.1 / Viewing Grand Challenges as a System Moderator:Tom McDermott ; Panelists: Shriya Das ; Al George (Cornell); Bob Kenley (Purdue); Julian Johnson (Holistem); Cecilia Haskins (NTNU);	Paper#54: 2.2.1 / A value-driven, integrated approach to Model-Based Product Line Engineering Juan Navas (Thales Corporate Engineering); Stephane Bonnet (Thales Avionics Technical Directorate); Jean-Luc Voirin (Thales Airborne Systems / Thales Technical Directorate); Hugo Guillermo Chale Gongora (Thales Corporate Engineering)	Paper#43: 2.3.1 / Agility in the Future of Systems Engineering (FuSE) - A Roadmap of Foundational Concepts Keith Willett (Dept of Defense); Rick Dove (Self); Alan Chudnow, Emmet Eckman (Northrop Grumman); Larri Rosser (Raytheon); Jennifer Stevens (NASA); Robin Yeman (Lockheed Martin); Michael Yokell (Raytheon)	Paper#7: 2.4.1 / Aspect-Oriented Architecting Using Architecture Frameworks James Martin (The Aerospace Corporation)	Invited Content#4: 2.5.1 / Spectacular Views of the City Jon Mooney (ACOUSTICS BY JW MOONEY LLC)
10:15	10:55	**13:15**	**13:55**	18:15	18:55	19:15	19:55	22:45	23:25	1:15	1:55	2:15	2:55	3:15	3:55			Paper#20: 2.2.2 / Formulas and Guidelines for Deriving Functional System Requirements from a Systems Engineering Model John Shelton, Victoria Heisler, Kristina Sebacher (Johns Hopkins University, Applied Physics Lab)	Paper#49: 2.3.2 / Security in the Future of Systems Engineering (FuSE), a Roadmap of Foundation Concepts Rick Dove (Independent); Keith Willett (U.S. Department of Defense); Tom McDermott (Systems Engineering Research Center); Holly Dunlap (Raytheon Technologies); Delia MacNamara (Australian Government); Cory Ocker (Raytheon Technologies)	Paper#137: 2.4.2 / UAF (Unified Architecture Framework) Based MBSE (UBM) Method to build a System of Systems Model Lalitha Abhaya (Airbus Defence and Space)	Invited Content#TechOps#3: 2.5.2 / S.O.S. for FSS: The need for Systems of Systems (SoS) Thinking per Financial Services Architectures, both Current and Emerging. Gina Guillaume-Joseph, Bradford Leigh
11:00	11:40	**14:00**	**14:40**	19:00	19:40	20:00	20:40	23:30	0:10	2:00	2:40	3:00	3:40	4:00	4:40			Paper#130: 2.2.3 / Is CAD A Good Paradigm for MBSE? Kaitlin Henderson, Alejandro Salado (Virginia Tech)	Paper#45: 2.3.3 / Security as a Functional Requirement in the Future of Systems Engineering Keith Willett (U.S. Department of Defense)	Paper#6: 2.4.3 / Enterprise Architecture Process Guide for the Unified Architecture Framework (UAF) James Martin (The Aerospace Corporation); David O'Neil (SAIC)	Invited Content#TechOps#4: 2.5.3 / Leading the Way to Diversity, Equity, and Inclusion in Systems Engineering Alan Harding, Alice Squires
14:40	15:00	**14:40**	**15:10**	19:40	20:10	20:40	21:10	0:10	0:40	2:40	3:10	3:40	4:10	4:40	5:10	**Break**					
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney				Systems Competency/ Teaching/Training	MBSE		System Security, Defense	TechOps Invited Content
12:10	12:50	**15:10**	**15:50**	20:10	20:50	21:10	21:50	0:40	1:20	3:10	3:50	4:10	4:50	5:10	5:50	**Session 3**	Paper#76: 3.1.1 / Developing a Topic Network of Published Systems Engineering Research Rudolph Oosthuizen (CSIR)	Presentation#3: 3.2.1 / How do we know that we know? - A Model-Based-Knowledge-Management Concept supporting digital effectiveness Robert Nilsson (Volvo Cars Corporation)	Panel#8: 3.3 / Heuristics for Systems Engineering: Useful or Dangerous? Outdated or Enduring? Moderator:Dorothy McKinney (Advanced Systems Thinking, Inc.); Panelists: Gan Wang (BAE Systems); Robert Halligan (PPI); Peter Brook (Dashwood Systems Engineering); Sarah Sheard (Carnegie Mellon University (retired)); Chandru Mirchandani (Leidos); Scott Jackson (Burnham Systems Research);	Paper#47: 3.4.1 / Insights for Systems Security Engineering from Multilayer Network Models Adam Williams, Gabriel Birch, Susan Caskey, Elizabeth Fleming, Thushara Gunda, Thomas Adams, Jamie Wingo (Sandia National Laboratories)	Invited Content#TechOps#5: 3.5 / Panel: SysML 1.7 to 2.0 Daniel Siegl
12:55	13:35	**15:55**	**16:35**	20:55	21:35	21:55	22:35	1:25	2:05	3:55	4:35	4:55	5:35	5:55	6:35			Presentation#7: 3.1.2 / Systems Engineering Professional Certification Standard Ray Hentzschel (Systems Engineering Society of Australia)	Presentation#16: 3.2.2 / Providing truth, trust and traceability to MBSE Adriana D'Souza (Airbus); Larry Gurule (CMPIC / I-Infusion / SAE SMC/G33); David Hetherington (Systems Strategy, inc); Aleksander Przybylo (Boeing)		Paper#98: 3.4.2 / STPA-Sec Analysis for the DevSecOps Reference Design Ryyan Reule, Brynn Feighery (U.S. Air Force Academy); Mark Winstead, Daryl Hild, Will Barnum (MITRE); Martin Span (U.S. Air Force Academy)	
14:40	15:00	**16:35**	**16:45**	21:35	21:45	22:35	22:45	2:05	2:15	4:35	4:45	5:35	5:45	6:35	6:45	**Break**					
13:45	14:30	**16:45**	**17:30**	21:45	22:30	22:45	23:30	2:15	3:00	4:45	5:30	5:45	6:30	6:45	7:30		**Sponsors Track**				

IS2021 Schedule

Tuesday at IS 2021

Start time	End time	**Start time**	**End time**	Start time	End time	Start time	End time	Start time	End time	Start time	End time	Start time	End time	Start time	End time		**Track 1**	**Track 2**	**Track 3**	**Track 4**	**Track 5**
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney							
04:00	04:45	**07:00**	**07:45**	12:00	12:45	13:00	13:45	16:30	17:15	19:00	19:45	20:00	20:45	21:00	21:45		**Sponsors Track**				
05:45	06:00	**08:45**	**09:00**	13:45	14:00	14:45	15:00	18:15	18:30	20:45	21:00	21:45	22:00	22:45	23:00	**Break**					
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney							
05:00	**06:30**	**08:00**	**09:30**	**13:00**	**14:30**	**14:00**	**15:30**	**17:30**	**19:00**	**20:00**	**21:30**	**21:00**	**22:30**	**22:00**	**23:30**	**Keynote**	**Keynote - Plenary#K2: K2 / The role of architecture in achieving Society 5.0 Masayoshi Arai (Director-General, Commerce and Information Policy Bureau Ministry of Economy, Trade and Industry (METI), Government of Japan)**				
06:30	7:00	**09:30**	**10:00**	14:30	15:00	15:30	16:00	19:00	19:30	21:30	22:00	22:30	23:00	23:30	0:00	**Break**					
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney			Autonomous Systems, Artificial Intelligence/ Machine Learning	Industry 4.0 & Society 5.0, Social/ Sociotechnical and Economic Systems	Oil & Gas		Infrastructure, Needs and Requirements Definition, City Planning
7:00	7:40	**10:00**	**10:40**	15:00	15:40	16:00	16:40	19:30	20:10	22:00	22:40	23:00	23:40	0:00	0:40	**Session 4**	Paper#110: 4.1.1 / Framework for Formal Verification of Machine Learning Based Complex System-of-System Ramakrishnan Raman, Nikhil Gupta, Yogananda Jeppu (Honeywell Technology Solutions Lab)	Presentation#14: 4.2.1 / Conflict is your friend- Managing healthy conflict in the systems engineering workplace Zane Scott (Vitech)	Paper#4: 4.3.1 / Developing domain-specific AI-based tools to boost cross-enterprise knowledge reuse and improve quality Sajjad Sarwar (MHWirth); Cecilia Haskins (NTNU / USN)	Panel#3: 4.4 / A Framework for Understanding Systems Engineering Principles and Heuristics Moderator:Peter Brook (Dashwood Systems Engineering); Panelists: Michael Pennotti (Stevens Institute of Technology); David Rousseau (Centre for Systems Philosophy);	Paper#88: 4.5.1 / Requirement Patterns in the Construction Industry Ron Claghorn, Hussam Shubayli (Saudi Arabia Bechtel Company)
7:45	8:25	**10:45**	**11:25**	15:45	16:25	16:45	17:25	20:15	20:55	22:45	23:25	23:45	0:25	0:45	1:25		Paper#132: 4.1.2 / A Systems Engineering Approach to the Design and Education of a Robotic Baby Hanqing Zhu (Georgia Institute of Technology); Eric Feron (King Abdullah University of Science and Technology)	Presentation#15: 4.2.2 / Making Your Case-Negotiation and persuasion for the systems engineer Zane Scott (Vitech)	Paper#64: 4.3.2 / How can simplified requirements affect project efficiency – A case study in oil and gas Eirik Fallrø, Kristin Falk (University of South-Eastern Norway)		Paper#95: 4.5.2 / Demonstrating the Value of Systems Engineering as the Professional Standard of Care Oliver Hoehne (WSP USA)
8:30	9:30	**11:30**	**12:30**	16:30	17:30	17:30	18:30	21:00	22:00	23:30	0:30	0:30	1:30	1:30	2:30	**Break**					
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney			President Invited Content	Industry 4.0 & Society 5.0, Social/ Sociotechnical and Economic Systems, Information Management	Oil & Gas, Maritime	Systems Sciences, Systems Thinking	Modeling/Simulation/Analysis, Resilience
9:30	10:10	**12:30**	**13:10**	17:30	18:10	18:30	19:10	22:00	22:40	0:30	1:10	1:30	2:10	2:30	3:10		Invited Content#Inv#2: 5.1 / DE meets SE: Building a Joint Culture Moderator:Troy Peterson ; Panelists: Philomena Zimmerman ;	Presentation#20: 5.2.1 / System Holarchy Structures for Sustainable Development Goals Maya Narayan, Anshul Agrawal (Holon Perspectives)	Paper#2: 5.3.1 / Assessing a supplier to the offshore oil and gas industry following a worldwide pandemic Mo Mansouri, Kristian Frederik Wedel Jarlsberg (University of South-Eastern Norway)	Presentation#25: 5.4.1 / Systems Engineering – A Matter of Perspectives David Long (Vitech Corporation)	Paper#24: 5.5.1 / Employing a Model Based Conceptual Design Approach to Design for Resilience David Flanigan (The Johns Hopkins University Applied Physics Laboratory); Kevin Robinson (Shoal Group)
10:15	10:55	**13:15**	**13:55**	18:15	18:55	19:15	19:55	22:45	23:25	1:15	1:55	2:15	2:55	3:15	3:55	**Session 5**		Paper#37: 5.2.2 / Unlocking the power of big data within the early design phase of the new product development process. Haytham B. Ali (University of South-Eastern Norway (USN)); Fredrik H. Helgesen (University of South-Eastern Norway); Kristin Falk (University of South-Eastern Norway (USN))	Paper#109: 5.3.2 / Implementation of tailored requirements engineering and management principles in a supplier to the oil and gas industry Jenny Camilla Hårstadsveen, Satyanarayana Kokkula (University of South-Eastern Norway)	Paper#128: 5.4.2 / An Assessment of the Adequacy of Common Definitions of the Concept of System Alejandro Salado, Adityau. Kulkarni (Virginia Tech)	Paper#16: 5.5.2 / Evaluation of Requirements Management Processes Utilizing System Modeling Language (SysML) Executable Models Tami Katz (Ball Aerospace)
11:00	11:40	**14:00**	**14:40**	19:00	19:40	20:00	20:40	23:30	0:10	2:00	2:40	3:00	3:40	4:00	4:40			Paper#79: 5.2.3 / Opportunities and Challenges of Sociotechnical Systems Engineering John Gill (Scientific System Company, Incorporated); Avigdor Zonnenshain (Neaman Institute for National Policy Research); Danielle Lamoureux (MS Data Science)	Paper#75: 5.3.3 / Application of A3 Architecture Overviews in Subsea Front-End Engineering Studies: A Case Study Remi Haugland, Siv Engen (University of South-Eastern Norway)	Paper#106: 5.4.3 / Systems Thinking: A Critical Skill for Systems Engineers Charles Keating (Old Dominion University); Polinpapilinho Katina (University of South Carolina Upstate); Raed Jaradat (Mississippi State University); Richard Hodge (DrRichardHodge.com)	Paper#102: 5.5.3 / Resilience Requirements Patterns John Brtis, Michael McEvilley, Michael Pennock (The MITRE Corporation)
11:40	12:10	**14:40**	**15:10**	19:40	20:10	20:40	21:10	0:10	0:40	2:40	3:10	3:40	4:10	4:40	5:10	**Break**					
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney			MBSE		Risk and Opportunity Management	Social Systems/ Resilience	Systems Modeling/ Infrastructure Management
12:10	12:50	**15:10**	**15:50**	20:10	20:50	21:10	21:50	0:40	1:20	3:10	3:50	4:10	4:50	5:10	5:50	**Session 6**	Paper#42: 6.1.1 / From UAF to SysML: Transitioning from System of Systems to Systems Architecture Aurelijus Morkevicius, Aiste Aleksandraviciene, Gintare Krisciuniene	Panel#7: 6.2 / Solving the Digital Engineering Information Exchange Challenge Moderator:Terri Chan (Boeing Commercial Airplanes); Panelists: Philomena Zimmerman (US DoD); Celia Tseng (Raytheon); Sean McGervey (John Hopkins University Applied Physics Laboratory); Tamara Hambrick (Northrop Grumman);	Paper#30: 6.3.1 / The risk maturity model: a new tool for improved risk management and feedback Brede Aas-Haug (Norwegian DoD); Cecilia Haskins (NTNU / USN)	Paper#55: 6.4.1 / Dealing with COVID-19 Pandemic in Complex Societal System for Resilience Study: A Systems Approach Bijun Wang, Mo Mansouri (Stevens Institute of Technology)	Presentation#23: 6.5.1 / A Systems Theory Approach to Building Management Jonathan Coburn (KBR)
12:55	13:35	**15:55**	**16:35**	20:55	21:35	21:55	22:35	1:25	2:05	3:55	4:35	4:55	5:35	5:55	6:35		Paper#99: 6.1.2 / Verification and Validation of SysML Models Myron Hecht, Jaron Chen (The Aerospace Corporation)		Paper#41: 6.3.2 / Predicting failure events from crowd-derived inputs: schedule slips and missed requirements Georgios Georgalis, Karen Marais (Purdue University)	Paper#9: 6.4.2 / Why Systems Engineers May Have an Edge When It Comes to Personal Resilience Heidi Hahn (New Mexico Tech)	
14:40	15:00	**16:35**	**16:45**	21:35	21:45	22:35	22:45	2:05	2:15	4:35	4:45	5:35	5:45	6:35	6:45	**Break**					
13:45	14:30	**16:45**	**17:30**	21:45	22:30	22:45	23:30	2:15	3:00	4:45	5:30	5:45	6:30	6:45	7:30		**Time with the President**				

IS2021 Schedule

Wednesday at IS 2021

Start time	End time	**Start time**	**End time**	Start time	End time	Start time	End time	Start time	End time	Start time	End time	Start time	End time	Start time	End time		**Track 1**	**Track 2**	**Track 3**	**Track 4**	**Track 5**
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney							
04:00	04:45	**07:00**	**07:45**	12:00	12:45	13:00	13:45	16:30	17:15	19:00	19:45	20:00	20:45	21:00	21:45		**Sponsors Track**				
05:45	06:00	**08:45**	**09:00**	13:45	14:00	14:45	15:00	18:15	18:30	20:45	21:00	21:45	22:00	22:45	23:00	**Break**					
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney							
05:00	**06:30**	**08:00**	**09:30**	**13:00**	**14:30**	**14:00**	**15:30**	**17:30**	**19:00**	**20:00**	**21:30**	**21:00**	**22:30**	**22:00**	**23:30**	**Keynote**	**Keynote - Plenary#K3: K3 / How systems engineering made solar cars a reality Lex Hoefsloot (Co Founder of Lightyear)**				
06:30	7:00	**09:30**	**10:00**	14:30	15:00	15:30	16:00	19:00	19:30	21:30	22:00	22:30	23:00	23:30	0:00	**Break**					
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney			Social/Sociotechnical and Economic Systems	System Architecture/Design Definition, Syetem Requirements	Measurement and Metrics	System Requirements/ Product Line Engineering	
7:00	7:40	**10:00**	**10:40**	15:00	15:40	16:00	16:40	19:30	20:10	22:00	22:40	23:00	23:40	0:00	0:40	**Session 7**	Paper#27: 7.1.1 / Putting the Social in Systems Engineering: An Overview and Conceptual Development Erika Palmer (CIRiS-Centre for Interdisciplinary Research in Space); Donna Rhodes (Massachusetts Institute of Technology); Michael Watson (NASA Marshal Space Flight Center); Cecilia Haskins (NTNU / USN); Camilo Olaya (Universidad de los Andes); Ian Presland (Charterhouse Systems Limited); Knut Fossum (CIRiS-Centre for Interdisciplinary Research in Space)	Paper#62: 7.2.1 / A Framework for Identifying and Managing New Operational Requirements during Naval Vessel Batch-Building Programs Brett Morris (Naval Group)	Presentation#30: 7.3.1 / Defining a Measurement Framework for Digital Engineering Joseph Bradley (Main Sail, LLC)	Paper#11: 7.4.1 / Innovative Approaches to Superset Asset Templates using Feature-Based Product Line Engineering June Kobayashi, Steve Way, Jonathan Krauss (Northrop Grumman Space Systems); Paul Clements (BigLever Software, Inc.)	Panel#1: 7.5 / The MBSE Futurist's Dilemma: Diffusing systems engineering practices in an AI dominated era Moderator:Ramakrishnan Raman (Honeywell); Panelists: Stephen Piggott (Canadian Space Agency); Vincent Arnould (Hensoldt); Juan Navas (Thales Group); Hany Fawzy (Canadian Space Agency);
7:45	8:25	**10:45**	**11:25**	15:45	16:25	16:45	17:25	20:15	20:55	22:45	23:25	23:45	0:25	0:45	1:25		Paper#32: 7.1.2 / Social Science Solutions for the Systems Engineer: What's Needed Charlotte Dunford (Rolls Royce); Erika Palmer (CIRiS-Centre for Interdisciplinary Research in Space); Richard Beasley (Rolls Royce)	Paper#115: 7.2.2 / An Elaboration of Service Views within the UAF Lars-Olof Kihlström (Syntell AB); Matthew Hause (SSI)	Paper#124: 7.3.2 / Measuring performance and identifying metrics of machine protection systems for particle accelerators Szandra Kövecses, Annika Nordt (Europan Spallation Source ERIC); Dag Bergsjö (Chalmers University of Technology)	Presentation#29: 7.4.2 / Ushering in a New Era for Feature-based Product Line Engineering with the ISO/IEC 26580 International Standard Charles Krueger (BigLever Software)	
8:30	9:30	**11:30**	**12:30**	16:30	17:30	17:30	18:30	21:00	22:00	23:30	0:30	0:30	1:30	1:30	2:30	**Break**					
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney			President Invited Content	Infrastructure, Life-Cycle Costing and/or Economic Evaluation	MBSE	Systems Thinking, Aerospace	Competency/ Teaching/ Training
9:30	10:10	**12:30**	**13:10**	17:30	18:10	18:30	19:10	22:00	22:40	0:30	1:10	1:30	2:10	2:30	3:10	**Session 8**	Invited Content#Inv#3: 8.1 / Using Systems Thinking to Add Value in these Uncertain Times Moderator:Charlotte Dunford ; Panelists: Gary Smith (ISSS / Airbus); Jawahar Bhalla ; Patrick Godfrey ; Suja Joseph-Malherbe ;	Paper#46: 8.2.1 / Network Rail's Systems Integration for Delivery (SI4D) Framework Derek Price (Network Rail)	Paper#123: 8.3.1 / Return on Investment in Model-Based Systems Engineering Software Tools James Duffy, Jingyao Feng, Robert Combs, James Richardson (George Mason University)	Paper#114: 8.4.1 / Investigation of Remote Work for Aerospace Systems Engineers Eric van Velzen, Alison Olechowski (University of Toronto)	Paper#105: 8.5.1 / Systems Thinking in Socially Engaged Design Settings: What Can We Learn? Chanel Beebe, C. Robert Kenley (Purdue University)
10:15	10:55	**13:15**	**13:55**	18:15	18:55	19:15	19:55	22:45	23:25	1:15	1:55	2:15	2:55	3:15	3:55			Paper#85: 8.2.2 / Using Models and Simulation for Concept Analysis of Electric Roads Lars-Olof Kihlstrom (Syntell AB); Matthew Hause (Systems Solutions Inc (SSI)); Andreas Kihlstrom (BRP Systems AB); Ida Karlsson, Bilin Chen (Syntell AB)	Paper#57: 8.3.2 / Application of natural language processing for systematic requirement management in model-based systems engineering Michael Riesener, Christian Dölle, Annika Kristin Becker (Laboratory for Machine Tools and Production Engineering (WZL), RWTH Aachen); Sofia Gorbatcheva (RWTH Aachen University); Eric Rebentisch (MIT Center for Sociotechnical Systems); Günther Schuh (Laboratory for Machine Tools and Production Engineering (WZL), RWTH Aachen)	Paper#56: 8.4.2 / From Brownfield to Greenfield Development – Understanding and Managing the Transition Johanna Axehill, Erik Herzog, Johan Tingström (Saab Aeronautics); Marie Bengtsson (Linköping University)	Paper#28: 8.5.2 / The value of trade-off studies for student projects Håkon Kindem (Orbit NTNU); Cecilia Haskins (NTNU)
11:00	11:40	**14:00**	**14:40**	19:00	19:40	20:00	20:40	23:30	0:10	2:00	2:40	3:00	3:40	4:00	4:40			Paper#89: 8.2.3 / Solar Energy Investment Framework for Real Estate in Norway – a Case Study in Systems Engineering Elisabet Syverud, Karsten Hofstad Bak (University of South-Eastern Norway)	Presentation#28: 8.3.3 / MBSE Components in the Supply Chain, Spring 2021 Student Capstone Project David Hetherington (System Strategy, Inc); Steven Dam (SPEC Innovations)	Paper#94: 8.4.3 / The Systems Engineering Conundrum: Where is the Engineering? Charles Wasson (Wasson Strategics, LLC)	Paper#117: 8.5.3 / The Evolution of HELIX: A Competency Model for Complex Problem Solving Tom McDermott, Nicole Hutchison (Stevens Institute of Technology); Ruth Crick (Jearni Sciences)
11:40	12:10	**14:40**	**15:10**	19:40	20:10	20:40	21:10	0:10	0:40	2:40	3:10	3:40	4:10	4:40	5:10	**Break**					
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney			Systems Engineering Lifecycle	Systems/ Software Architecture	Product Line Engineering	System Safety, Aerospace	
12:10	12:50	**15:10**	**15:50**	20:10	20:50	21:10	21:50	0:40	1:20	3:10	3:50	4:10	4:50	5:10	5:50	**Session 9**	Presentation#13: 9.1.1 / 6 Vs and 3 Ts of Systems Engineering David Long (Vitech)	Paper#13: 9.2.1 / A Guide for Systems Engineers to Finding Your Role in 21st-Century Software-Dominant Organizations Sarah Sheard (Carnegie Mellon University (Retired)); Mickael Bouyaud (World Line); Macaulay Osaisai (L3Harris Technologies); Jeannine Siviy (SDLC Partners); Kenneth Nidiffer (George Mason University)	Paper#31: 9.3.1 / Feature-based Product Line Engineering: An Essential Ingredient in Agile Acquisition Rowland Darbin (General Dynamics Mission Systems); Randy Pitz (The Boeing Company); Matthew Taylor, James Teaff (Raytheon Technologies Intelligence and Space); Bobbi Young (Raytheon Technologies); Beth Wilson (INCOSE Security Systems Engineering Working Group); David Hartley (General Dynamics Mission Systems); Paul Clements (BigLever Software, Inc.)	Paper#53: 9.4.1 / Integrating Safety Analysis into Model-Based Systems Engineering for Aircraft Systems: A Literature Review and Methodology Proposal Kimberly Lai (University of Toronto); Thomas Robert, David Shindman (Safran Landing Systems); Alison Olechowski (University of Toronto)	Panel#9: 9.5 / Investigating transdisciplinary systems approaches for health care access Moderator:Shamsnaz Bhada (Worcester Polytechnic Institute); Panelists: Leonard Bruce ; Alex Agloro (Arizona State University);
12:55	13:35	**15:55**	**16:35**	20:55	21:35	21:55	22:35	1:25	2:05	3:55	4:35	4:55	5:35	5:55	6:35		Presentation#17: 9.1.2 / Economic Analysis of Unmanned Aerial Vehicle (UAV) Platform Options Abdul Rahman El Fouly (The Boeing)	Paper#78: 9.2.2 / A Method to Visualize the Relationship between Regulations and Architectural Constraints Yoshiko Ohno, Seiko Shirasaka (Graduate School of System Design and Management ,KEIO University)	Paper#21: 9.3.2 / How Missile Engineering is Taking Product Line Engineering to the Extreme at Raytheon Bobbi Young, Tom Sanderson, Matt Thurman, Jeffrey Turpin (Raytheon Missiles & Defense); Elizabeth O'Keefe (DZYNE Technologies); Paul Clements (BigLever Software, Inc.)	Paper#8: 9.4.2 / You Don't Save Money by Doing Less Testing – You Save Money by Doing More of the Right Testing! Andrew Pickard (Rolls-Royce Corporation); Richard Beasley, Andrew Nolan (Rolls-Royce plc)	
14:40	15:00	**16:35**	**16:45**	21:35	21:45	22:35	22:45	2:05	2:15	4:35	4:45	5:35	5:45	6:35	6:45	**Break**					
13:45	14:30	**16:45**	**17:30**	21:45	22:30	22:45	23:30	2:15	3:00	4:45	5:30	5:45	6:30	6:45	7:30		**Sponsors Track**				

IS2021 Schedule

Thursday at IS 2021

Start time	End time	**Start time**	**End time**	Start time	End time	Start time	End time	Start time	End time	Start time	End time	Start time	End time	Start time	End time		**Track 1**	**Track 2**	**Track 3**	**Track 4**	**Track 5**
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney							
04:30	**05:15**	**07:30**	**08:15**	**12:30**	**13:15**	**13:30**	**14:15**	**17:00**	**17:45**	**19:30**	**20:15**	**20:30**	**21:15**	**21:30**	**22:15**		**Sponsors Track**				
05:15	05:30	**08:15**	**08:30**	13:15	13:30	14:15	14:30	17:45	18:00	20:15	20:30	21:15	21:30	22:15	22:30	**Break**					
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney							
																	Autonomous Systems	Automotive	Needs and Requirements definition, Risk and Opportunity Management	Enterprise SE	
05:30	06:10	**08:30**	**09:10**	13:30	14:10	14:30	15:10	18:00	18:40	20:30	21:10	21:30	22:10	22:30	23:10	**Session 10**	Presentation#22: 10.1.1 / System of Systems Modeling to empower decision makers in drone based services - an application in Agriculture Mudit Mittal (BlueKei Solution Pvt. Ltd.); Stueti Gupta (BlueKei Solutions Pvt Ltd)	Paper#131: 10.2.1 / Towards a Software Defined Truck Subhojeet Mukherjee, Jeremy Daily (Colorado State University)	Paper#67: 10.3.1 / Idea Development Method, Applying Systems Design Thinking in a Very Small Entity Tommy Langen, Elisabet Syverud (University of South-Eastern Norway)	Presentation#27: 10.4.1 / Why Engineers Should Think More Like Marketers (Sometimes) Barclay Brown (Raytheon Technologies); Honor Lind (Hart Initiative Inc.)	Panel#4: 10.5 / Human-AI Teaming: A Human Systems Integration Perspective Moderator:Guy Andre Boy (CentraleSupelec (Paris Saclay University) & ESTIA Institute of Technology); Panelists: Nancy Cooke (Arizona State University); Michael Boardman (Ministry of Defence); Avigdor Zonnenshain (TECHNION); Ido Lev-Ran (RAFAEL); Mica R. Endsley (SA Technologies);
06:15	06:55	**09:15**	**09:55**	14:15	14:55	15:15	15:55	18:45	19:25	21:15	21:55	22:15	22:55	23:15	23:55		Presentation#11: 10.1.2 / Safety Engineering of Semi-Autonomous Cars Riya Shah, Amrendra Kumar (Mahindra Electric Mobility Limited (Mahindra and Mahindra group))	Paper#81: 10.2.2 / A Concept for a Digital Thread based on the Connection of System Models and Specific Models Matthias Bajzek, Clemens Faustmann, Daniel Krems, Philipp Kranabitl, Hannes Hick (Graz University of Technology)	Presentation#5: 10.3.2 / The Necessity of Systems Engineering for Nuclear Power Plant Deployment Kent Welter (NuScale Power, LLC)	Presentation#9: 10.4.2 / Delighting your client as a Systems Engineering consultant Duncan Kemp (Ministry of Defence); Meaghan Oneil (Cambridge Consultants)	
7:00	7:30	**10:00**	**10:30**	15:00	15:30	16:00	16:30	19:30	20:00	22:00	22:30	23:00	23:30	0:00	0:30	**Break**					
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney							
																	President Invited Content	Aerospace, Needs and Requirements definition	Biomed/Healthcare/Social Services	Entreprise SE	Modeling/Simulation/Analysis, Human System Integration
7:30	8:10	**10:30**	**11:10**	15:30	16:10	16:30	17:10	20:00	20:40	22:30	23:10	23:30	0:10	0:30	1:10	**Session 11**	Invited Content#Inv#4: 11.1 / The next Systems Challenge: Developing resilient, effective, inclusive, sustainable societal systems of systems Moderator:Anne O'Neil (Anne O'Neil Consultants); Panelists: Brian Collins ; Duncan Kemp ; Jim Bentley (New South Wales (NSW) Water Sector, NSW Department of Planning, Industry and Environment); Dr. Kirsten MacAskill (University of Cambridge); Dr. Catherine Tilley (King's College London);	Presentation#12: 11.2.1 / Towards an Integrated Approach of Systems Behavior Modeling and Specification. Jean Duprez (Airbus Operations SAS); Raphael Faudou (Samares Engineering)	Paper#51: 11.3.1 / Developing a Model Based Systems Engineering Architecture for Defense Wearable Technology Tara Sarathi, Jillian Cyr, Richard DeLaura, James Balcius, Paula Collins, Michael Shatz (MIT Lincoln Laboratory)	Paper#38: 11.4.1 / Product portfolio mapping used to structure a mature sub-system with large variation - A case study Arne Odin Sundet, Satyanaranyana Kokkula, Gerrit Muller, Elisabet Syverud (University of South-Eastern Norway)	Paper#29: 11.5.1 / Analyzing Standard Operating Procedures Using Model-based System Engineering Diagrams Jomana Bashatah, Lance Sherry (George Mason University); Steve Dam, Lauren Flenniken, Patrick Hartmann, Tom Harold (SPEC Innovations)
8:10	8:55	**11:10**	**11:55**	16:10	16:55	17:10	17:55	20:40	21:25	23:10	23:55	0:10	0:55	1:10	1:55			Presentation#24: 11.2.2 / Designing Systems by Drawing Pictures and Telling Stories Barclay Brown (Raytheon Technologies)	Presentation#1: 11.3.2 / Using Heuristics to Refine the System Physical Architecture Jose L. Fernandez (Independent Consultant); Juan Antonio Martinez, Efren Diez (Universidad de Alcala)	Presentation#26: 11.4.2 / Practical demonstration of a highly functional system-centric digital thread Tim Keer, Pawel Chadzynski (Aras Corp.)	Paper#101: 11.5.2 / Ontology-Based search engine for simulation models from their related system function Sara Mejdal (Quartz Supméca/INSA Centre Val de Loire); Olivia Penas (Quartz Supméca); Romain Barbedienne (IRT SystemX); Régis Plateaux (Quartz Supméca); Mathieu Bisquay, Jean-Patrick Brunet (IRT SystemX)
9:00	9:40	**12:00**	**12:40**	17:00	17:40	18:00	18:40	21:30	22:10	0:00	0:40	1:00	1:40	2:00	2:40			Presentation#21: 11.2.3 / Integrating MBSE and Product Lifecycle Management Kevin Sweeney (PTC Software)	Paper#103: 11.3.3 / The Benefits of Enhanced Contact Tracing and Quarantine to Resume and Maintain College-Campus Operations: An Agent-Based Probabilistic Simulation Analysis Jomana Bashatah, Lance Sherry, Amira Roess (George Mason University)	Paper#65: 11.4.3 / Application of T-shaped engineering skills in complex multidisciplinary projects Ida Kristin Trogstad, Satya Kokkula (University of South-Eastern Norway); Joris Van Den Aker (ESI (TNO))	Presentation#2: 11.5.3 / Utilizing a Human Readiness Level (HRL) Scale to Promote Effective System Integration Benjamin Schwartz (Engineering For Humans)
9:40	10:30	**12:40**	**13:30**	17:40	18:30	18:40	19:30	22:10	23:00	0:40	1:30	1:40	2:30	2:40	3:30	**Break**					
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney							
																	Technical Leadership	System Integration, Measurement and Metrics, Agile Systems Engineering	System Verification/ Testing	Enterprise SE	
10:30	11:10	**13:30**	**14:10**	18:30	19:10	19:30	20:10	23:00	23:40	1:30	2:10	2:30	3:10	3:30	4:10	**Session 12**	Paper#119: 12.1.1 / Technical Leadership of Virtual and Remotely Distributed Teams Francesco Dazzi (Cherenkov Telescope Array Observatory gGmbH); Mark McKelvin (The Aerospace Corporation); Elena Gallego Palacios (Thales Nederland); Sean McCoy (Trame Technologies); Patrick Keen (Lockheed Martin Space); Allison Weigel (Toray Composite Materials America, Inc.); Lisa Ziliox (BAE Systems)	Paper#74: 12.2.1 / Enhancing Enterprise Architecture with Resilience Perspective Victoria Jnitova (UNSW@ADFA); Mahmoud Efatmaneshnik (UNISA); Keith Joiner, Elizabeth Chang (UNSW@ADFA)	Paper#34: 12.3.1 / Challenges in Detecting Emergent Behavior in System Testing Kent Aleksander Kjeldaas, Rune Andre Haugen, Elisabet Syverud (University of South-Eastern Norway)	Presentation#8: 12.4.1 / How to get the most out of your Systems Engineering consultants Duncan Kemp (Ministry of Defence); Meaghan Oneil (Cambridge Consultants)	
11:15	11:55	**14:15**	**14:55**	19:15	19:55	20:15	20:55	23:45	0:25	2:15	2:55	3:15	3:55	4:15	4:55			Paper#80: 12.2.2 / A Metrics Framework to Facilitate Integration of Disaggregated Software Development Stephen Cook (Shoal Group Pty Ltd and The University of Adelaide); Ashok Samalam (Shoal Group Pty Ltd); Mark Unewisse (Defence Science and Technology Group)	Presentation#31: 12.3.2 / From Systems to Silicon: MBSE-Enabled Digital Electronics Verification Lisa Murphy (Siemens Digital Industries Software); Mark Malinoski (Siemens EDA); Shashank Alai (Siemens Digital Industries Software, Inc.); Ahmed Hamza (Siemens EDA)	Presentation#18: 12.4.2 / Am i doing the right job and am i doing the job right? Jawahar Bhalla (JB Engineering Systems)	
12:00	12:30	**15:00**	**15:30**	20:00	20:30	21:00	21:30	0:30	1:00	3:00	3:30	4:00	4:30	5:00	5:30	**Break**					
US West Coast		**US East Coast**		UK		Europe		India		China Hongkong		Korea and Japan		Australia Sydney							
12:30	13:30	**15:30**	**16:30**	20:30	21:30	21:30	22:30	1:00	2:00	3:30	4:30	4:30	5:30	5:30	6:30	**Plenary**	**Keynote - Plenary#PresidentPanel: K4.1 / Presidents' Panel: Accelerating through Adversity – Back to the Future!** **Moderator:Marilee Wheaton (INCOSE President Elect); Panelists: Donna Rhodes (2000); David Long (2014-2015); Alan Harding (2016-2017); Kerry Lunney (2020-2021);**				
13:30	14:00	**16:30**	**17:00**	21:30	22:00	22:30	23:00	2:00	2:30	4:30	5:00	5:30	6:00	6:30	7:00		**Keynote - Plenary#: K4.2 / Closing Address**				

Disclaimer: Technical program as of July 14, 2021 - Subject to change.